



EUROPEAN COMMISSION
DG Competition

Case M.8425 - SAFRAN / ZODIAC AEROSPACE

Only the English text is available and authentic.

**REGULATION (EC) No 139/2004
MERGER PROCEDURE**

Article 6(1)(b) NON-OPPOSITION
Date: 21/12/2017

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EUROPEAN COMMISSION

In the published version of this decision, some information has been omitted pursuant to Article 17(2) of Council Regulation (EC) No 139/2004 concerning non-disclosure of business secrets and other confidential information. The omissions are shown thus [...]. Where possible the information omitted has been replaced by ranges of figures or a general description.

Brussels, 21.12.2017
C(2017) 9119 final

PUBLIC VERSION

To the Notifying party

**Subject: Case M.8425 - SAFRAN / ZODIAC
Commission decision pursuant to Article 6(1)(b) of Council
Regulation No 139/2004¹ and Article 57 of the Agreement on the
European Economic Area²**

Dear Sir or Madam,

- (1) On 16 November 2017, the European Commission received notification of a proposed concentration pursuant to Article 4 of the Merger Regulation by which Safran S.A. ("Safran", France) acquires within the meaning of Article 3(1)(b) of the Merger Regulation control of the whole of Zodiac Aerospace S.A. ("Zodiac", France).³ Safran is designated hereinafter as the "Notifying Party" and together with Zodiac as the "Parties".

1. THE PARTIES

- (2) Safran is active worldwide in the aerospace and defence industries. Safran's aerospace propulsion business includes the development and manufacture of aircraft engines, helicopter turbine engines and space engines. Safran also supplies other aircraft equipment including landing systems, wheels and brakes, nacelles, electrical systems and wiring systems.

¹ OJ L 24, 29.1.2004, p. 1 (the 'Merger Regulation'). With effect from 1 December 2009, the Treaty on the Functioning of the European Union ('TFEU') has introduced certain changes, such as the replacement of 'Community' by 'Union' and 'common market' by 'internal market'. The terminology of the TFEU will be used throughout this decision.

² OJ L 1, 3.1.1994, p. 3 (the 'EEA Agreement').

³ Publication in the Official Journal of the European Union No C 396, 23.11.2017, p. 13.

- (3) Zodiac is active in the aerospace industry in the development and manufacture of aircraft equipment and on-board systems, as well as solutions for space applications. Its product offering includes aircraft seats, cabin interiors and various equipment including safety, electrical, control and water and waste systems.

2. THE CONCENTRATION

- (4) On 24 May 2017, the Parties entered into a binding Business and Combination Agreement setting out the terms of the acquisition by Safran of sole control over Zodiac (hereinafter the "Transaction" or the "Proposed Concentration"). The Transaction consists of a public tender offer by Safran for Zodiac's shares, with (i) a primary cash offer targeting 100% of Zodiac's shares, and (ii) a subsidiary exchange offer targeting a maximum of 31.4% of Zodiac's shares, offering to Zodiac's shareholders Safran preferred shares that would bear the same rights as ordinary shares but would not be transferable and would convert into ordinary shares three years after their issuance upon completion of the tender offer.
- (5) Completion of the tender offer will be subject to reaching (i) the mandatory overall acceptance threshold of 50% of Zodiac's share capital or voting rights, and (ii) a voluntary overall acceptance threshold of two-thirds of the exercisable voting rights of Zodiac, which may be waived by Safran.
- (6) Prior to the Transaction, no shareholder controls Zodiac within the meaning of Article 3 of the Merger Regulation.⁴ Upon completion of the Tender Offer, Safran will be Zodiac's majority shareholder and [...]. Safran will appoint a majority of the members of Zodiac's supervisory board, and a new executive board composed of members selected by Safran.
- (7) The Transaction therefore amounts to an acquisition by Safran of sole control over Zodiac within the meaning of Article 3(1)(b) of the Merger Regulation.

3. EU DIMENSION

- (8) The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million [Safran: EUR 17 753.6 million, Zodiac: EUR 5 208.2 million]⁵. Each of them has an EU-wide turnover in excess of EUR 250 million [Safran: EUR [...], Zodiac: EUR [...] million], but they do not achieve more than two-thirds of their aggregate EU-wide turnover within one and the same Member State. The Proposed Concentration therefore has an EU dimension.

⁴ The shareholding in Zodiac is divided into (i) free float (58.4% of share capital, representing 46.8% of voting rights), (ii) founding families (23.9% of share capital, representing 36.7% of voting rights), (iii) FFP Invest and FFP (5.2% of the share capital, representing 7.3% of voting rights), and (iv) other shareholders, none of which holds more than 5% of the share capital or voting rights in Zodiac.

⁵ Turnover calculated in accordance with Article 5 of the Merger Regulation.

4. OVERVIEW OF THE AIRCRAFT MANUFACTURING INDUSTRY

- (9) As a matter of general introduction, this section summarises the Commission's understanding of the basic features of the aircraft manufacturing industry, as explained mainly by the Notifying Party in the Form CO, and introduces terms and concepts used in the remainder of the decision.

4.1. Types of aircraft

- (10) For the purpose of the merger control assessment of the Proposed Concentration, three types of aircraft are relevant: (i) commercial aircraft, (ii) military aircraft, and (iii) helicopters.⁶
- (11) The commercial aircraft category includes large commercial aircraft, regional aircraft and business/corporate jets.
- a. Large commercial aircraft are generally equipped with over 100 seats, can cover a range of more than 2,000 nautical miles and cost over USD 35 million. A distinction can be drawn between (i) wide-body aircrafts equipped with 200-850 seats and carrying passengers over more than 4,000 nautical miles distances, and (ii) narrow-body aircrafts equipped with 100-200 seats and carrying passengers over 2,000-4,000 nautical miles distances.
 - b. Regional aircraft are generally equipped with 30 to 90 seats and can cover a range of less than 2,000 nautical miles. Regional aircrafts are comprised of (i) large regional aircraft which can transport 70-90 passengers and (ii) small regional aircraft which can transport 30-50 passengers.
 - c. Business/corporate aircraft/jets are aircrafts designed for corporate activities and typically cost between USD 3 million and more than USD 50 million.
- (12) The military aircraft category comprises aircrafts designed for military activities, be it combat aircraft or non-combat aircraft – i.e. designed for search and rescue, reconnaissance, transport, observation and training.
- (13) Helicopters include normal and transport rotorcrafts propelled by turbine engines used for civil or military applications.⁷

4.2. Supply chain

- (14) The supply chain in the aerospace industry mainly comprises two types of suppliers: Tier-1 and Tier-2 (and Tier-3 as the case may be). Tier-1 suppliers generally have integration capabilities and provide whole systems and equipment.

⁶ As a fourth category, the industry generally defines aircrafts used for flight activities not involving commercial air transportation or aerial work as "general aviation aircrafts". General aviation aircraft typically seat 1-6 passengers and are generally equipped with piston-powered engines; they are used *inter alia* for personal/private travel, air tourism, recreational flying, and air sports.

⁷ Very small light helicopters are also equipped with piston-driven engines.

Tier-2 suppliers tend to be active at an upstream stage, supplying components and sub-components which are later integrated into the systems/equipment by either the aircraft manufacturer or the Tier-1 supplier (or third-parties system integrators).

- (15) On the demand side, different types of customers purchase systems and equipment depending on the type of aircraft considered.
- a. Large commercial aircraft: depending on the system/equipment considered, purchasers are either (i) aircraft manufacturers (also known as "airframers") with significant integration capabilities or (ii) end-users – *inter alia* airlines, lessors and national governments – who sometimes directly purchase certain equipment and systems from the Tier-1 supplier.
 - b. Regional aircraft/corporate jets: systems and equipment are usually purchased by aircraft manufacturers who then resell the whole aircraft to end-users.
 - c. Military aircraft and helicopters: systems and equipment are usually purchased by aircraft and helicopter manufacturers, in some cases also the Ministry of Defence depending on the equipment or system considered. Helicopter/military aircraft manufacturers will in any case provide the integration of main systems and equipment.

4.3. Procurement process

- (16) In most cases, customers in the aircraft manufacturing industry source systems and equipment by means of competitive tender offers, often for the duration of the aircraft programme in question. The structure of the tender process can vary according to the aircraft type, customer involved or platform in question.

4.3.1. Large commercial aircraft

- (17) Aircraft manufacturers of large commercial aircraft can either source products through build-to-print or build-to-specification ("build-to-spec") processes. The build-to-print process requires the supplier to manufacture equipment, systems and components to the exact specifications provided by the customer. The build-to-specification process, on the other hand, allows the supplier to use its own design and manufacturing skills.
- (18) Additionally, a distinction needs to be drawn between buyer-furnished equipment ("BFE") and supplier-furnished-equipment ("SFE"). BFE are purchased by end-users (e.g. airlines), whereas SFE are purchased by the aircraft manufacturer before the sale of the aircraft to the end-user.
- (19) With respect to SFE, suppliers for the different systems and equipment of an aircraft platform are selected through a competitive tender process. When launching a new aircraft platform, the aircraft manufacturers first issue Requests for Information ("RFI") to several prospective bidders in order to identify a preliminary list of potential suppliers for the systems/equipment/part that it will not manufacture in-house. The aircraft manufacturers then typically issue Requests for Proposals ("RFP") in order to "down-select" a limited number of

final candidates who will submit "Best and Final Offers" on the basis of which final negotiations and selection will be conducted.

- (20) Tenders for BFE products typically occur at a later stage of the procurement process, around two years before the delivery of the aircraft.

4.3.2. Regional aircraft/corporate jets

- (21) Contrary to the procurement process for large commercial aircraft (which can be based either SFE or BFE), most equipment and systems for regional aircraft/business jets are sold on an SFE basis. The purchasers are therefore in most cases the aircraft manufacturers and not end-customers.

4.3.3. Military aircraft

- (22) The procurement process for equipment and systems for military aircraft follows a specific pattern. Due to the low volume of aircraft and to the complexity of the integrated systems, the procurement process requires close cooperation between the airframer, the system supplier and the National Procurement Authority acting on behalf of the end-users.

4.3.4. Helicopters

- (23) The procurement of systems and equipment for helicopters is usually organized by the helicopter manufacturer, though certain parts can also be sourced directly by Ministries of Defence for military helicopters (e.g. engines). For helicopters, purchases take place by means of a tender process or through a negotiated procedure.

5. PRODUCT MARKET DEFINITION

- (24) Both Safran and Zodiac are active in the production and supply of aircraft equipment on a worldwide basis. Although their respective product portfolios are complementary to a large extent, there are some horizontal overlaps between the Parties' activities.
- (25) Zodiac (and Safran to a lesser extent) also produces and supplies components that can be used as input for aircraft equipment and systems produced by Safran (and Zodiac to a lesser extent). As a result, there are also vertical links between the Parties' activities.
- (26) In addition, Safran and Zodiac are both active on the aftermarket in relation to their own products and supply parts to other aftermarket service providers.
- (27) The present section examines market definition for all products in relation to which the Parties' activities overlap horizontally, are vertically related or could potentially be regarded as complementary to one another.

5.1. Electrical systems

- (28) The aircraft electrical systems include all electrical units and components that generate, control, convert and supply electrical power on an aircraft. According to the Notifying Party, and as apparent from Commission precedents,⁸ the main elements of the aircraft electrical energy chain comprise the generation system and the distribution system.⁹ They are typically combined with conversion devices, which convert the electrical power from one voltage to another or from AC to DC current, and together form the conversion system of the aircraft.¹⁰ In addition, the aircraft electrical systems include batteries used to support ground operations and cope with failures in generation.¹¹

5.1.1. Electrical generation systems

5.1.1.1. Introduction

- (29) The electrical generation system is used to generate electrical power for various equipment and devices used on aircraft by converting mechanical energy into electrical energy by a process of electromagnetic induction. Overall, there are three types of generators: main generators, auxiliary power unit ("APU") generators and emergency power unit ("EPU") generators.
- (30) The main power generator is the principal electrical power source of the aircraft during normal flight conditions and produces electricity driven by the engines of the aircraft. In practice, power is generated by using the engines to drive a gearbox, which in turn drives the electrical generators.¹² The main power generator is located near the engine, in the nacelle. In the basic configuration of an aircraft, each engine drives one or two main power generator(s), so that, for example, twin-engine aircraft generally carry two or four main power generators. The power rating of generators can vary from around 5kVA to over 250kVA, and different sizes of generators tend to be used in different types of aircraft.¹³
- (31) The main power generator can be based on either AC or DC technology. AC technology is used mainly in large commercial aircraft, which have greater power needs (generally more than 15kVA) and longer power lines, but also some large helicopters and military aircraft. AC main power generators can be either based on constant frequency or on variable frequency.

8 See, e.g., Case COMP/M.6410 – *UTC / Goodrich*, paras. 19-20.

9 Form CO, para. 228.

10 Form CO, para. 233.

11 Form CO, para. 238.

12 In some cases, the main generator may have an add-on start function, which is used to start the main engine electrically (rather than pneumatically or through an air turbine). In this case, the main generator is called a starter generator.

13 The capacity rating of a generator is typically represented by its power rating, *i.e.*, the amount of electrical power that the generator can produce. The typical capacity rating for generation systems for large commercial aircraft, regional and corporate jets are respectively 90-250 kVA, 40-100 kVA and 6 to 40 kVA.

- (32) DC main power generators are generally found in smaller aircraft with lower power requirements and are mostly low voltage (i.e. 28V). Low voltage DC generators are typically used on regional aircraft, business jets and helicopters, where limited flight time and less electrical power is needed. High-voltage DC generators (i.e. 270V) are used on a very small number of military fighter aircraft.¹⁴ The Notifying Party believes that high voltage DC generators may in the future become an alternative for power generation in large commercial aircraft. However, these generators are based on a complex technology and raise safety issues.
- (33) The APU generator provides electrical power to the aircraft's systems and devices while the engines are shut down, mainly when the aircraft is on the ground. During flight, APU generators are not normally operated continuously but can be available in emergency situations (in case of engine failure, to provide back-up electrical power and compressed air to help main engine restarting). As for main power generators, APU generators are based on either AC or DC technology (depending on the technology on which the main generation is based), whereas they naturally run at (or close to) a constant speed.
- (34) Large aircraft also carry an EPU generator, a device that generates additional or alternative low-output electric power in case of failure of the main and auxiliary power systems (when all engine power is lost) to maintain essential flight and landing systems. The EPU is normally located in the aircraft ventral or nose section and based on a different (and simpler) technology than main and auxiliary power generators, such as Ram air turbines ("RATs") that generate electricity by using the air flowing around the aircraft. Since only Safran is active in the supply of EPU generators and the Transaction does not give rise to vertical relations involving EPU generators, they are not discussed specifically in the remainder of this decision.

5.1.1.2. Main power generators

- (35) In *UTC/Goodrich*,¹⁵ the Commission concluded that main power generators, APU generators and EPU generators constitute separate product markets. The Commission also found that main power generators based on AC and DC technology constitute separate product markets.
- (36) Within AC main generators, the Commission found that AC main generators based on constant frequency ("Main AC CF") and AC main generators based on variable frequency ("Main AC VF") constitute different product markets.¹⁶
- (37) Within DC main generators, the Commission defined separate product markets for high-voltage DC systems (i.e. 270V) ("Main DC HV") and low-voltage DC systems (i.e. 28V) ("Main DC LV").

14 Such as on the Lockheed Martin F-22 military aircraft.

15 Case COMP/M.6410 – *UTC/Goodrich*, para. 27.

16 Case COMP/M.6410 – *UTC/Goodrich*, para. 28.

- (38) In that decision, the Commission considered an alternative delineation within main power generators based on the size of the aircraft served, the main categories of aircraft being large commercial aircraft, regional commercial aircraft and corporate jets. This segmentation was ultimately left open.
- (39) The Notifying Party submits that, in the present case, the exact market definition can be left open since no competition concern arises under any alternative product market definition.
- (40) The market investigation conducted in the present case confirmed that main generators, APU generators and EPU generators constitute distinct product markets. In effect, all competitors and all customers (airframers) responding to the market investigation indicated that they consider this segmentation appropriate.¹⁷
- (41) Similarly, the market investigation confirmed the Commission' decisional practice regarding the appropriateness of a further segmentation of main power generators between Main AC CF, Main AC VF, Main DC LV and Main DC HV. All suppliers who responded to the market investigation considered appropriate to segment main generators according to AC/DC, CF/VF and LV/HV categories, per the Commission's previous practice, since these differ in terms of manufacturing cost, technical characteristics, sales price and usage.¹⁸ Likewise, a majority of customers (airframers) responding to the market investigation indicated that these various types of main generators differ in terms of function/usage, technical characteristics and price.¹⁹
- (42) As regards a possible sub-segmentation of Main AC CF, Main AC VF, Main DC LV and Main DC HV by type of aircraft, the market investigation was not conclusive. A number of competitors responding to the market investigation indicated that such further segmentation would be inappropriate, notably because the choice of a given technology is generally dictated by the size of the aircraft so that a further segmentation by size of aircraft would be redundant. However, the opposite opinion was expressed in similar proportion. For example, a respondent indicated that "*[s]olutions are very similar between very light business jets and helicopters, solutions are different between military jet and commercial aircraft*", while another explained that "*[i]t is the specific technical / performance requirements of the machine, not the aircraft type that matter.*"²⁰
- (43) In contrast, a majority of customers (airframers) considered inappropriate to further segment main generators per type of aircraft.²¹ In any event, the Commission considers that the exact market definition in this regard can be left open for the purpose of this decision since the Transaction does not raise serious

17 Replies to question 13 of eQuestionnaire 1 – Competitors and Replies to question 13 of eQuestionnaire 3 – Airframers.

18 Replies to questions 14 and 17 of eQuestionnaire 1 – Competitors.

19 Replies to question 14 of eQuestionnaire 3 – Airframers.

20 Replies to question 18 of eQuestionnaire 1 – Competitors.

21 Replies to question 15 of eQuestionnaire 3 – Airframers.

doubts as to its compatibility with the internal market whether or not main generators are further segmented by type of aircraft.

- (44) The market investigation also elicited isolated comments suggesting further segmentations between brush and brushless, as well as oil cooled and air cooled generators.²² When presented with these possible segmentations, the Notifying Party replied as follows:
- a. As regards Main AC VF: more than 90% of AC VF main generators are oil cooled and all the main AC VF suppliers (UTAS, GE, Honeywell and Thales, as well as Safran) supply oil cooled main generators;
 - b. Air cooled main generators are essentially Main DC LV (to the exception of the few Main AC VF). When looking at the market for Main DC LV, all are air cooled;
 - c. Nearly all of the Main DC LV for aircraft currently in service are brush. The brushless technology has been introduced only recently and is used on a few programmes, most of which are still at development stage. According to the Notifying Party, all major DC LV main generator suppliers – such as Skurka, Astronics, Meggitt, Ametek and Thales, as well as Zodiac – are developing DC brushless technology,²³
- (45) The Commission considers that no further segmentation is appropriate based on the type of cooling or the brush/brushless technology on the Main DC LV and Main AC VF markets for the following reasons.
- (46) On the Main DC LV market, all generators are air cooled and, therefore, a segmentation based on the type of cooling would not alter the competitive assessment. Furthermore, given that the large majority of Main DC LV generators are brush, a sub-segmentation of the market for Main DC LV based on brush technology would substantially overlap with the delineation of the market for Main DC LV.
- (47) On the Main AC VF market, the great majority of generators are oil cooled. Therefore, a sub-segmentation of the market for Main AC VF based on oil cooled technology would substantially overlap with the delineation of the market for Main AC VF.
- (48) Finally, the Notifying Party submits that back-up generators are part of the same market as main generators. Back-up generators are used on very few platforms. On the Boeing 777/777X, for example, the main generation system is composed of two generators (one main and one back-up), both driven and installed on the engines. Some helicopters (such as the Boeing CH-47 and the Bell 525) may also have back-up generators. In essence, main and back-up generators contribute to

22 One respondent also suggested distinguishing main generators according to the speed thereof. However, this criterion does not appear relevant because both AC and DC main generators are designed to operate over a wide operating speed range linked to the engine rotation speed. Likewise, the rotational speed of generators varies from one platform to another.

23 Notifying Party's reply to RFI 4.

supply the main electrical power of the aircraft during flight, so that there is no interruption in the power transferred to the various loads. The difference between a back-up generator and an EPU generator is that the EPU generator is deployed in case of engine failure and subsequent loss of both the main and the back-up generators.

- (49) The outcome of the market investigation supports the Notifying Party's claim, as both the majority of responding customers (airframers) and competitors indicated that they consider inappropriate to segment main and back-up generators.²⁴ One competitor for example indicated that main and back-up generators are "[...] *the same system at the end, the only difference is main generators are designed to operate for long duration at variable load while back-up are to be run when there is an outage to the utility grid or the main source of power in a backup situation*".²⁵ As a result, the Commission considers that back-up generators are part of the same markets as main generators.
- (50) In view of the above, the Commission considers it appropriate to define separate product markets for Main AC CF, Main AC VF, Main DC LV and Main DC HV generators. A further segmentation by type of aircraft can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions. In contrast, other sub-segmentations do not appear warranted for the reasons explained above.

5.1.1.3. Auxiliary Power Unit ("APU") generators

- (51) APU generators are driven by the APU of the aircraft, a small gas turbine engine located in the aircraft tail section, which is used to start the aircraft's main engines.²⁶ APU generators provide electrical power to the aircraft systems and devices while the engines are shut down, i.e., mainly when aircrafts are grounded.²⁷
- (52) According to the Notifying Party, APU generators are either tendered by airframers separately from main generators or as one and the same work package.²⁸ The Notifying Party also contends that the only relevant segmentation of APU generators is between AC and DC current.²⁹ Conversely, the distinction between constant and variable frequency is not relevant for APU generators since they run at (or close to) constant speed.³⁰

24 Replies to question 16 of eQuestionnaire 3 – Airframers and 21 of Questionnaire 1 – Competitors.

25 Replies to question 21 of eQuestionnaire 1 – Competitors.

26 Form CO, para. 273. For a discussion of APUs, see also section 5.6.3. below.

27 Form CO, para. 274. See also Case COMP/M. 6410 - *UTC/Goodrich*, para. 22.

28 Form CO, paras. 277 and 279.

29 Form CO, para. 363.

30 *Idem*.

- (53) As noted, the market investigation confirmed that the distinction between main generators and APU generators (and EPU generators) is appropriate.³¹ Likewise, certain suppliers indicated that a segmentation of APU generators between AC and DC current is required.³² In contrast, the outcome of the market investigation was inconclusive as to whether APU generators should be further segmented per type of aircraft. Certain suppliers pointed to significant differences across aircraft types, such as commercial aircraft and helicopters, while others emphasized that APU generators are nearly identical for commercial and regional aircrafts.³³ In contrast, a majority of airframers considered that it is not appropriate to split APU generators per type of aircraft,³⁴ or in any other ways.³⁵
- (54) In any event, given that the Transaction would not lead to horizontally affected markets under any alternative market definition, the precise market definition can be left open for the purpose of this decision.³⁶ For this reason and since the Transaction does not either give rise to any vertical relations involving APU generators or materially expands the Parties' product portfolio, they are not further discussed in the present decision.

5.1.2. *Electrical distribution systems and components*

5.1.2.1. Introduction

- (55) The electrical distribution system of an aircraft connects the aircraft's generators to the individual devices and systems powered by electrical energy, during both flight and ground operations. As discussed in section 5.1.3., the electrical distribution system is distinct from the electrical conversion system that converts the electrical power produced by generators from one voltage to another and from AC to DC current.
- (56) The electrical distribution system of any type of aircraft is divided into a "primary" and a "secondary" system, each of which fulfils different functions within the electrical system. The primary distribution system takes the electrical power from the generators (main generators and APUs) and channels it to (multiple) primary power distribution panels, which are composed of high power switching and circuit protection devices. Electrical power is then allocated to certain high power loads of the aircraft (e.g. the galley) and mainly to the secondary distribution system. The secondary distribution system, through

31 Replies to question 13 of eQuestionnaire 1 – Competitors; replies to question 12 of eQuestionnaire 3 – Airframers.

32 Replies to question 23 of eQuestionnaire 1 – Competitors.

33 Replies to question 22 of eQuestionnaire 1 – Competitors.

34 Replies to question 18 of eQuestionnaire 3 – Airframers.

35 Replies to question 19 of eQuestionnaire 3 – Airframers.

36 The Parties' combined market share remains below [10-20]% irrespective of the alternative market definition considered. In effect, the Parties' activities only overlap horizontally in relation to APU generators based on AC technology for military aircrafts where their combined market share remains below [5-10]% and the increment brought about by the Transaction is limited ([0-5]% by 2020) since Zodiac supplies the APU generator for one single platform (Form CO, Annex 58).

(multiple) secondary power distribution panels, controls and distributes electricity to each individual system or device of the aircraft that requires electrical power. Secondary power distribution panels can be decentralised near key loads and in the cockpit. They are composed of low power switching and circuit protection devices.

- (57) Another important function of the electrical distribution system is the protection of the aircraft wiring from electrical overloads and the monitoring of any power surge incident in the distribution circuit. This is achieved by means of circuit protection devices.
- (58) The main components that form part of electrical distribution systems include contactors, relays, bus power control units ("BPCUs"), fuses, circuit breakers, remote control circuit breakers ("RCCBs") and Solid State Power Controllers ("SSPC"). They have the purpose of switching, controlling, isolating and protecting the electrical circuits of the aircraft against power surge incidents, short circuits, electrical arc or other electrical failure.
- (59) Contactors and relays are electro-mechanical devices which perform the task of switching electrical circuits. Fuses and circuit breakers are devices that mechanically interrupt and isolate a circuit in the event of excessive current. BPCUs are electronic calculators installed in the primary power distribution panels which manage the dispatch of electrical power. SSPC, which combine a circuit breaker and a relay, electronically interrupt and isolate a circuit in the event of excessive current.

Figure 1: Distribution components (source: Form CO)



5.1.2.2. Electrical distribution systems

- (60) The Notifying Party submits that a distinction needs to be made between primary and secondary electrical distribution systems of an aircraft, given that (i) they perform different functions within the aircraft and are often procured in separate procurement packages and from different suppliers, and (ii) the technologies and know-how required to supply them are different (the primary distribution system mainly requires know-how in contactors, electrical system design and fault isolation, while the secondary distribution system mainly requires know-how in SSPC and arc-fault detection).
- (61) Conversely, the Notifying Party submits that no further distinction needs to be made within primary and secondary power distribution systems, respectively. In particular, the Notifying Party submits that it is not appropriate to segment distribution systems according to the size or end-use of the aircraft because the technology behind primary and secondary distribution systems is the same

regardless of the type of aircraft. The Notifying Party further submits that no distinction between AC and DC technologies is appropriate because: (i) unlike generation systems, distribution systems will generally provide (through conversion devices) both AC and DC depending on the electrical device to which the electrical power is connected, (ii) all suppliers provide both AC and DC distribution systems, and (iii) customers do not issue separate tenders according to the technology used. The Notifying Party considers that the market definition can however be left open since no competition concerns arise under any alternative definition.³⁷

- (62) The outcome of the market investigation confirms the distinction between the primary and secondary distribution systems, although certain respondents indicated that they are not always sourced separately, as certain airframers procure the entire distribution system as a package from the same supplier.³⁸ A large majority of respondents to the market investigation also indicated that distribution systems generally provide (through conversion devices) both AC and DC depending on the electrical load to which the power is delivered, and that a distinction between AC and DC technologies is thus not warranted.³⁹
- (63) As regards a possible segmentation according to type of aircraft, several customers and suppliers indicated that the technological requirements and complexity of distribution systems found on (large and regional) commercial aircraft are different from those of smaller aircraft such as helicopters, business jets or military aircraft.⁴⁰ The Notifying Party also acknowledges that the complexity of the primary and secondary distribution systems is dictated by the size of the aircraft, and in particular the number of main generators, of electrical loads (which ranges from 50 in a small aircraft to more than 750 in large commercial aircraft) and the number of electrical networks embedded in the aircraft to power the loads.⁴¹
- (64) Based on the results of the market investigation, the Commission considers that electrical distribution systems can be segmented into primary distribution systems and secondary distribution systems. A distinction can furthermore be made according to the size of the aircraft into electrical distribution systems for large

37 Form CO, paras. 464-471.

38 Replies to question 42 of eQuestionnaire 1 – Competitors; Replies to question 35 of eQuestionnaire 3 – Airframers.

39 Replies to question 43 of eQuestionnaire 1 – Competitors; Replies to question 36 of eQuestionnaire 3 – Airframers. In Case M.6410 - *UTC/Goodrich* (paras. 39-44), the Commission considered appropriate to distinguish between primary and secondary distribution systems but also according to the technology used by the generators to which they are connected, i.e. between AC distribution and low-voltage and high voltage DC distribution. In that case, the Commission considered distribution systems including conversion devices. In contrast, the outcome of the market investigation carried out in the present case largely supports the Notifying Party's view that distribution and conversion systems need to be considered separately and that distribution systems should not be segmented between AC and DC technologies since distribution systems generally provide both AC and DC depending on the electrical load to which the power is delivered.

40 Replies to question 44 of eQuestionnaire 1 – Competitors, and question 37 of eQuestionnaire 3 – Airframers.

41 Form CO, para. 461.

commercial aircraft and smaller aircraft. The exact delineation of the product market can however be left open for the purpose of this decision as the Transaction does not raise serious doubts as to its compatibility with the internal market under any of the alternative market definitions considered.

5.1.2.3. Electrical distribution components

- (65) The Notifying Party submits that the relevant product market definition encompasses all aircraft distribution components (contactors, relays, BPCUs, fuses, circuit breakers, RCCBs and SSPC) because they all serve the same purpose of switching, controlling, isolating and protecting the electrical circuits of the aircraft, they do not substantially differ in terms of their technical characteristics (even though their rating and voltage varies with the power required by the relevant device) and suppliers generally master the technologies and know-how required for the manufacturing of all electrical distribution components. The Notifying Party further submits that all distribution components are found both in primary distribution panels and secondary distribution panels (although circuit breakers are generally more present in secondary distribution while contactors are generally more present in primary distribution, though not only), and that there is some degree of substitutability between different distribution components: for instance, SSPCs are increasingly replacing circuit breakers and contactors for circuit protection, and RCCBs integrate contactors and circuit breakers to supply power to a dedicated function.⁴²
- (66) The outcome of the Commission's market investigation was not conclusive as to whether and how the market for distribution components should be segmented. Although a significant number of respondents agreed with the Notifying Party's views, others indicated that not all manufacturers have the know-how to supply all types of distribution components and that certain components, such as contactors, are more specialised and technically complex than others, or that a distinction should be drawn between electronic components like SSPCs and electro-mechanical units such as relays, circuit breakers, RCCB.⁴³
- (67) In view of certain differences in their functions and manufacturing technology, the Commission finds that each distribution component (contactors, relays, BPCUs, fuses, circuit breakers, RCCBs and SSPCs) can plausibly be considered to constitute a distinct relevant product market. The exact market definition can however be left open for the purpose of this decision as the Transaction does not raise serious doubts as to its compatibility with the internal market under any alternative market definition considered.

5.1.3. *Electrical conversion systems*

- (68) Conversion devices convert the electrical power produced by generators from one voltage to another and from AC to DC current. According to the Notifying Party, conversion devices constitute stand-alone equipment and comprise transformers, transformer-rectifier units ("TRUs" to convert AC into DC), auto transformer-

⁴² Form CO, para. 474.

⁴³ Replies to question 45 of eQuestionnaire 1 – Competitors, and question 38 of eQuestionnaire 3 – Airframers.

rectifier units ("ATRU"s, also to convert AC into DC) and inverters (to convert DC into AC),⁴⁴ which was broadly confirmed by the market investigation.⁴⁵

- (69) In effect, the market investigation confirmed that conversion devices consist in a distinct electrical system located between the generation and distribution systems and involving a different technology and supplier base than generation and distribution systems.⁴⁶ Likewise, the majority of respondents to the market investigation confirmed that conversion systems are generally tendered out separately from generation and distribution systems.⁴⁷ Conversely, none of the respondent to the market investigation suggested that conversion devices need to be segmented in any particular way.
- (70) As a result, in view of the outcome of the market investigation, the Commission considers it appropriate to define one distinct product market for conversion systems including all conversion devices. In any event, the precise market definition can be left open because even if the different types of conversion devices were considered separately, the Transaction would not lead to horizontally or vertically affected markets.⁴⁸ In effect, conversion systems are only relevant for the purpose of assessing the Transaction insofar as they may be considered close complements of generation and distribution systems and as the Transaction will enable Safran to acquire complementary conversion capabilities, thereby expanding its electrical system product portfolio.

5.1.4. *Battery systems*

- (71) According to the Notifying Party, batteries constitute the fourth distinctive part of the electrical system of an aircraft, next to generation, distribution and conversion.⁴⁹ In particular, battery systems are used to: (i) provide electrical power on the ground for certain specific operations (maintenance, fuel loading, towing), (ii) provide electrical power in emergency situations when the main generator does not work, and (iii) provide power to the APU.⁵⁰ Batteries used in aircrafts currently in service include lead acid batteries and nickel cadmium

44 Form CO, para. 233.

45 Minutes of the conference call with a competitor on 1 December 2017.

46 Replies to question 46 of eQuestionnaire 1 – Competitors; replies to question 39 of eQuestionnaire 3 – Airframers. The main suppliers of converters include Crane, Thales, Meggitt and Avionics Instruments (form CO, para. 236) but also, e.g., Honeywell (reply to RFI to Honeywell, question 1.1) and GE Aviation (reply to RFI I.1, para. 26).

47 Replies to question 46 of eQuestionnaire 1 – Competitors; replies to question 39 of eQuestionnaire 3 – Airframers (an airframer e.g. explains that "conversion and distribution systems are part of different work packages because they imply different systems, different functioning").

48 Safran is not active in electrical conversion (Form CO, footnote 70). Zodiac supplies only TRUs for a limited number of platforms and generated 2016 sales of less than EUR [...] (Form CO, footnote 70). As a result, the Transaction does not result in a horizontal overlap. Likewise, conversion devices do not constitute an input into other electrical systems. Hence, the Transaction does not either create a vertical relation involving conversion systems.

49 Form CO, para. 238 and reply to RFI I.1, para. 1.

50 Form CO, footnote 74.

(NiCd) batteries.⁵¹ Some of the most recent platforms also use low voltage Lithium-ion (li-ion) batteries but that technology is still largely at development stage.⁵²

- (72) Based on the information submitted by the Notifying Party and obtained as part of the market investigation, the Commission finds it appropriate to define a distinct product market for batteries, irrespective of the underlying technology, given their distinctive function, separate procurement and different supplier base.⁵³ The exact market definition can however be left open for the purpose of this decision as the Transaction does not give rise to affected markets under any alternative market definition considered.⁵⁴ Since the Transaction does not either give rise to any vertical relations involving batteries, they are not further discussed in the present decision.

5.2. Landing gears

- (73) The landing gear supports the weight of the aircraft while on the ground and absorbs most of the energy at landing and during take-off, by damping the mechanical shocks caused by the irregularities of the runway. Large commercial aircraft, regional and corporate aircraft generally have two main landing gears located under the wings and one nose landing gear.⁵⁵ Only large helicopters have landing gears (two main and one nose landing gears), the smaller ones do not.
- (74) The landing gear generally consist of: (i) a leg assembly, composed of a main fitting and a sliding tube; (ii) a retraction actuator; (iii) a sidestay/forestay; (iv) torque links; (v) a boogie beam for main landing gears with four or six wheels; (vi) harnesses; and (vii) hydraulic hose and tube assemblies.

51 Reply to RFI I.3, paras. 2 and 3.

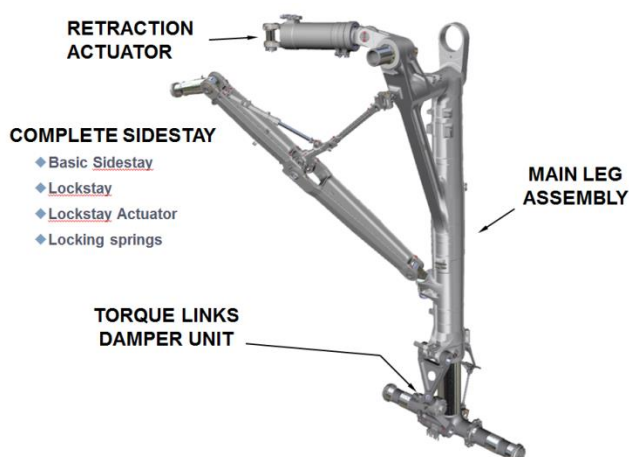
52 Reply to RFI I.3, para. 4 (li-ion batteries are characterised by high energy density, i.e., the ability to store a lot of energy in a lightweight compact form).

53 Form CO, paras. 238 and 542; Reply to RFI I.3.

54 Neither Safran nor Zodiac manufacture batteries; the Parties purchase batteries as commodities from third parties and integrate them with other electrical systems (Form CO, footnote 74 and reply to RFI I.3, para. 3). [...] (Reply to RFI I.3, para. 6). Hence, there is also no overlap in product development in relation to batteries. [...].

55 By way of exception, two large commercial aircrafts – the A380 and the B747 – have five landing gears.

Figure 2: 2-wheel main landing gear overview (source: Form CO)



- (75) The Notifying Party submits that there is one overall relevant market for landing gears. In particular, it explains that the distinction between main landing gear and nose landing gear or between landing gears for various types of aircraft is not appropriate based on the fact that these use the same technology and basic design, and can be supplied by the same manufacturers.⁵⁶ However, the Notifying Party submits that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.⁵⁷
- (76) In a previous decision,⁵⁸ the Commission has examined a market encompassing all landing gears, however considering that the landing gear market is divided into two customer segments, civil and military. The market investigation confirmed that there are no significant technological differences between main and nose landing gears⁵⁹ and that they are supplied together.⁶⁰ With regard to the further segmentation of the market for landing gears according to aircraft types, the market investigation was inconclusive.⁶¹
- (77) In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.3. Brakes and wheels

- (78) The design of brakes and wheels are linked as the wheel hosts the brake. Brakes and wheels are replaced several times over the lifetime of the aircraft. The brakes

⁵⁶ Paras. 823-826 of the Form CO.

⁵⁷ Para. 827 of the Form CO.

⁵⁸ Case IV/M.368 – *SNECMA / TI*, paras. 19-20.

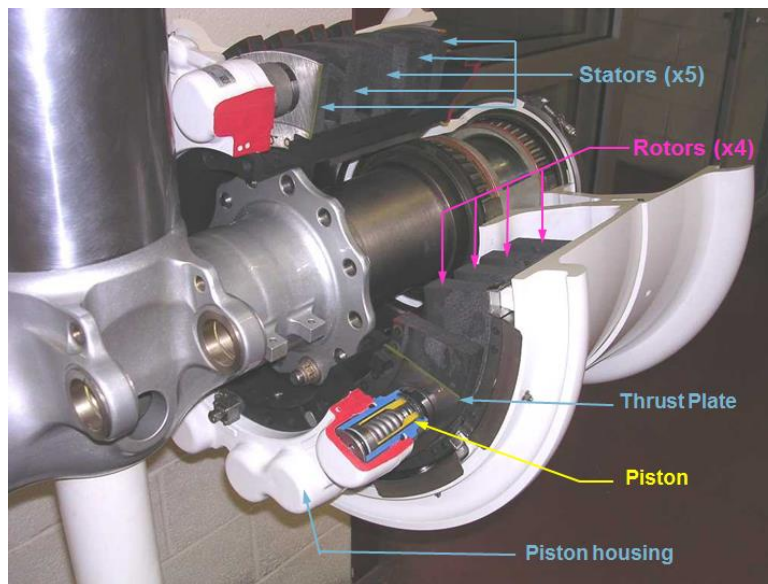
⁵⁹ Replies to question 95 of eQuestionnaire 1 – Competitors.

⁶⁰ Replies to question 75 of eQuestionnaire 3 – Airframers.

⁶¹ Replies to question 96 of eQuestionnaire 1 – Competitors.

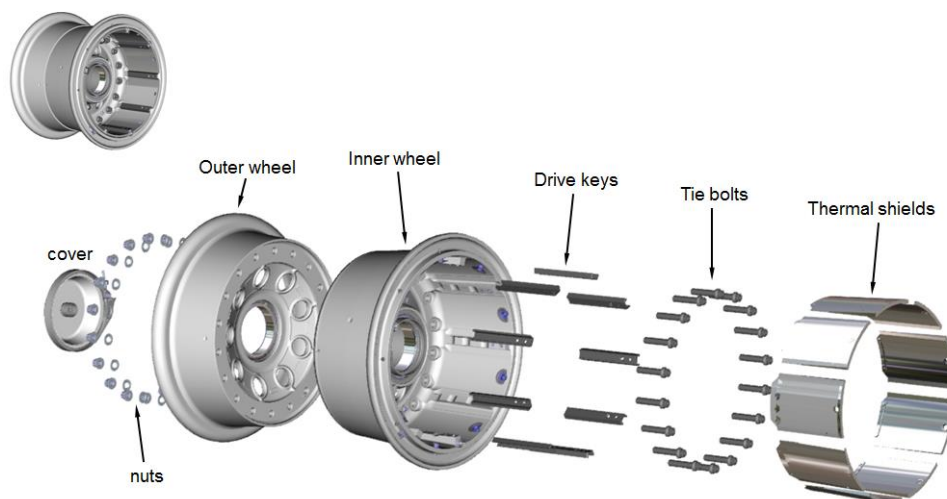
are composed of: (i) the stators; (ii) the rotors; (iii) the pistons/actuators; (iv) a thrust plate; and (v) harnesses.

Figure 3: Components of a brake (source: Form CO)



- (79) The wheel assembly is mainly composed of two wheel halves: the outer and inner wheel. This structure enables to mount the tyre onto the wheel. Brake rotors are located in the inner wheel.

Figure 4: Wheel structure (source: Form CO)



- (80) The Notifying Party submits that brakes and wheels form one relevant product market because airlines purchase brakes and wheels together from one supplier and because brakes and wheels are designed and manufactured simultaneously.⁶² Furthermore, the Notifying Party considers that there is no need to distinguish between the various types of aircraft as all suppliers are able to supply all types of

62 Para. 911 of the Form CO.

aircraft and as the technology is the same.⁶³ In any event, the Notifying Party is of the view that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.⁶⁴

- (81) The market investigation confirmed that brakes and wheels belong to the same relevant product market. Indeed a large majority of customers responded that they source brakes and wheels together.⁶⁵ Although the majority of suppliers stated that they do not design and manufacture brakes and wheels together,⁶⁶ the majority of manufacturers confirmed that they are however supplied together to customers.⁶⁷
- (82) With regard to the further segmentation according to aircraft types, the market investigation results are inconclusive. The majority of suppliers replied that brakes and wheels for different aircraft types differ significantly from a technical point of view.⁶⁸ This is also reinforced by the fact that slightly different ranges of suppliers are active in the different segments.⁶⁹ However, the majority of respondents stated that they would be technically capable of supplying brakes and wheels for all types of aircraft, indicating supply-side substitutability.⁷⁰
- (83) In this regard, the Commission also notes that the procurement process of brakes and wheels on the different segments differs significantly. Brakes and wheels for large commercial aircraft are purchased by the end-customers, i.e. the airlines after the pre-selection of the suppliers by the airframer. [...]. Conversely, the customers of brakes and wheels for other aircraft types are the airframers who are charged at the time of supply.
- (84) The exact product market definition can nonetheless be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.4. Control systems and equipment

- (85) Control systems and equipment command and control various functions of an aircraft through series of components. The customers of control systems and equipment are airframers, which source these products directly from Tier 1 suppliers. For the assessment of the Transaction, three control systems and

63 Para. 912 of the Form CO.

64 Para. 913 of the Form CO.

65 Replies to questions 13 and 79 of eQuestionnaires 2 – Airlines and 3 – Airframers, respectively.

66 Replies to question 104 of eQuestionnaire 1 – Competitors.

67 Replies to question 105 of eQuestionnaire 1 – Competitors.

68 Replies to question 107 of eQuestionnaire 1 – Competitors.

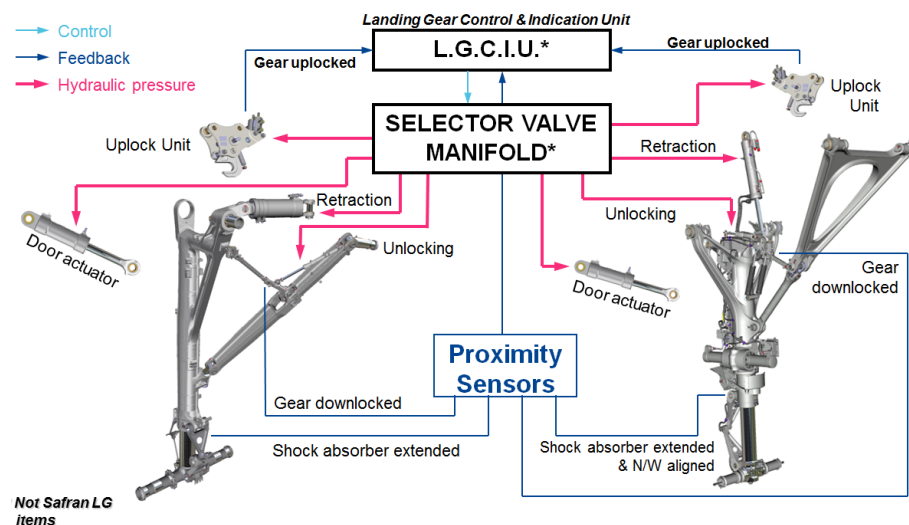
69 Replies to question 106 of eQuestionnaire 1 – Competitors.

70 Replies to question 108 of eQuestionnaire 1 – Competitors.

equipment have to be reviewed, namely the landing gear extension/retraction system, the braking control system and the steering control system.⁷¹

- (86) The computer-controlled landing gear extension/retraction system performs successive operations to extend the landing gears before landing and retract them after take-off. It generally consists of: (i) the landing gear control handle lever;⁷² (ii) the landing gear control indication unit ("LGCIU"); (iii) the selector valve; (iv) solenoid valves (manifold); (v) electromechanical actuators ("EMA") valves; (vi) the door actuator; (vii) uplock and unlock units and; (viii) sensors.

Figure 5: Landing gear extension/retraction system – nose and main landing gears (source: Form CO)



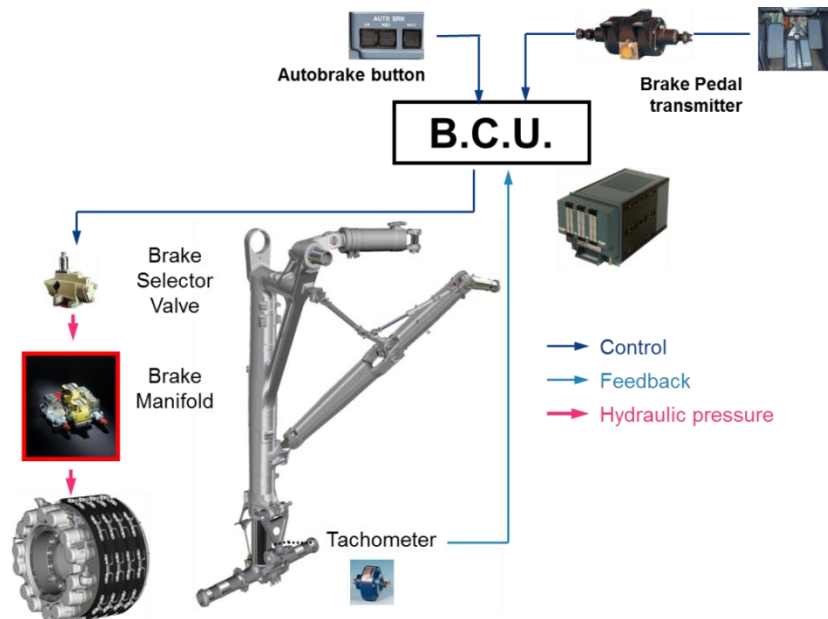
- (87) In normal mode, the power source for landing gear extension/retraction is hydraulic. In case of loss of the main hydraulic circuit, a back-up/emergency mode enables to unlock doors; the landing gears are then extended by gravity.
- (88) Braking control systems command and control the aircraft's brakes upon pilot's command at landing or taxiing. The braking control system can be either hydraulic (most of existing platforms) or electronic (Boeing 787, Bombardier C-series). Accordingly, the on-board computer (usually called braking control unit – "BCU") controls a hydraulic braking regulation system or directly drives electric brakes.

⁷¹ For the sake of completeness it should be mentioned that Safran also manufactures and supplies monitoring systems, however, Zodiac is not active on this market or the markets upstream or downstream from it.

⁷² Handle levers are pilot controls (see section 5.8.3) that can be purchased together with the landing gear extraction/retraction system or on a stand-alone basis.

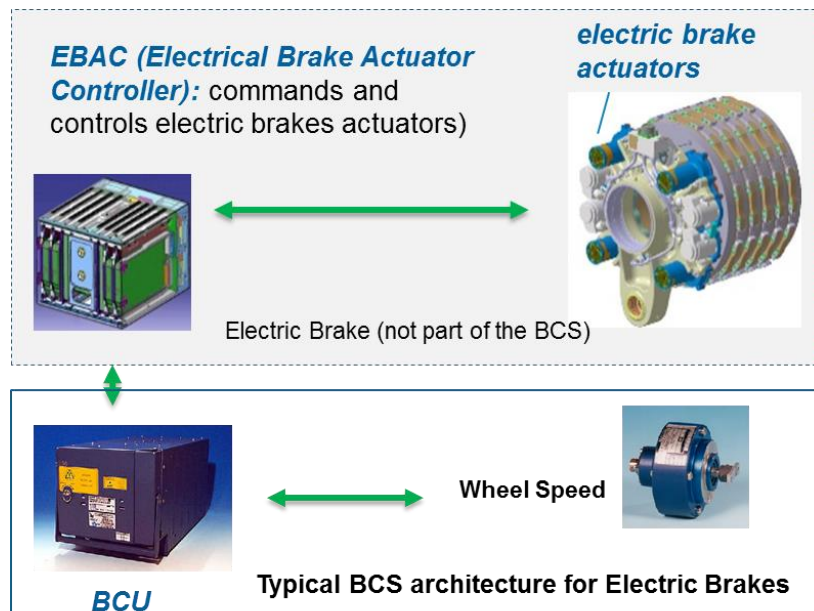
- (89) A hydraulic braking control system generally consist of: (i) pilot controls; (ii) the BCU; (iii) the selector valve;⁷³ (iv) a braking manifold embedding valves and servo-valves; and (v) tachometers

Figure 6: Hydraulic braking control system (source: Form CO)



- (90) Electric braking control systems are similar in their design except that the BCU commands another controller usually called electrical brake actuator, which in turn commands the electric brakes themselves. Similarly, tachometers provide wheel speed feedback to the BCU.

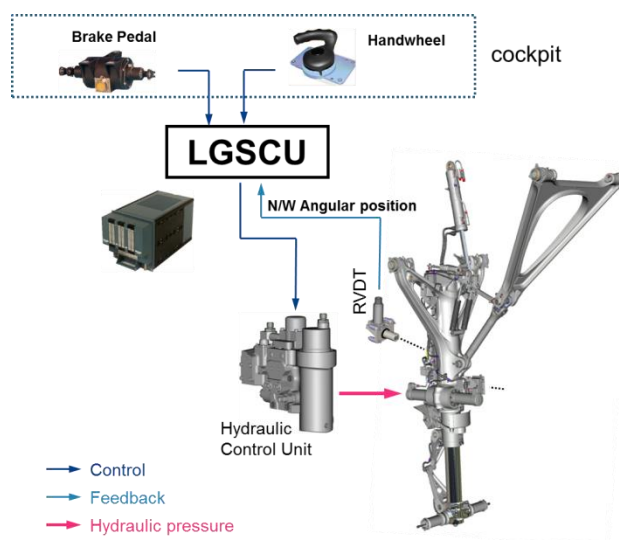
Figure 7: Electric braking control system (source: Form CO)



⁷³ The selector valve is the main valve providing the hydraulic pressure from the A/C.

- (91) The steering control system controls the position of the nose wheels relative to the aircraft centreline in order to change the direction of the aircraft when on the ground. The computer-controlled steering control system is hydraulically powered. Its major components are: (i) pilot controls; (ii) a landing gear steering control unit ("LGSCU"); (iii) servo-valves (manifold); (iv) position feedback rotary variable differential transformer ("RVDT"); (v) a nose wheel steering deactivation box; and (vi) sensors.

Figure 8: Steering control system (source: Form CO)



- (92) The Notifying Party considers that there are three distinct relevant markets for (i) braking control systems, (ii) landing gear extension/retraction systems and (iii) steering control systems for the following reasons.⁷⁴ First, the relevant markets should not include the end-equipment controlled by the systems as they are supplied separately. Second, the components of a specific system are always supplied as a group, therefore the system itself constitutes a relevant product market.⁷⁵ Third, a distinction should be made between the different systems as they have different functions (no demand-side substitutability); they are tendered separately and there is limited supply-side substitutability as the systems require different materials and technologies.⁷⁶ Finally, the Notifying Party argues that further segmentation according to the types of aircraft would not be appropriate because all suppliers are able to supply all types of aircraft as technologies are identical.⁷⁷
- (93) In any event, the Notifying Party is of the view that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.⁷⁸

⁷⁴ Para. 984 of the Form CO.

⁷⁵ Para. 985 of the Form CO.

⁷⁶ Para. 986 of the Form CO.

⁷⁷ Para. 987 of the Form CO.

⁷⁸ Para. 988 of the Form CO.

- (94) The market investigation confirmed that the end-equipment (e.g. landing gears with the landing gear extension/retraction system) is not supplied/sourced together with their control systems⁷⁹ and that the different control systems do not belong to the same relevant product market based on the separate procurement⁸⁰ and technological differences.⁸¹ The majority of respondents stated that control systems differ significantly across aircraft types⁸² and that their company would not be technically able to supply the respective control system for all aircraft types.⁸³ On the other hand, a competitor argued that this is mostly a question of scale and that there are no major technological differences between control systems for different types of aircraft.⁸⁴
- (95) The exact product market definition can nonetheless be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.5. Nacelles

5.5.1. Introduction

- (96) Nacelles are enclosures on the exterior of an aircraft, often attached to the wings, used to house the engine and its components. Large commercial aircraft, regional aircraft, business jets and military aircraft have nacelles. On the contrary, helicopters do not have nacelles. The main functions of the nacelle are to contribute to the performance of the propulsion system, to ensure the best aerodynamics and to participate in the braking of the aircraft. It also helps reduce engine noise, and incorporates safety components to protect the aircraft from the engine heat.
- (97) The nacelle contains the engine and its accessories. The exterior of a nacelle is covered with a cowling that can be opened to access the engine and components inside. A cowling is designed to provide a smooth airflow over the nacelle and to protect the engine from damage. Nacelles are complex pieces of equipment, with different components that must be assembled and integrated with the engine into the aircraft. Nacelles in large commercial aircraft are comprised of four main components and related systems: the air inlet, the exhaust⁸⁵, the thrust reverser and fan cowl doors. Nacelles in the other types of aircraft do not have an exhaust.

79 Replies to questions 117 of eQuestionnaire 1 – Competitors and 82 of eQuestionnaire 3 – Airframers.

80 Replies to questions 118 of eQuestionnaire 1 – Competitors and 83 of eQuestionnaire 3 – Airframers.

81 Replies to question 119 of eQuestionnaire 1 – Competitors.

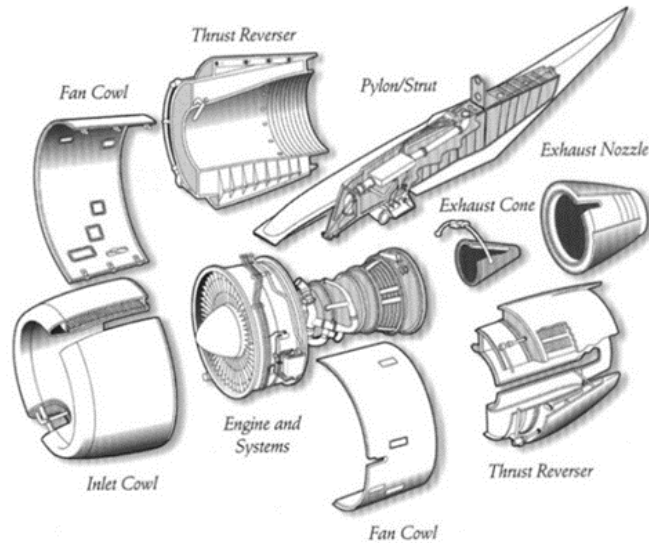
82 Replies to question 120 of eQuestionnaire 1 – Competitors.

83 Replies to question 121 of eQuestionnaire 1 – Competitors.

84 Non-confidential minutes of a conference call with a competitor on 01.12.2017.

85 The exhaust refers to the exhaust cone and the exhaust nozzle altogether.

Figure 9: Components of the nacelle (source: Form CO)



- (98) The air inlet (also called nose cowl) is used to provide the air flow to the engine fan. It also attenuates the engine fan noise forward. The air inlet typically includes a pneumatic anti-icing system. It prevents or eliminates ice that may form in flight on the inlet cowl lip. Hot air from the engine compressor is used to heat the inlet cowl lip with a controlled flow.
- (99) Fan cowl doors are large doors on both sides of the nacelle that can be opened to access the engine and components inside.
- (100) The thrust reverser is located next to the engine and helps the aircraft slow down on the ground by reversing the air flow so as to produce a retarding backward force. To do so, the thrust reverser obstructs the primary air flow, so that the aircraft engine's exhaust is directed forward rather than backwards. The thrust reverser is the most important component of the nacelle in terms of mass and cost, representing more than half the value of the nacelle. There are three types of thrust reversers: thrust reversers with cascades, thrust reversers with doors and target thrust reversers.
- (101) The thrust reverser comprises two main parts: a fixed structure and a transcowl structure that is a mobile part. The thrust reverser functions with an actuation system ("TRAS") that is needed to move the transcowl structure.
- (102) The exhaust expels the secondary air flow from the engine. The exhaust provides the extra thrust force required for all flight conditions and is composed of exhaust nozzle and of the front plug and the rear plug.

5.5.2. Nacelles

- (103) In *UTC/Goodrich*,⁸⁶ the Commission regarded nacelles as forming part of a separate product market. Particularly, in that decision the Commission investigated whether it was appropriate to further segment the market for nacelles

86 Case COMP/M.6410 – *UTC/ Goodrich*, para. 114.

according to the size and type of aircraft served (i.e. large commercial aircrafts or regional aircrafts). In that case the market definition was ultimately left open, however the market investigation gave indications that such a segmentation would have likely been inappropriate due to supply-side substitution considerations.

- (104) The Notifying Party agrees with the above market definition.
- (105) The market investigation broadly confirmed the views of the Notifying Party. The vast majority of customers responding to the market investigation in fact indicated that they do not consider appropriate to segment the market for nacelles by type of aircraft. As one respondent explained "*some differences depending on engine temp and position but the technology is the same*".⁸⁷ From the supply side, the market investigation yielded largely inconclusive results, however it appears that there is a certain degree of supply-side substitutability between nacelles for different types of aircraft. In fact a number of players, typically the largest ones, indicated that they are able to supply nacelles for all the different types of aircrafts.⁸⁸
- (106) In light of the above, the Commission considers that nacelles may constitute a separate product market and that a further segmentation according to type of aircraft may not be entirely appropriate. In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.5.3. *Nacelles components – Thrust reversers*

- (107) In past decisions,⁸⁹ the Commission identified separate product markets for each of the main components of the nacelle, *i.e.* thrust reversers, air inlets, exhaust and fan cowl doors.
- (108) As the only overlap between the Parties' activities arises from the vertical relationship between the nacelle sub-components (such as thrust reverser cascades, scoops, flexible metal hoses and wiring systems) supplied by Zodiac on the one hand and thrust reversers supplied by Safran on the other hand, only thrust reversers will be further discussed below.
- (109) The Notifying Party agrees with the Commission's approach that each component of the nacelles constitutes a separate product market and further claims that a segmentation according to the type of thrust reverser (*i.e.*, thrust reversers with cascades, thrust reversers with doors and target thrust reversers) is inappropriate.
- (110) The Commission takes the view that the segmentation of the market for thrust reversers based on their type is not appropriate. Although some customers (airframers) responding to the market investigation in fact indicated that this

87 Replies to question 87 and 87.1 of eQuestionnaire 3 – Airframers

88 Replies to question 134 of eQuestionnaire 1 – Competitors

89 Cases COMP/M.2168 – *Snecma/Hurel-Dubois*, para. 8; COMP/M.6410 – *UTC/ Goodrich*, para. 117.

segmentation may be appropriate from a demand perspective in terms of technical characteristics and price,⁹⁰ there is broad supply-side substitutability as the majority of suppliers indicated that they are able to manufacture all types of thrust reversers.⁹¹

- (111) The need to further sub-segment the market for thrust reversers according to aircraft types can be left open for the purpose of this decision since the Transaction does not raise serious doubts as to its compatibility with the internal market under any alternative market definition considered.

5.5.4. *Nacelles sub-components*

- (112) Zodiac supplies a number of sub-components that are used in the manufacturing of nacelles and nacelle components and systems. In particular, these are: (i) thrust reverser cascades; (ii) scoops for thrust reversers; (iii) flexible metal hoses; (iv) wiring systems; (v) high-temperature/high-pressure ducting assemblies; and (vi) utility actuators.
- (113) The market definition concerning wiring systems is discussed in section 5.9. The relevant market for utility actuators is discussed in section 5.10.6 below.
- (114) For the remaining components, the Notifying Party claims that each constitutes a distinct product market and that no further segmentation is appropriate.
- (115) The market investigation broadly supported the Notifying Party's claims, and particularly:
- a. With respect to high-temperature/high-pressure ducting assemblies the majority of competitors responding to the market investigation indicated that there is no difference between the ones used in nacelles (de-icing ducting) and high-temperature/high-pressure ducting assemblies used elsewhere on an aircraft. This was also supported by the responses of the customers (air framers);
 - b. As regards thrust reverser cascades and scoops for thrust reversers there appear to be a degree of supply-side substitution as suppliers are able to manufacture all types of thrust reverser cascades and scoops for thrust reversers.⁹²
- (116) In light of the above, the Commission concludes that each of thrust reverser cascades, scoops for thrust reversers, flexible metal hoses and high-temperature/high-pressure ducting assemblies constitute a separate product market and that a further segmentation is not appropriate.

90 Replies to question 88 and 89 of eQuestionnaire 3 – Airframers.

91 Replies to question 136 of eQuestionnaire 1 – Competitors.

92 Replies to question 137 of eQuestionnaire 1 – Competitors.

5.6. Engines

5.6.1. Introduction

- (117) All aircraft and helicopter engines are differentiated products which are designed and manufactured for a specific aircraft platform. Engines must meet specific requirements imposed by the aircraft or helicopter manufacturer (or as the case may be by the national government), in particular in terms of thrust, mass, range, altitude, etc. depending on the type of missions of the aircraft or helicopter.
- (118) The basic principle of a jet engine is identical to any and all engines that extract energy from chemical fuel. The four main steps for any internal combustion engine are: (i) intake of air; (ii) compression of the air; (iii) combustion, where fuel is injected and burned to convert the stored energy; (iv) expansion and exhaust, where the converted energy is put to use.
- (119) There are three types of engines: turboprop, turbofan and turboshaft engines, which have different architectures but are all equipped with turbomachinery (which can take many forms, such as fans, compressors, turbines and propellers):
- a. **turboprop engines** have two main parts: the core engine and the propeller. The core is similar to a basic turbojet engine, except that instead of expanding all the air through the nozzle to produce thrust, the latter is provided by an external propeller. Turboprop engines are most efficient at speeds between 250 and 400 mph and altitudes between 18,000 and 30,000 feet. They also perform well at the slow airspeeds required for take-off and landing and are fuel efficient. The turboprop provides the benefits of high-thrust and low-fuel consumption for aircraft designed for short distances. Because propellers become less efficient as the speed of the aircraft increases, turboprop engines are usually deployed on regional aircraft (which fly at low speed over short distances) and military carriers and surveillance aircraft (which transport heavy charges at low speed).

Figure 10: Turboprop engine (source: Form CO)

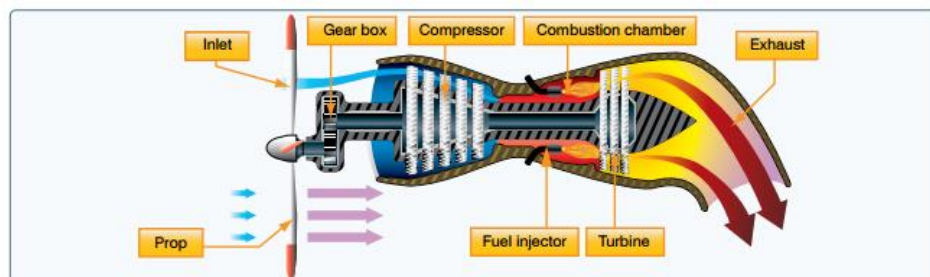


Figure 7-24. Turboprop engine.

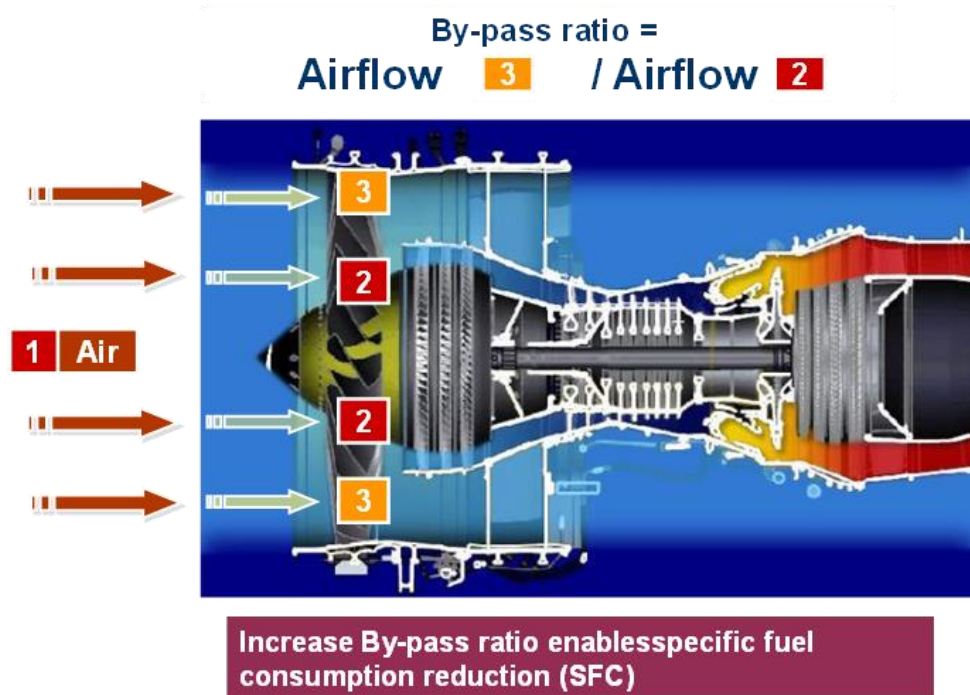
- b. **turbofan engines** are the most modern variation of the basic turbojet engine and were developed to combine some of the best features of the turbojet and the turboprop engines. Turbofan engines are composed of the core engine (gas turbine), achieving mechanical energy from combustion, and a fan which uses the mechanical energy from the low pressure gas turbine to accelerate air rearwards. In contrast to the above mentioned turboprop engines where all the air that enters the front of the

engine passes through the turbine, in turbofan engines only part of the air passes through the turbine. The remaining part (the by-pass flow) bypasses or goes around the core of the engine and directly exit through the exhaust nozzle.

Therefore, a turbofan gets some of its thrust from the core and some of its thrust from the fan. More particularly, in military turbofan engines, most of the thrust is coming from the core flow (low by-pass ratio); in commercial engines, most of the thrust is coming from the fan (high by-pass ratio). The increase of the by-pass ratio (approximately 10 for recently developed large commercial engines) enables to reduce engine fuel consumption, but this benefit is impacted by the increase of propulsion system's weight. This is the reason why light-weight materials are required.

Turbofan engines are deployed on all types of commercial aircraft (large commercial aircraft, regional aircraft and corporate jets) and increasingly on military aircraft.

Figure 11: Turbofan engine (source: Form CO)



- c. In **turboshaft** engines most of the energy produced by the expanding gases is used to drive a power turbine rather than produce thrust. The principle is similar to a turboprop engine but a large shaft is attached to the back of the turbine. The shaft powers the rotor blade transmission and the latter consequently transfers rotation from the shaft to the rotor blade. Turboshaft engines are deployed on helicopters and on vertical take-off and landing (VTOL) aircraft.

Figure 12: Turboshaft engine (source: Form CO)

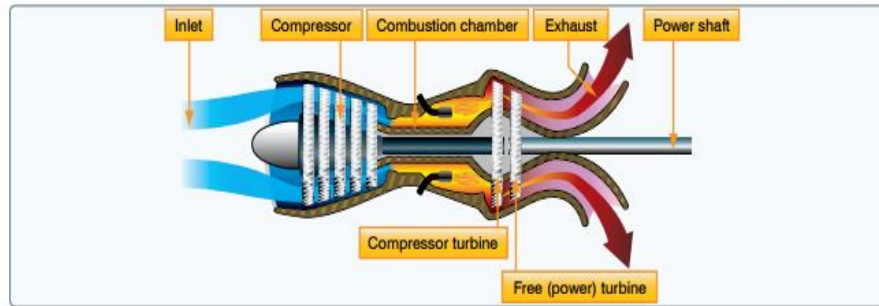


Figure 7-26. Turboshaft engine.

- (120) In addition to main engines, Auxiliary Power Units ("APU") may also power the aircraft and some helicopters (depending on their size) while the plane is on the ground, during normal flight conditions or in case of in-flight emergency. APUs are small gas turbines that sit in a plane's tail section. The APU is started by a battery or a hydraulic accumulator. APUs do not provide propulsion but power (electrical, pneumatic, hydraulic, depending on the design of the aircraft) to start the main engine. While the plane is on the ground, APUs may also be used to provide airflow to the cabin, to operate hydraulic equipment (flight controls or flaps) and to provide electrical power. APUs are supplied by engine manufacturers directly to aircraft manufacturers.
- (121) Engines are made up of different components, including:
- Front bearing compartments, which are chambers which enclose the bearings that support the rotating parts of the engine – such as shafts – and provide mechanical interface between the engine and the aircraft engine support structure as well as their lubrication and cooling;
 - Oil systems, which serves several functions such as lubricating and cooling the bearings; and,
 - Mechanical power transmission systems, which is a mechanism that transmits the power developed by the engine to the accessories and equipment of the aircraft. From a material perspective, it is a gearbox, connected to the engine, to which is connected the equipment (such as oil pump, starter, fuel pump, electric drive generator), identified on the basis of the aircraft manufacturer's needs.
- (122) Safran manufactures and sells engines and components. Zodiac is not active in these markets but is a supplier of some of the sub-components used in the manufacturing process. Particularly, Zodiac manufactures: (i) engine oil seals; (ii) check valves; (iii) electrical and mechanical oil debris detectors/collectors; (iv) couplings and seals; (v) air valve actuators; (vi) fuel servo-valves; (vii) ducting assemblies and flexible hoses; (viii) acoustic panels; (ix) scoops for engines; (x) harnesses; (xi) sensors; and, (xii) small sub-components.

5.6.2. *Engines*

- (123) In the past, the Commission left open the question of whether separate product markets should be defined for turbofan, turboprop and turboshaft engines.⁹³ In earlier decisions, the Commission assessed aircraft turbofan engines depending on the "mission profile" of the aircraft (that is to say, the purpose for which the aircraft is purchased, determined by reference to the aircraft's seating capacity, flying range, price and operational cost) on which the engine is deployed, i.e.: turbofan engines for large commercial aircraft (wide and narrow body); turbofan engines for regional aircraft; and turbofan engines for corporate jets. This distinction was not further discussed in later cases.
- (124) The Notifying Party considers that the exact market definition can be left open as whatever the exact market definition eventually retained, the Transaction will not raise any competitive concerns.
- (125) The Commission considers that a segmentation of the product market by type of engine (i.e. between turbofan, turboprop and turboshaft engines) could be considered as appropriate. This is because customers (airframers) indicated that they do not regard the different types of engines as substitutable. Although there is a significant degree of supply side substitutability as all the aircraft engines manufacture can and do manufacture all types of engines, there is no need to conclude on the precise market definition as the Transaction will not raise competition concerns irrespective of the precise definition retained.
- (126) As regards a further segmentation by mission profile, the Notifying Party claims that is inappropriate as only turbofan engines are to be found across all "mission profiles". Turboshaft engines are in fact only deployed on helicopters and the technologies used are very similar across all types of helicopter, whereas turboprop engines are mainly intended for regional and military aircraft.
- (127) The market investigation was largely inconclusive as regards the appropriateness of a segmentation based on "mission profiles". In any event the Commission considers that there is no need to analyse this further segmentation as the Transaction will not raise competition concerns irrespective of the precise market definition retained.
- (128) In light of the above, the Commission considers that each individual type of engine may likely constitute a separate product market. In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions..

5.6.3. *APUs*

- (129) In previous decisions, the Commission has identified different types of APUs depending on the shaft power of the APU or depending on the type of aircraft concerned.⁹⁴

⁹³ Case COMP/M.6410 – *UTC/Goodrich*, para.52.

⁹⁴ Case COMP/M.6410 – *UTC/Goodrich*, para.56.

- (130) The Notifying Party submits that APUs should not be further segmented. From a supply perspective, several APU suppliers are able to manufacture most types of APUs for most type of aircraft and helicopters.
- (131) The market investigation gave clear indications that APUs should be considered as forming part of a separate market. The results of the market investigation regarding to the appropriateness of further segmenting that market were however inconclusive.
- (132) In particular, the number of competitors indicating that segmentations are relevant according to type of APU (i.e APU with an output below 550hp, APUs with an output between 550 and 1100 hp and APU with a power output above 110hp) or type of aircraft on which it will be installed and the number of those indicating the opposite is the same. A customer (airframer) responding to the market investigation indicated that segmenting by "specific power applications and by propulsion type is appropriate" and that *"the APUs are considered scaled/sized for different specific aircraft requirements, although the fundamental engineering/design technology remains similar"*.
- (133) The market investigation however indicated that there is a significant degree of supply-side substitutability as the majority of APU suppliers indicate that, albeit not currently manufacturing all types of APU, they are capable of doing so.
- (134) Given that under no alternative market definition would the Transaction lead to affected markets, the market definition can be left open for the purposes of this decision. For the same reason, APUs are not further discussed in the present decision.⁹⁵

5.6.4. *Front bearing compartments*

- (135) The Commission has not considered a market for front bearing compartments in its previous decisions.
- (136) The Notifying Party submits that there is supply-side substitutability on the basis of the functionality of the products and the suppliers' capabilities across the applications and, therefore, the product market for front bearing compartments should not be further delineated.
- (137) The Commission understands that types of front bearing compartments have basically the same utility and features. Particularly ball/roller bearings' function is to convey the mechanical loads generated by the rotoric parts to the static parts of the turbomachine engine. These bearings are installed onto bearing supports which are arranged as a self-standing module which is called the "bearing compartment". The bearings need lubrication and cooling oil, as delivered by the lubrication units. The bearing compartment therefore also includes a sealing

⁹⁵ Safran is only active in the sub-segment of APUs for military aircraft (market share of [5-10]%) and for helicopters (market share of [0-5]%) and is not selling APUs for any other type of aircraft. As regards a plausible segmentation by output, [...], and therefore the above conclusion will not change. Zodiac does not manufacture APUs but only components. On the components' markets Zodiac's share is below [0-5]% under any plausible market definition.

function in order to contain the cooling oil flow within the compartment and avoid oil migration to inappropriate engine areas.

- (138) In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.6.5. *Lubrication units*

- (139) The Commission has not in the past considered a market for lubrication units.
- (140) The Notifying Party submits that there is supply substitutability on the basis of the functionality of the products and the suppliers' capabilities across the applications and, therefore, the product market for lubrication units should not be further segmented.
- (141) According to the Notifying Party, all types of lubrication units have the same utility, features and basic functioning and all suppliers are capable of manufacturing lubrication units for all sorts of engines.
- (142) Lubrication units work as follows: on turbomachine engines, a suitable flow of plain oil is required to provide adequate lubrication and cooling to engine components such as bearings and gears. This is achieved by positive displacement supply pumps (i.e. volumetric pumps). As the plain oil passes through these components, it is heated and becomes contaminated by debris and entraps a certain quantity of air. It is therefore necessary to process this oil, prior to its injection back into the components, through cooling, filtration and de-aeration operations. This process is achieved by positive displacement scavenge pumps. A lubrication unit is the self-standing module which includes both supply and scavenge pumps. Most of the time, the lubrication unit also features a filtration unit that removes debris from contaminated oil.
- (143) The results of the market investigation were largely inconclusive; however some indications support the Notifying Party's claims. The majority of competitors responding to the market investigation in fact indicated that lubrication units for different kind of aircraft do differ,⁹⁶ however they further indicated the underlying know-how required to design them and produce them is the same, regardless of the aircraft they will be installed on. One competitor explained that "*for gas turbine engines, regardless of the aircraft type, the lubrication unit know-how does not significantly vary*".⁹⁷
- (144) In light of the above, the Commission considers that it is plausible to consider that the market for lubrication units should not be further segmented. In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

96 Replies to question 160 of eQuestionnaire 1 – Competitors.

97 Replies to question 161.1 of eQuestionnaire 1 – Competitors.

5.6.6. Mechanical power transmission systems

- (145) A mechanical power transmission system is a mechanism that transmits the power developed by the engine to the accessories and equipment of the aircraft. From a material perspective, it is a gearbox, connected to the engine, to which the equipment is connected (such as oil pump, starter, fuel pump, electric drive generator), identified on the basis of the aircraft manufacturer's needs.
- (146) Mechanical power transmission systems include: (i) accessory drive train ("ADT") for aircraft and helicopter engines; (ii) reduction gearbox ("RGB") for aircraft and helicopter engines; (iii) propeller gearbox ("PGB") for turboprop aircraft; and (iv) helicopter transmissions: main gearbox ("MGB") and transfer gearbox ("TGB").
- (147) Most of mechanical power transmission systems developed and produced by Safran Transmission Systems are ADTs. The ADT performs two main functions. First, during start-up, the ADT system transmits torque from a starter to the engine, setting it in motion. Second, during normal operation, the ADT system collects power from the engine *via* the shaft and distributes it to the gearbox mounted accessories as applicable (pumps and generators) necessary for the engine and / or aircraft supply needs. The power is transferred *via* a pair of bevel gears known as the IGB. The power is then delivered, *via* the RDS, to a second set of bevel gears located in the TGB and fed to the AGB. The AGB is an arrangement of gearlines and shafts, installed on bearings and integrated into low weight casings. At the end of the transmission process described above, the AGB provides power to various airplane equipment – such as electric generator or lubrication unit - directly installed on it.
- (148) To a lesser extent, Safran also manufactures RGBs, which are a variation of ADTs and enables speed variation between the engine and the equipment or accessories that need to be powered. It can reduce or accelerate the speed before transmitting it to the aircraft equipment.
- (149) In a past decision,⁹⁸ the Commission has considered mechanical power transmission systems but finally left the precise market definition open.
- (150) The Notifying Party submits that there is one product market for all the mechanical power transmission systems mainly on the basis of the functionality of the products and the suppliers' capabilities across the various transmission systems. Particularly, the Notifying Party submits that there is supply substitutability on the basis of the functionality of the products and the suppliers' capabilities across the applications and because all mechanical power transmission systems use the same basic technology and design principle.
- (151) The market investigation was largely inconclusive concerning the demand-side substitutability between the different types of mechanical power transmission systems. However, the market investigation gave indications partially contradicting the Notifying Party's views concerning the supply substitutability of the various mechanical power transmission systems.

⁹⁸ Case COMP/M.6844 – *GE/Avio*, paras. 51 and 60.

- (152) Competitors indicated that the supply-side substitutability is not as strong as indicated by the Notifying Party: only a very limited number of respondents currently supply the entire portfolio of mechanical power transmission systems and a very limited number of suppliers indicated that it would be able to start producing those mechanical power transmission systems which are currently not manufacturing.⁹⁹
- (153) In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions..

5.6.7. *Engine sub-components*

- (154) There is a wide range of engine sub-components of various characteristics and functions.
- (155) Safran purchases sub-components from third party suppliers, and then integrates them into its engines or its engine components and systems. Zodiac Aerospace supplies sub-components that are used in the manufacturing and assembly of Safran's engines, engine components and engine systems.

5.6.7.1. *Acoustic panels*

- (156) Acoustic panels contribute to the engine noise reduction. They are made in carbon or glass according to the using environment specificities. Some are installed in fan cases of aircraft engines and others in thrust reversers.

5.6.7.2. *Scoops for engines*

- (157) Scoops are composite parts for engines that can be placed in aircraft engines to drive the air inside the engine.

5.6.7.3. *Air valves actuators*

- (158) Air-valve actuators form part of the fuel system of the engine and convert an electrical signal into mechanical movement (open/close) of an air valve.
- (159) With regards to the products under (a), (b) and (c) above, the market investigation was not entirely conclusive as regards the appropriateness to further segment the market for acoustic panels. However a number of respondents indicated that they consider any further segmentation inappropriate.¹⁰⁰

5.6.7.4. *Electrical motors*

- (160) Electrical motors are devices that convert electrical energy into mechanical energy. The electrical motors supplied by Zodiac to Safran are used to start the APU.

⁹⁹ Replies to question 165 and 166 of eQuestionnaire 1 – Competitors

¹⁰⁰ Replies to question 168 of eQuestionnaire 1 – Competitors.

- (161) The market investigation suggests that a further segmentation of electrical motors could be inappropriate. The vast majority of competitors responding to the market investigation indicated that they not consider that electrical motors are different depending on the type or size of aircraft they will be installed on, or on the application for which they are used (civil, military or helicopter).¹⁰¹
- (162) Competitors responding to the market investigation also largely indicated that they are capable of manufacturing electrical starter motors for all types and sizes of aircrafts, as well as for all types of applications.¹⁰²
- (163) In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.6.7.5. Electrical and mechanical oil debris detectors and collectors

- (164) Oil debris collectors and detectors permit rapid and frequent checking for the presence of ferrous metal in the oil system and are therefore used as a warning in case of detection of ferrous particles. In lubrication systems, they capture debris generated by the wear of transmissions, gearboxes, bearings, gears etc. Usually located in a gearbox or reservoir drain plug location, the magnetic chip collector captures and retains metallic particles for later removal and off-line analysis. The chip collector and chip detectors can also be line-mounted, closer to the potential failure point for detecting a failure.
- (165) The Notifying Party claims that oil debris detectors and oil debris collector form part of the same product market.
- (166) The market investigation was largely inconclusive with regards to the Parties' claim that debris collectors and debris detector should form part of the same market. However, a number of competitors indicated that any segmentation of those products is inappropriate.
- (167) In any event, the exact product market definition in this regard can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions..

5.6.7.6. Small sub-components

- (168) Zodiac also supplies a number of small sub-components which are inputs to engines, APUs and engine components. For the analysis of the market definition of these subcomponents, please refer to section 5.10.3 of this decision.

101 Replies to question 169 of eQuestionnaire 1 – Competitors.

102 Replies to question 170 of eQuestionnaire 1 – Competitors.

5.7. Environmental control systems

5.7.1. Introduction

- (169) The environmental control system ("ECS") of an aircraft provides air supply, thermal control and cabin pressurisation for the crew and passengers. The ECS encompasses bleed air systems, air conditioning systems, cabin pressurisation systems, as well as ice and rain protection systems.
- (170) Bleed air systems are comprised of components that control compressed bleed air from the main engine or APU, cool it by using outside air, and deliver it to other downstream systems such as cabin air conditioning, cabin pressurisation, fuel tank and hydraulic reservoir pressurisation, engine start. Air conditioning and cabin pressurisation systems supply and maintain the air in the pressurised fuselage compartments at the correct pressure, temperature and freshness for passenger comfort and equipment cooling, and also provide air for ventilation functions in the unpressurised fuselage bays. Ice and rain protection systems have the role of preventing and removing rain and ice from critical surfaces of the aircraft.
- (171) Air conditioning can be based on air cycling cooling technology, which uses engine or APU bleed air to provide chilled air, or on vapour cycling technology. Vapour cycling systems ("VCS") do not use engine or APU bleed air to provide chilled air but operate in a closed loop – like in a car's air conditioning – in which the refrigerant absorbs heat from the cabin and rejects it into the outside air, after which it returns to the cabin to repeat the cycle. The operation of the VCS involves the following major components: compressor, condenser, receiver-dryer, evaporator and fans/blowers. VCS technology is less sophisticated than air cycling and it is typically used on small aircraft such as smaller business jets (without an APU) and helicopters, whereas large commercial aircraft and regional aircraft use air cycling cooling systems.

5.7.2. Environmental control systems

- (172) The Notifying Party submits that ECS for small aircraft (smaller sized business jets and helicopters) constitute a relevant product market, distinct from the market for ECS for commercial (large and regional) aircraft, as they rely on a different cooling technology (vapour cycling) and are globally less sophisticated than ECS used in large aircraft. In addition, certain suppliers, such as Zodiac, are only active in ECS for small aircraft, and do not provide ECS for commercial aircraft.¹⁰³
- (173) The Notifying Party considers that ice and rain protection systems are not part of the relevant market for ECS which encompasses only air conditioning, bleed air control and cabin pressure control systems. The Notifying Party however submits that the relevant market for ECS for small aircraft should not be segmented according to the function performed by the system because the technical parameters and characteristics of air conditioning, bleed air control and cabin

¹⁰³ Form CO, paras. 1562 - 1563.

pressure control systems are very similar as they all manage air within a similar band of pressures and temperatures.¹⁰⁴

- (174) In a past decision,¹⁰⁵ the Commission noted that ECS includes systems which perform different functions in the aircraft, namely bleed air systems, anti-ice systems, air conditioning and cabin pressure control systems, and that a distinction can be drawn between air cycling cooling technology and vapour cycle cooling, but it ultimately left the market definition open.
- (175) The market investigation broadly confirmed the segmentation between air cycling-based and vapour cycling-based ECS systems, and the fact that they are generally used in different types of aircraft, although some respondents pointed out that vapour cycling technology can also be used on large aircraft as auxiliary cooling, and that air cycling can also be used on smaller sized aircraft.
- (176) As regards the segmentation according to system function, the market investigation shows that not all suppliers supply all individual systems, and that there are certain differences in relation to the technology used in bleed air systems, air conditioning systems and cabin pressurisation. Certain customers also indicated that they organise separate tenders to source the individual systems.¹⁰⁶
- (177) The Commission considers that the market definition can be left open as the Transaction will not raise serious doubts as to its compatibility with the internal market irrespective of the exact definition retained.

5.7.3. Fans for ECS

- (178) Within the ECS functions described above, only air conditioning and bleed air control require fans. They are supplied by equipment manufacturers either to Tier-1 suppliers of ECS or directly to aircraft manufacturers which have decided to manufacture cooling systems themselves.¹⁰⁷
- (179) The Notifying Party submits that a distinction should be drawn between fans for ECS for small aircraft (smaller business jets and helicopters) based on vapour cycling cooling technology, which are basic, low-value, single speed asynchronous fans (fix frequency) regarded as commodity products, and fans for ECS for commercial aircraft, which are higher-end, variable speed and variable frequency fans with more complex features (in particular as regards software and power electronics elements) and higher price. In addition, fans used in large commercial and regional aircraft have a much higher utilisation rate and therefore higher reliability requirements. The Notifying Party also submits that different suppliers are active on the two segments and that the technological competence

104 Form CO, paras. 1565 – 1566. Notifying Party's reply to question 20 of RFI I.1 of 23 November 2017.

105 Case COMP/M.1493 – *United Technologies / Sundstrand*, paras. 18-19.

106 Replies to questions 184 and 185 of eQuestionnaire 1 – Competitors, and questions 113 and 114 of eQuestionnaire 3 – Airframers.

107 According to the Notifying Party, this strategy is more common in the small aircraft segment.

required to produce ECS fans for commercial aircraft is higher than for fans for small aircraft. In addition, certain suppliers, such as Zodiac, are only active in the small aircraft ECS fans segment.¹⁰⁸

- (180) The Notifying Party also submits that fans for ECS for small aircraft should not be further segmented according to type of aircraft (business jets, helicopters and other small aircraft) or according to whether they are used in bleed air or air conditioning systems.
- (181) The market investigation was inconclusive as to how fans for ECS should be segmented: while certain respondents agreed with the distinction based on aircraft type, others indicated that the main differentiator relates to the technology (mechanical or electric) and the power source (for electric fans) and that a more appropriate segmentation would thus be into mechanical fans, DC fans, AC fixed frequency fans and AC variable fans. Certain market participants also indicated that fans used for air conditioning should be distinguished from fans used for bleed air control.¹⁰⁹
- (182) The Commission considers that the market definition can be left open as the Transaction will not raise serious doubts as to its compatibility with the internal market irrespective of the exact definition retained.

5.8. Flight controls

5.8.1. Introduction

- (183) Flight controls consist of a range of equipment responsible for the control and navigation of the aircraft in flight. Flight controls generally encompass:

- a. flight control actuation;

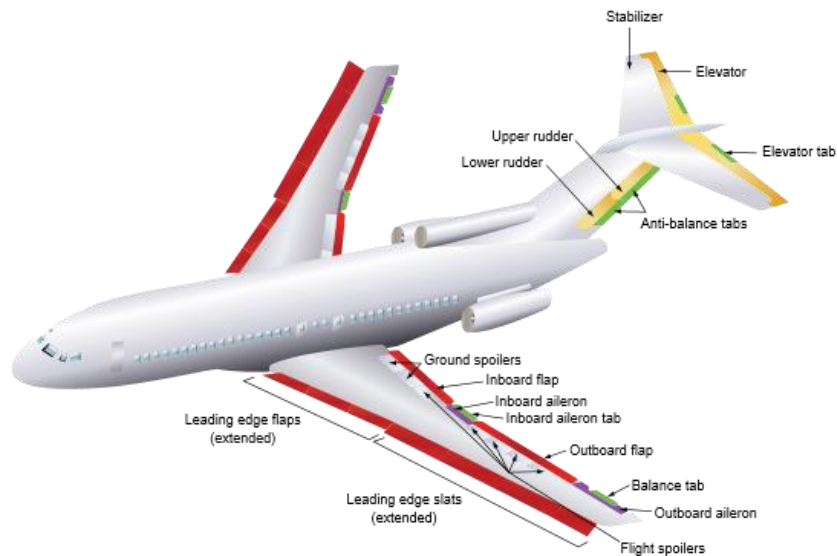
Actuators are components responsible for moving or controlling a mechanism or system, for example by rotating an object, opening or closing a device or pushing a surface up or down. When coupled with electronics that command actuators, they constitute a flight control actuation system.

Flight control actuation can be sub-divided into primary and secondary flight control actuators. Primary flight control actuators – such as ailerons, elevators and rudders – are needed when the aircraft is in the air, while secondary flight control actuators – such as flap and slat controls and stabiliser controls – are used to trim the primary flight control surfaces and by the take-off and the landing.

¹⁰⁸ Form CO, paras. 1570-1571.

¹⁰⁹ Replies to questions 184 and 185 of eQuestionnaire 1 – Competitors, and questions 113 and 114 of eQuestionnaire 3 – Airframers.

Figure 13: Flight control actuation system of the Boeing 727 (source: Form CO)



- b. flight control electronics;

Flight control electronics include computers, controllers and sensors and in particular the flight control computers and the autopilot.

- c. pilot controls;

Pilot controls are electromechanical equipment directly accessible to the pilot in the cockpit providing the man-machine interface for piloting functions (speed up, brake, land, etc.). Pilot controls typically include throttle quadrants, joysticks and yokes, rudder pedals, flight deck control suites, active side stick units, thrust control assemblies, different kinds of levers (flap slat lever, landing gear control lever, braking control lever, speedbrake lever) and nose wheel steering handles.

- d. cockpit control panels and cockpit components.

Cockpit control panels are mechanical plates of various sizes with push-buttons, switches and toggles – the cockpit components –, as well as the associated electronics behind the plate. The cockpit control panel can be located over the pilots' heads, on the sides or in between the two pilots.

- (184) Given that with regard to flight controls the Parties' activities – horizontally or vertically - overlap only on the markets for flight control actuation, pilot controls, cockpit control panels and cockpit components, only these are further discussed in the present decision.

5.8.2. *Flight control actuation*

- (185) The Notifying Party submits that flight control actuation should be further segmented into primary and secondary flight control actuation. It furthermore

states that it is not appropriate to further segment the market for flight control actuators according to aircraft types.¹¹⁰

- (186) In previous decisions,¹¹¹ the Commission considered that flight control actuation can be further divided into primary and secondary flight control actuators. Moreover, the Commission considered but ultimately left the question open whether civil and military applications constitute different product markets.¹¹²
- (187) Given that under no alternative market definition would the Transaction lead to affected markets, the market definition can be left open for the purposes of this decision. For the same reason, flight control actuation is not further discussed in the present decision.¹¹³

5.8.3. *Pilot controls*

- (188) The Notifying Party considers that no distinction should be made between the different pilot controls as although they perform a different function within the aircraft systems, they are all electromechanical equipment in the cockpit having a man-machine interface with the pilot. Furthermore, all suppliers supply the various types of pilot controls.¹¹⁴
- (189) However, the Notifying Party submits that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.¹¹⁵
- (190) The market investigation did not confirm the Notifying Party's claim that all pilot controls belong to the same relevant product market. Competitors¹¹⁶ and customers¹¹⁷ alike pointed out that pilot controls have very different functions, technologies, requirements, procurement and suppliers.
- (191) In any event however, the exact product market definition in this regard can be left open for the purpose of this decision as the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

110 The Notifying Party's reply to question 39 (b) of pre-notification RFI08.

111 Cases IV/M.1493 – *United Technologies / Sundstrand*, para. 11; COMP/M.2183 – *Smiths Industries / TI group*, para. 9.

112 Case COMP/M.2183 – *Smiths Industries / TI group*, para. 9.

113 The Parties' activities only overlap with regard to secondary flight control actuation for business jets, achieving a combined market share below [0-5]%.

114 Paras. 1689-1692 of the Form CO.

115 Para. 1693 of the Form CO.

116 Replies to question 195 of eQuestionnaire 1 – Competitors.

117 Replies to question 128 of eQuestionnaire 3 – Airframers.

5.8.4. *Cockpit control panels and cockpit components*

- (192) The Notifying Party submits that a distinction should be made between cockpit control panels integrating various components on the one hand; and cockpit control components sold on a stand-alone basis on the other hand.¹¹⁸ Furthermore, it argues that cockpit control components constitute one relevant product market given that they serve the same function, the suppliers offer the whole range of products and they are tendered together by cockpit/systems integrators.¹¹⁹ In any event, the Notifying Party submits that the exact product market definition can be left open as no competition concerns arise under any alternative product market definition.¹²⁰
- (193) The market investigation confirmed that cockpit control panels on the one hand and cockpit components on the other hand constitute separate product markets.¹²¹ Furthermore, market participants agreed with the Notifying Party's view that the market for cockpit components should not be further segmented.¹²²
- (194) Based on these results, the Commission takes the view that separate relevant product markets exist for cockpit control panels on the one hand and all cockpit components on the other hand.

5.9. **Wiring systems and components**

5.9.1. *Introduction*

- (195) Wiring systems consist in assemblies of cables, called harnesses, designed to transmit electrical power, data and/or signals between two or more termination points.¹²³ There are various types of harnesses with different characteristics in terms of material used, weight, size, resistance, flexibility, etc., depending on their position in the aircraft and final use. A distinction is commonly made between general harnesses that are not exposed to specific stresses (as found, e.g., in the fuselage, cockpit, pylons, tailplane, wings or doors) and harnesses for harsh environments where they have to withstand challenging thermal, chemical, mechanical and radiative stresses (as found, e.g., in engines, nacelles, landing gears or brakes).¹²⁴

118 Para. 1695 of the Form CO.

119 Para. 1695 of the Form CO.

120 Para. 1697 of the Form CO.

121 Replies to questions 198 of eQuestionnaire 1 – Competitors and 131 of eQuestionnaire 3 – Airframers.

122 Replies to questions 199 of eQuestionnaire 1 – Competitors and 132 of eQuestionnaire 3 – Airframers.

123 Form CO, para. 597.

124 Form CO, paras. 602-603.

- (196) In addition to cables, harnesses are made out of various components used for cable management, routing and harness protection. According to the Notifying Party,¹²⁵ these components include:
- a. conduits, sleeves, rigid tubes and/or overbraiding used to protect cables and ensure mechanical, thermal and electromagnetic protection. These components can be made of various materials, including polymers, woven textiles, braided or woven metallic screens and other combinations;
 - b. backshells and fittings, transitions, small junction boxes, contacts and lugs, which are used to ensure the physical connection between harnesses, branches thereof or with a connector. They can be made of aluminium, stainless steel, composite or plated composite;
 - c. connectors used to join electrical terminations and create a circuit. They can be made of steel, aluminium or composite
- (197) The above components can be used in different combinations to produce harnesses for different applications. Suppliers of wiring systems assemble these components into harnesses and deliver them to customers, which include aircraft manufacturers and other (sub-)system suppliers. In turn, harnesses can be assembled based on a "build-to-print" or a "build-to-spec" model. Under a "build-to-print" model, the design of the wiring system is conceived by the customer, which outsources the manufacture of the harnesses. General harnesses are generally purchased by aircraft manufacturers under this model.¹²⁶ Under a "build-to-spec" model, both the design and the manufacture of the wiring system is outsourced to a Tier-1 wiring system supplier. Harnesses for harsh environments are generally purchased by (sub-)system suppliers (e.g., landing gears or nacelles manufacturers) under this model.¹²⁷ Alternatively, aircraft manufacturers can favour a "make" strategy whereby they design, manufacturer and install harnesses themselves, which is frequently the preferred option for the general harnesses of smaller aircrafts such as regional aircrafts, business jets and helicopters.¹²⁸
- (198) General harnesses are typically designed to endure the lifetime of the aircraft and do not require regular maintenance. They are sourced either for the lifetime of the aircraft program from the same supplier or for a more limited duration, and then tendered out again. In turn, they are installed by the aircraft manufacturer, the harnesses supplier or in cooperation between the two.¹²⁹ Harnesses for harsh environments require regular maintenance, including replacement, and are also

125 Form CO, para. 604.

126 Form CO, para. 610.

127 Idem.

128 Idem.

129 Form CO, paras. 611-614.

sourced either for the lifetime of the program or for a more limited duration. They are usually installed by the (sub-)system supplier.¹³⁰

5.9.2. *Wiring systems*

- (199) The Notifying Party submits that wiring systems for the aerospace industry differ from other industries' wiring systems (e.g., automotive or railway) due to specific demand-side requirements and supply-side skills and know-how, such as data configuration and management.¹³¹
- (200) However, for the purpose of market definition, the Notifying Party considers that no segmentation is warranted among aerospace wiring system and, notably, that general and harsh environment harnesses belong to the same product market because:¹³² (i) from a demand-side perspective, each customer has different requirements in terms of cable protection and wiring components, which tends to blur the boundaries between general and harsh environment wiring systems; and (ii) from a supply-side perspective, the skills required for the assembly of general harnesses and harsh environment harnesses do not differ substantially, at least under a "build-to-print" model, while the expertise required to supply "build-to-spec" harnesses can be acquired within a relatively limited period of time (12-18 months) and with limited investments.
- (201) Likewise, the Notifying Party submits that wiring systems are tailored to each aircraft platform whereas, from a technical standpoint, there are no significant differences between wiring systems for different types of aircraft or in relation to their commercial or military application. Hence, no distinction according to aircraft size or application is warranted, notably in view of high supply-side substitutability.¹³³ In any event, the Notifying Party submits that the exact product market definition can be left open since no competition concern arises under any alternative segmentation.¹³⁴
- (202) In a somewhat distant past, the Commission left open the existence of a specific market for harsh environment harnesses for engines, distinct from general harnesses due to the specific stresses they have to endure, but combining both civil and military applications.¹³⁵ In the absence of detailed and recent precedent, the Commission carried out a complete assessment of the relevant market segmentation of wiring systems in the present case.
- (203) The respondents to the market investigation generally agree that wiring systems are specific to the aerospace industry and do not clearly see an immediate convergence of technical requirements with other industries (such as automotive

130 Idem.

131 Form CO, paras. 633-634.

132 Form CO, para. 636.

133 Form CO, paras. 639-640.

134 Form CO, paras. 638, 643 and 657.

135 Case COMP/M.2021 – *SNECMA / Labinal*, paras. 19-20. See also Case COMP/M.2738 – *GEES / Unison*, para. 11.

and railway).¹³⁶ However, the majority of respondents consider that general and harsh environment harnesses differ in terms of technical characteristics, manufacturing costs, sales price and function/usage. In particular, respondents indicate that the need to withstand harsher elements translates in more engineering, specialised materials and additional manufacturing processes and testing procedures for harsh environment harnesses.¹³⁷ In addition, while a majority of suppliers appear to manufacture both general and harsh environment harnesses, this does not seem to be always the case due to the additional engineering skills and know-how required to supply harsh environment harnesses.¹³⁸

- (204) Conversely, a majority of respondents to the market investigation do not consider appropriate to further segment the general harnesses category, including by types of aircraft, though isolated comments referred to the possibility of entertaining segmentations by function (power vs data) or by wire technology (optical fibre, aluminium, copper).¹³⁹ A majority of respondents also consider unnecessary to segment the harsh environment harnesses category according to types of aircraft or specific applications, though product requirements and prices may differ per end-application (e.g., for engines, nacelles or landing gears).¹⁴⁰
- (205) Overall, the Commission considers that the market investigation is not supportive of a segmentation based on function or by wire technology, notably because all aircraft platforms require the different functions and harnesses combine cables carrying different functions and made out of different technologies since certain cables are more or less suitable for certain function or differ in terms of weight and level of power that they can transmit.¹⁴¹ Likewise, it can be left open whether separate markets exist for general wiring harnesses and harsh environment harnesses or whether harsh environment harnesses should be further segmented by type of aircraft or application, since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of these alternatives.

5.9.3. *Wiring components*

- (206) According to the Notifying Party, components fulfil different functions within the wiring system, thereby justifying a segmentation of product markets between: (i) cables; (ii) conduits and sleeves (incl. all protective sheathing enveloping wires

136 Replies to questions 82 and 83 of eQuestionnaire 1 – Competitors; replies to questions 65 and 66 of eQuestionnaire 3 – Airframers.

137 Replies to question 78 of eQuestionnaire 1 – Competitors; replies to question 60 of eQuestionnaire 3 – Airframers.

138 Replies to question 80 of eQuestionnaire 1 – Competitors; minutes of conference call with a competitor on. 25 October 2017, paras. 8-9..

139 Replies to questions 78.2 and 81 of eQuestionnaire 1 – Competitors; replies to questions 61 and 66 of eQuestionnaire 3 – Airframers.

140 Replies to question 78.2 and 81 of eQuestionnaire 1 – Competitors; replies to question 62 of eQuestionnaire 3 – Airframers.

141 Reply to RFI I.5, paras. 4-5.

and cables in a harness); (iii) backshells and fittings (incl. all mechanical parts used to assemble a complete harness from individual conduit or sleeve, as they are typically manufactured by all existing suppliers); and (iv) connectors.¹⁴² However, no distinction between components for general or harsh environment harnesses is warranted, or per end-application.¹⁴³

- (207) The outcome of the market investigation supports the definition proposed by the Notifying Party and suggests that no further segmentation is warranted due to substitutability among components within each category both from a demand- and supply-side point of view.¹⁴⁴ As a result, the Commission takes the view that separate relevant product markets exist for: (i) cables; (ii) conduit and sleeves; (iii) backshells and fittings; and (iv) connectors.

5.10. Various components

- (208) The product market definition of components which can be used as an input to several equipment/systems will be discussed in this section.

5.10.1. Aerospace hose and tube assemblies

- (209) Hoses are flexible, while tubes are rigid devices used to convey hydraulic fluid, aviation fuel, water and cooling/heat exchanger fluids in aircraft. A typical fluid conveyance system in an aircraft comprises long runs of rigid tube, securely fastened to the structure to prevent vibration and shorter length of flexible hose, to accommodate movement where necessary.
- (210) The Notifying Party submits that aerospace hose and tube assemblies constitute one relevant product market. However, it is of the view that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.¹⁴⁵
- (211) The Commission considers that aerospace hose and tube assemblies constitute one relevant product market for the following reasons. First, irrespective of the system or the type of aircraft they are built in, aerospace hose and tube assemblies convey the same function and manufactured using the same technology. Second, these products are commonly manufactured to standard specifications which are approved by the OEM manufacturers for a range of pressure applications.

5.10.2. Externally located electrical boxes

- (212) Externally located electrical boxes include *inter alia* nose wheel steering deactivation boxes, landing bay door operation boxes and landing gear maintenance boxes. They are typically located in a position readily accessible to the ground crew and are designed to withstand exposure to the elements.

142 Form CO, paras. 654-656.

143 Form CO, paras. 676-678.

144 Replies to question 84 of eQuestionnaire 1 – Competitors; replies to question 67 of eQuestionnaire 3 – Airframers.

145 Para. 836 of the Form CO.

- (213) The steering deactivation electrical box provides the means for the ground crew to disable the nose landing gear steering so that the aircraft can be safely towed. A lever operated switch with a removable locking pin provides this function.

Figure 14: Nose wheel steering deactivation box (source: Form CO)



- (214) The landing gear maintenance box is located in landing gear bays and used by the ground crew to manually operate the landing gear doors and to shut down the APU in the event of a fire.

Figure 15: Landing gear maintenance box (source: Form CO)



- (215) The Notifying Party submits that all externally located electrical boxes belong to one relevant product market because although they have distinct functions (e.g. maintenance operations, deactivations of nose wheel steering systems, etc.), they are basically the same kind of equipment.¹⁴⁶
- (216) The Commission takes note of the fact that the different types of externally located electrical boxes all have different functions and as such are not substitutable from the customers' perspective. The price of these products also

146 Para. 838 of the Form CO.

differs based on their size and the number of components and electrical interfaces.¹⁴⁷

- (217) The market investigation was inconclusive with regard to the supply-side substitutability between the different kinds of externally located electrical boxes; approximately the same amount of suppliers replied that it would be or would not be technically able to produce different types of externally located electrical boxes.¹⁴⁸
- (218) The exact product market definition can however be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.10.3. Small sub-components

- (219) The Notifying Party submits that there is a relevant product market encompassing a number of small sub-components such as seals, coupling, check valves, caps, etc.¹⁴⁹ It argues that these are mere hardware commodities with no technical specificities, which are produced by multiple suppliers for multiple applications in many industries. Therefore, although they do provide different functions, defining narrow product markets based on each of these small sub-components would not reflect the economic reality.¹⁵⁰
- (220) The market investigation mostly confirmed that different small sub-components belong to the same relevant product market;¹⁵¹ however, some respondents pointed out the differences among them in term of function and technology.
- (221) The exact product market definition can however be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.10.4. Solenoid valves (manifold)

- (222) Solenoid valves constitute a type of liquid flow valves having the specific function of switching on and off the liquid flow.
- (223) The Notifying Party submits that given the different function and underlying technology, solenoid valves and servo-valves constitute separate relevant markets.¹⁵² Furthermore, the Notifying Party argues that no distinction should be made between solenoid valves and manifolds because (i) manifolds are small sub-systems incorporating solenoid valves, (ii) all manufacturers of solenoid

147 [...] (para. 847 of the Form CO).

148 Replies to question 204 of eQuestionnaire 1 – Competitors.

149 Para. 859 of the Form CO.

150 Paras. 851 and 852 of the Form CO.

151 Replies to questions 205 and 206 of eQuestionnaire 1 – Competitors.

152 Para. 993 of the Form CO.

valves also manufactures manifolds and (iii) most manufacturers of manifolds manufacture solenoid valves.¹⁵³

- (224) The Commission considers that in view of the lack of demand-side substitutability because of the different functions and of the limited supply-side substitutability based on the different technology, solenoid valves and servo-valves constitute different relevant product markets.
- (225) The question whether solenoid valves sold on a standalone basis and in manifolds constitute one single product market can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.10.5. Servo-valves (manifold)

- (226) Servo-valves constitute a type of liquid flow valves which regulate the level of flow in proportion to the command received from the calculator.
- (227) The Notifying Party considers that no further distinction is appropriate based on the aircraft system that the servo-valves serve as their function remains the same: transforming an electrical signal into a hydraulic output. Furthermore, they all require the same sub-components, the same industrial means and are produced on the same machines.¹⁵⁴ The Notifying Party further submits that no distinction should be made between servo-valves and manifolds because (i) manifolds are small sub-systems incorporating servo-valves, (ii) all manufacturers of servo-valves also manufactures manifolds and (iii) most manufacturers of manifolds manufacture servo-valves.¹⁵⁵
- (228) The market investigation largely confirmed that all servo-valves belong to the same relevant product market.¹⁵⁶ The majority of respondents also stated that they supply servo-valves both on a stand-alone basis and in manifolds.¹⁵⁷ In this regard however the exact product market definition can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.10.6. Utility actuators

- (229) The Notifying Party submits that there is a relevant product market for utility actuators encompassing a number of actuators such as EMA valves, EMA uplocks, EMA unlocks, fan cowl opening actuators, cargo door opening actuators, passenger door opening actuators, APU opening actuators, etc. The Notifying

153 Para. 994 of the Form CO.

154 Paras. 997-1000 of the Form CO.

155 Para. 1001 of the Form CO.

156 Replies to question 207 of eQuestionnaire 1 – Competitors.

157 Replies to question 208 of eQuestionnaire 1 – Competitors.

Party also argues that as all these actuators present the same function, i.e. opening and blocking, they should be part of one relevant product market.¹⁵⁸

- (230) The Commission has previously not examined the market for actuators, although it has considered the segmentation of actuation systems into "utility", "primary" and "secondary" actuation; the first category comprising all actuation systems other than flight control systems.¹⁵⁹ The question whether the market should be further segmented and be defined on a component-by-component basis can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.10.7. Sensors

- (231) Sensors are electronic components which purpose is to detect events and changes (in position, pressure, temperature, etc.) and send the information for analysis to a computer processor.
- (232) The Notifying Party submits that no distinction should be made between the various types of sensors as this would lead to the existence of multitude of very small product markets which would not properly reflect the economic reality of this category of components. Furthermore, all suppliers offer a comparable range of products.¹⁶⁰
- (233) The question whether the market should be further segmented and be defined on a component-by-component basis can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.11. Space launchers

5.11.1. Introduction

- (234) Space launchers are vehicles based on rocket engines and used to deliver space systems (satellite and space infrastructure elements) into orbit. Depending on their class, launchers can deliver satellites of up to 10 tons to orbits varying from 160 km high (low earth orbit or "LEO") to 36,000 km (geostationary transfer orbits or "GTO"). Launchers can usually reach a rather wide range of orbits but are optimised for a specific orbit. In particular, launchers can be categorized between (i) launchers with GTO capacity and (ii) launchers with only LEO capacity.
- (235) In Europe, space launchers are ordered and developed by the European Space Agency (ESA), an intergovernmental organisation with 22 Member States¹⁶¹ dedicated to the exploration of space. In particular, ESA is responsible for the

158 Para. 1010 of the Form CO.

159 Case COMP/M.2183 – *Smiths Industries / TI group*, para.9.

160 Para. 1015 of the Form CO.

161 20 EU Member States, Norway and Switzerland.

development of all European launchers, in particular through the Ariane and Vega programmes.

- (236) The manufacturing of launchers is entrusted to European industry participants such as ArianeGroup, formerly known as Airbus Safran Launchers (ASL), a joint venture between Safran and Airbus. ESA selects one main contractor, the "prime contractor", which will be responsible for building the launcher, and several subcontractors, which will produce the different launcher subsystems and equipment. For a large part of those contracts, ESA does not conduct open tenders but designates its industrial partners on the basis of those partners' known expertise and the so-called "*juste retour*" principle according to which the share of business awarded to manufacturers in a given Member State needs to be closely related to the share of financial contribution from that Member State to the respective programme.¹⁶²
- (237) ArianeGroup is the prime contractor for all Ariane programmes, i.e. the operational Ariane 5 vehicles and Ariane 6, which is under development.¹⁶³ Zodiac supplies telemetry equipment and non-cryogenic valves to ArianeGroup for integration in space launchers.

5.11.2. *Prime contracting for ESA space launchers*

- (238) The Notifying Party submits that there is no open market for prime contracting for ESA space launchers for the following reasons. First, the Notifying Party submits that ESA is the only customer with regards to the prime contracting of launchers development in Europe. The prime contractor has always been attributed by ESA through bilateral negotiations to the industry of the main contributing Member State based on the *juste retour* principle without any competitive tender. Second, the Notifying Party submits that the prime contractor has already been selected for the current Ariane programmes and there are no other foreseeable launcher programmes for which a prime contractor would need to be selected in Europe. Finally, the Notifying Party submits that it is not possible to change the prime contractor once it has been selected and the development phase has started, and even less so during the exploitation phase.
- (239) In a past decision,¹⁶⁴ the Commission left open the question whether there is an open market for launcher prime contracting for ESA space launchers. The existence and exact scope of the relevant market can also be left open for the purpose of the present decision since the Transaction does not raise serious doubts as to its compatibility with the internal market irrespective of whether an open market for prime contracting for ESA space launchers exists.

¹⁶² Convention for the establishment of a European Space Agency, article VII and annex V.

¹⁶³ Ariane 5 launchers are currently in operation, whereas the Ariane 6 launcher is under development. The prime contractor for the Vega C launcher currently under development is ELV.

¹⁶⁴ Case M.7353 – *Airbus/Safran/JV*, para. 74.

5.11.3. Telemetry equipment for space launchers

- (240) Space launchers are made up of systems, subsystems and equipment. Equipment consists of components used in systems and subsystems. Zodiac only supplies components to ArianeGroup.
- (241) Telemetry equipment provides the communication link of the launcher with the ground. It consists of various receivers and transmitters: (i) slave digital acquisition units (DAU), which collect digital and analog data used for the flight control system and for transmission to the ground, (ii) the Master DAU, which receives measurements from the slave DAUs and processes them before sending the data to the transmitter, (iii) the radio frequency transmitter for the ground datalink, which sends the data from the Master DAU to the ground segments, and (iv) the flight termination receiver used to activate the neutralization and destruction of the launcher in case of mission failure.
- (242) The Notifying Party submits that telemetry equipment for space launchers constitutes a separate relevant market as it uses a distinct technology compared to other telemetry equipment (e.g. satellite or aircraft telemetry equipment) but that the precise delineation of the relevant market can be left open as the Transaction does not give rise to competition concerns.
- (243) In a previous decision involving telemetry equipment for satellites,¹⁶⁵ the Commission considered command receivers as a distinct relevant product market. In light of their different functions, and of the fact that they are procured and supplied as individual equipment, rather than as a system, the various space launcher telemetry components could be considered as constituting distinct relevant products markets. However, the exact scope of the relevant product market can be left open given that for the purpose of the present decision since the Transaction does not raise serious doubts as to its compatibility with the internal market irrespective of the exact definition considered.

5.11.4. Valves equipment for space launchers

- (244) Valves equipment regulate the passage of fluid in liquid propulsion launcher engines and stages.
- (245) The Notifying Party submits that valves equipment for launchers must be distinguished from valves for other fields of application since equipment for one application cannot generally technically be used for the other applications. The Notifying Party further submits that valves may be distinguished between cryogenic valves (used in connection with very low temperature oxygen and hydrogen in cryogenic propulsion systems) and non-cryogenic valves (used in non-cryogenic propulsion systems and in connection with non-oxygen/hydrogen related function – e.g., in connection with helium – in cryogenic propulsion systems).

¹⁶⁵ Case M.3680 – *Alcatel/Finmeccanica/Alcatel Alenia Space and Telespazio*, para. 46.

(246) In a previous decision¹⁶⁶ involving the supply of valves equipment for space launchers, the Commission noted the distinction between cryogenic and non-cryogenic valves but left the exact scope of the relevant product market open. The market definition can also be left open for the purpose of the present decision since the Transaction does not raise serious doubts as to its compatibility with the internal market irrespective of the exact delineation considered.

5.12. Defence systems and equipment

5.12.1. Introduction

(247) Safran is also active as a supplier of a range of systems and equipment for defence applications, in particular inertial navigation systems for defence, missile and missile propulsion systems, guidance and pointing systems for weapon systems and missiles, optronics, remotely piloted aircraft and soldier modernisation program equipment, as well as ejection seats for military aircrafts.

(248) Zodiac supplies a number of components (mainly commodities) to Safran for integration into the defence equipment it manufactures.

5.12.2. Strategic missiles

(249) Strategic missiles are dedicated to critical state defence applications. They have a long range and great destruction capabilities relying on nuclear warheads. In previous decisions,¹⁶⁷ the Commission has drawn a distinction between strategic missiles and tactical missiles, which are used for specific geographically limited actions to protect against the threat of attack or to destroy the enemy infrastructure or capacity.

5.12.3. Tactical missiles

(250) As regards tactical missiles, the Commission noted that they can be classified according to functionality and products characteristics such as their point of origin and destination (e.g. air-to-air, surface-to-air/land, surface-to-air/naval, air-to-surface, anti-ships and anti-tanks) and range (very short range, short range, medium range and long range), but ultimately left the market definition open.¹⁶⁸ The product market definition can also be left open for the purpose of the present decision since the Transaction does not give rise to competition concerns irrespective of the exact product market definition considered.

5.12.4. Missile propulsion systems

(251) In previous decisions, the Commission has also drawn a distinction between propulsion systems for tactical missiles and propulsion systems for strategic missiles. As regards tactical missiles, the Commission noted that different

¹⁶⁶ Case M.7353 – *Airbus/Safran/JV*, paras. 91-93.

¹⁶⁷ Cases COMP/M.5032 – *Roxel / Protac*, para. 14, COMP/M.1745 – *EADS*, para. 122, COMP/M.4653 – *MBDA / Bayern- Chemie*, para. 17.

¹⁶⁸ Cases COMP/M.5032 – *Roxel / Protac*, para. 14, COMP/M.1745 – *EADS*, para. 122, COMP/M.4653 – *MBDA / Bayern- Chemie*, para. 17.

technologies can be used in their propulsion systems: solid rocket motors (SRM), ramjets and turbo-propulsion, but ultimately left open the question whether the market for tactical missile propulsion systems should be segmented according to the technology used.¹⁶⁹ The product market definition can also be left open for the purpose of the present decision since the Transaction does not give rise to competition concerns irrespective of the exact product market definition considered.

5.12.5. *Telemetry equipment for strategic missiles*

- (252) Telemetry equipment provides the communication link of the strategic missile with the ground. The Notifying Party submits that the technology used for strategic missiles is very similar to that of launchers, discussed in section 5.11.3 above, but that, in light of the specific features of the defence market, there is a distinct market for the supply of telemetry equipment for strategic missiles which is national in scope. For the purpose of the present decision the market definition can be left open since the Transaction does not give rise to competition concerns irrespective of the exact market definition considered.

5.12.6. *Optronics*

- (253) Optronics is a field of electro-optical applications which combines optic and electronic processing of physical signals susceptible to direction and transmission through optical devices. These physical signals are principally infra-red or visible light, either naturally produced or generated by dedicated systems such as lasers. The main applications in the defence sector are reconnaissance, target identification, range-finding, target illumination, automatic target illumination, automatic target tracking and missile guidance.
- (254) The Notifying Party submits that defence optronics equipment constitute a relevant product market, distinct from optronics for other civil applications, but that no further segmentation according to the specific purpose of a given equipment is relevant because the same key technologies are used to produce various types of optronics equipment and that most suppliers offer a variety of defence optronics equipment.¹⁷⁰
- (255) In previous decisions, the Commission noted that different categories of products can be distinguished based on their application (thermal imaging units, residual light amplification units, visors, laser range-finders, units for missile guidance systems, optronic sensors for reconnaissance, navigation and weapon guidance, optronic warning sensors), but ultimately left open the question whether the market for defence optronics equipment should be further segmented according to these categories.¹⁷¹

169 Case COMP/M.5032 – *Roxel / Protac*, paras. 14 and 19.

170 Form CO, para. 1820.

171 Case IV/M.598 – *Daimler Benz / Carl Zeiss*, paras. 8-10.

- (256) Through its subsidiary Safran Electronics and Defense, Safran supplies thermal imaging units, visors and units for missile guidance systems.¹⁷²
- (257) Although the technologies used to manufacture various types of optronics equipment are similar¹⁷³, the supply and demand landscapes are not necessarily the same for all products. For instance, not all suppliers of sights are also active in the area of thermal imaging units or units for missile guidance systems. Moreover, sights are typically purchased by platform integrators (i.e. aircraft, vehicle or ship manufacturers) while other optronics equipment, such as thermal imaging units, are purchased directly by end-users (i.e. government defence bodies or procurement agencies).¹⁷⁴ For these reasons, it appears that sights (which are the only segment in respect of which a vertical relationship between the Parties exists) may constitute a distinct relevant market separate from other optronics equipment, but the market definition can be left open for the purpose of the present decision since the Transaction does not give rise to competition concerns irrespective of the exact definition considered.

5.12.7. *Drones*

- (258) Drones are unmanned aerial vehicles which are remotely controlled, and which may be used by military operators for four types of mission: observation, communication (relays and scrambling), monitoring (electronic and communication intelligence), and combat.
- (259) In past decisions, the Commission considered that the market for drones is a relevant product market¹⁷⁵ but ultimately left open the question whether it has to be further segmented according to their mission (i.e. observation, communication, monitoring, and combat) or their technical characteristics. The Notifying Party submits that the relevant product market is that for drones.
- (260) The product market definition can be left open for the purpose of the present decision since the Transaction does not give rise to competition concerns irrespective of the exact definition considered.

5.12.8. *Ejection seats and components*

- (261) Ejection seats aim to rescue the pilot or other crew of military aircrafts in case of emergency. Like for any seat, the main components of ejection seats are the

172 Thermal imaging units are handheld equipment for armed-forces personnel enabling night vision for detection, recognition and identification. Visors, or sights, are equipment allowing to capture pictures in day and night conditions to detect, recognize and identify targets. Sights deliver information related to the target position to a firing system. They can also be used for reconnaissance mission. Sights are generally mounted on vehicles, ships, aircraft, helicopters or submarines. Missile seekers elaborate information relative to the target location, such information being used by the missile to adjust the missile trajectory.

173 These technologies relate to infrared detectors, gyrostabilisation, image-processing, mechanical design, optics, lasers.

174 Form CO, paras. 1817-1818.

175 Case COMP/M.1309 - *Matra/Aerospatiale*, para. 43, case COMP/M.1745 - *EADS*, para. 160.

bucket, back and headrest. However, ejections seats are also equipped with, e.g., a parachute, a survival pack and emergency oxygen supply.¹⁷⁶

- (262) The Notifying Party submits that, in view of their special characteristics and use, ejection seats constitute a relevant market on their own, whose precise delineation can be left open in the absence of any competition concern.¹⁷⁷ The Notifying Party further submits that ejection seat components can be segmented between (i) buckles, (ii) parachutes, and (iii) textile components for seats though, again, no competition issue arises irrespective of the precise market definition. These markets, according to the Notifying Party, are national in scope given national security interest involved and the monopsonistic feature of the national defence industry but the geographic dimension of the relevant markets may be left open.¹⁷⁸
- (263) The Commission agrees that product market definitions for ejection seats and components can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any plausible alternative definitions.

5.13. MRO services and spare parts

5.13.1. Introduction

- (264) Maintenance, Repair and Overhaul ("MRO") refers to the servicing of aircraft, engines and their respective components.

5.13.1.1. Types of MRO services

a. Line maintenance

- (265) Line maintenance refers to the aircraft maintenance checks that are carried out to ensure that the aircraft is fit for flight but that do not remove the aircraft from service. Line maintenance is generally performed at the different airports on the airline's route and consists of transit checks, pre-departure checks, night stops and the rectification of certain technical problems.
- (266) Mandatory checks are performed as part of line maintenance every X number of flight hours, as follows:
- an A-check is performed approximately every 800 flight hours and requires around 200-300 man-hours to complete;
 - a B-check is performed approximately every 4-6 months and is usually performed within 3 days at an airport hangar.

¹⁷⁶ Form CO, paras. 1600 and 1602.

¹⁷⁷ Form CO, para. 1615.

¹⁷⁸ Form CO, para. 1621 and 1624-1625.

b. Heavy maintenance

- (267) Heavy maintenance refers to regularly scheduled detailed inspection, maintenance, preventive maintenance and alteration of the entire aircraft and its installed components that will place the aircraft out of service for a pre-determined period of time.
- (268) Mandatory checks are performed as part of heavy maintenance every X number of flight hours, as follows:
- a C-check is performed approximately every 18 to 24 months or after a specific amount of actual flight hours as defined by the manufacturer;
 - a D-check/structural check is the most comprehensive and demanding checks, since the entire aircraft structure is taken apart for inspection and overhaul. Intermediate structural checks occur after 5-6 years and heavy structural checks occur after 10-12 years. Such checks will usually demand around 15,000 to 20,000 man-hours and around 1 month to complete at suitably equipped maintenance bases.

c. Engine maintenance

- (269) Engine maintenance refers to off-wing maintenance, preventive maintenance and alteration that restores the engine to designed operational condition. By regulation, the engine must be disassembled, inspected, its parts are to be repaired or replaced as necessary, and then re-assembled and tested.
- (270) In order to carry out this maintenance process, maintenance tasks have been segregated into two different categories.
- (271) Line maintenance, which includes any and all maintenance actions which can be carried out “on wing”, *i.e.* without removing the engine from the aircraft, while the aircraft is at an airport location. This includes routine checks, specific inspections, a limited number of repairs of the engine whenever possible (*e.g.* blending of dents on fan blades) and removing/replacing external components. Airlines generally have the capability to conduct line maintenance and only rarely outsource these services to the engine OEM or to independent MRO service providers.
- (272) Shop maintenance, which includes all maintenance actions for which engines need to be removed from the aircraft. Possible causes for shop visit can range from need to meet requirements for continued airworthiness and engine integrity which are safety-related, abnormal behaviour or mechanical failure discovered during health monitoring, unexpected failure, to fuel consumption improvement.
- (273) Shop maintenance can be performed on dedicated sites by airlines (albeit increasingly less frequent), engine OEM, or independent shops. These shops must be certified by their relevant authorities such as the Federal Aviation Authority (“FAA”), the European Aviation Safety Agency (“EASA”).
- (274) A shop visit, “engine overhaul”, may last 30 to 90 days or more (this explains why a fleet of “spare engines” is required in order to keep aircrafts flying). Typically, engine overhaul occurs at discretion, often at intervals of 8-10 years.

However, intervals between shop visits are very variable and vary depending on airworthiness limitations and directives, on operating conditions of the engine, as well as on the level of performance restoration chosen by the airline at the previous shop visit.

d. Component maintenance

- (275) Component maintenance comprises inspection, test and alteration of specific equipment and components installed on an aircraft, which can be repaired and are of a significant value.
- (276) Component parts are mainly repaired “on-condition”. This means that the maintenance actions required depend solely on the actual condition of the component, *i.e.* as long as the component works, no maintenance is required. The component condition is checked when failure is detected and/or within the framework of line maintenance and heavy maintenance services.
- (277) In addition, for some components such as safety parts, recommended or mandatory scheduled maintenance actions are set at specific flight hour or cycle or calendar thresholds. Scheduled maintenance for components is generically called “overhaul” and thresholds for an overhaul may vary according to the type of component and/or usage, irrespective of the aircraft type. These types of specific checks depend on the product and the platform, and may be ruled by safety authorities (FAA/EASA). The maintenance frequency depends on the component manufacturer recommendation, which is intrinsically linked to the product. Overhaul tasks usually include component disassembly, cleaning, replacement of parts and testing.

5.13.1.2. Types of MRO service providers

- (278) MRO service providers can be categorised as follows:
 - a. original system, equipment or component manufacturers (such as the Parties) providing MRO services with regard to their own system, equipment or component;
 - b. airlines and airline-owned MRO service providers (such as Lufthansa Technik or Air France Industries) servicing both their own fleet and that of third parties;
 - c. independent MRO service providers (such as ADAT or AJ Walter) and
 - d. airframers (such as Airbus and Boeing).
- (279) Airlines and airline-owned MRO service providers, independent MRO service providers and airframers usually offer MRO services for a broader portfolio of products or nose-to-tail (“NTT”) MRO services. Once they have won the contract with an airline, they can either undertake the MRO services themselves or sub-contract it to the respective original system, equipment or component manufacturers.

5.13.1.3. Types of spare parts

(280) While original spare parts qualified by the aircraft manufacturer on an aircraft platform can only be supplied by the original system, equipment or component manufacturers, alternate spare parts exist, developed and manufactured by third party spare parts suppliers. The main alternative forms of spare parts are as follows.

a. PMA

(281) “PMA” is an acronym for “Parts Manufacturer Approval.” It originated in the US and spread into the other parts of the world. Basically, the FAA permits the manufacture of replacement parts for aircraft if the part has been tested and meets FAA standards for airworthiness and the part is manufactured in accordance with FAA approved procedures.¹⁷⁹

b. OOPP

(282) “OOPP” is an acronym for Owner Operator Produced Parts. These are certified parts that can be manufactured by any airline/affiliated MRO having the required certification agreements for their own consumption as alternative to original supplier parts.

c. Surplus

(283) Instead of purchasing a new part, a customer can buy a used part on the second-hand market. Second-hand spare parts are in particular available for aircraft programmes which have been in operation for more than ten years.¹⁸⁰

d. STC

(284) Airlines have the possibility to have new components installed in their aircraft supplied by any alternative manufacturer holding a Supplemental or Supplementary Type Certificate (STC). An STC refers to a certificate issued by an aviation authority thereby approving the modification of an aeronautical product from its original design. STCs contain the product design change and states how the modification affects the existing type design.¹⁸¹

¹⁷⁹ PMA-holding manufacturers are *inter alia* Heico, Wencor, Chromalloy, JAB Aero Corp, Jet Repair Center Inc., Regent Aerospace Corp., Uniglobe Aerospace, Miraj, Naasco, Turbine Kinetics, Jets Parts Engineering, Seginus and Aerospace Turbine Rotables.

¹⁸⁰ Surplus spare parts are supplied by independent spare part providers such as GA Telesis, airlines or Tier 1/Tier 2 suppliers such as GE, Thales, Rockwell or Honeywell.

¹⁸¹ Alternative manufacturers holding an STC for the Parties' products are *inter alia* Aeroconseil, Aero Technics Design Ltd., Airbus, Northwest Aerospace Technologies Inc. and Airfrance (source: homepage of EASA - <https://www.easa.europa.eu/document-library/type-certificates/supplemental-type-certificates> - last downloaded on 12.12.2017).

e. Minor modification

(285) A Minor Modification is one that requires approval by safety agencies but has no appreciable effect on airworthiness or where the modification does not introduce new certification basis/interpretations/aspects of compliance or requires an extensive re-evaluation.

f. DER approved/DOA-holder MRO service:

(286) "DER" is the acronym for Design Engineering Representative. A DER is an individual who holds an engineering degree or equivalent, possesses an extensive technical knowledge and experience, and meets specific qualification requirements. DERs are very specialised and are given authorisations to perform approvals of the data (instructions) used to make certain modifications or repairs to aircraft. EASA has set out a similar system whereby organisations that design changes to aircraft, repairs of aircraft and parts and appliances need to hold a Design Organisation Approval (DOA). DER approved/DOA-holder MRO service providers are allowed to make repairs which do not follow the component maintenance manuals ("CMMs") for which they can use non-original spare parts.

5.13.2. MRO services

(287) The Notifying Party agrees with the Commission's decisional practice in distinguishing (i) line maintenance, (ii) heavy maintenance, (iii) engine maintenance and (iv) component maintenance; and submits that the Parties' activities only overlap with regard to component maintenance.¹⁸²

(288) The Notifying Party argues that at least as regards commercial aviation, no distinction should be made according to aircraft types as although some differences exist in the provision of component maintenance services to large commercial aircraft and regional aircraft on the one hand and business jets on the other hand, suppliers offer services across all aircraft segments.¹⁸³ The Notifying Party also submits that it might be appropriate to distinguish MRO services provided for commercial and military aircraft as MRO services for military aircraft are generally undertaken by the air force itself and only to a lesser extent by private MRO service providers; and as contractual and pricing terms differ between the two segments.¹⁸⁴ In any event, the Notifying Party submits that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.¹⁸⁵

(289) The Commission has previously distinguished (i) line maintenance, (ii) heavy maintenance, (iii) engine maintenance and (iv) component maintenance based on the part of the aircraft to be serviced and the level of service required.¹⁸⁶ The

182 For the sake of completeness, it is noted that Safran is also active in engine maintenance

183 Paras. 1901-1903 of the Form CO.

184 Para. 1905 of the Form CO.

185 Paras. 1904 and 1907 of the Form CO.

186 Case COMP/M.6410 – *UTC / Goodrich*, para. 174; case COMP/M.3280 – *Air France /KLM*, para. 39; case COMP/JV.19 – *KLM / Alitalia*, paras. 56-57.

Commission concluded that a further differentiation should be made according to the aircraft type that is serviced.¹⁸⁷ The Commission also considered but ultimately left the question open, whether a distinction between commercial and business aviation is appropriate.¹⁸⁸ It moreover noted that line maintenance and heavy maintenance can be further subdivided according to nature and frequency of the checks involved (A, B, C and D-checks).

- (290) Only the market for component maintenance is of relevance for this decision as the Parties' activities overlap only in the provision of this MRO service.
- (291) The market investigation confirmed that different types of MRO service providers – such as original system, equipment or component manufacturers ("OEMs"); airlines and airlines-owned MRO service providers; independent MRO service providers and airframers – compete against each other.¹⁸⁹ The market investigation further indicated that the competitive conditions vary substantially between MRO services provided for commercial and military aircraft.¹⁹⁰ With regard to the further segmentation of the MRO market according to aircraft types, the market investigation did not deliver unambiguous results. While the majority of the airlines stated that there are no significant differences between the different segments,¹⁹¹ OEMs and airframers were divided regarding this question.¹⁹²
- (292) However, the exact product market definition can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

5.13.3. Spare parts

- (293) The Notifying Party submits that it is not easy to segregate the provision of spare parts from the provision of MRO services as the latter necessarily involves the replacement of faulty pieces. In any event, the Notifying Party submits that the exact product market definition can be left open as no competition concerns arises under any alternative product market definition.¹⁹³
- (294) In a previous decision the Commission has considered the existence of a relevant product market for spare parts separate from the provision of MRO services.¹⁹⁴

187 Case COMP/JV.19 – *KLM / Alitalia*, paras. 56-57.

188 Case COMP/M.6410 – *UTC / Goodrich*, paras. 192-195.

189 Replies to question 212 of eQuestionnaire 1 – Competitors, question 18 of eQuestionnaire 2 – Airlines and question 140 of eQuestionnaire 3 – Airframers.

190 Replies to question 213 of eQuestionnaire 1 – Competitors, question 19 of eQuestionnaire 2 – Airlines and question 141 of eQuestionnaire 3 – Airframers.

191 Replies to question 20 of eQuestionnaire 2 – Airlines.

192 Replies to question 214 of eQuestionnaire 1 – Competitors and question 142 of eQuestionnaire 3 – Airframers.

193 Para. 1912 of the Form CO.

194 Case COMP/M.6410 – *UTC / Goodrich*, paras. 182-191.

- (295) The market investigation confirmed that spare parts not manufactured by the OEMs - see section 5.13.1.3 – belong to the same product market as the original spare parts. Indeed, the majority of OEMs and airframers and all airlines indicated that these are substitutable with each other.¹⁹⁵
- (296) However, the question whether a separate market exists for spare parts from that of MRO can be left open for the purpose of this decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any of the alternative definitions.

6. GEOGRAPHIC MARKET DEFINITION

- (297) The Notifying Party submits that, in line with past Commission decisions, the geographic markets for all aerospace (sub-)systems and components relevant for the assessment of the Transaction are worldwide in scope,¹⁹⁶ save for the systems and equipment for defence and space applications discussed in paragraphs (299) - (301) below. In particular, the Notifying Party submits that aerospace systems and their components are sourced globally, there are significant trade flows across countries, transport costs do not play a significant role and aircraft manufacturers generally apply a worldwide purchasing policy.¹⁹⁷ From a supply-side perspective, the manufacturing of these systems and components is also organised on a worldwide scale and suppliers are active across countries.¹⁹⁸ Likewise, prices are quoted on a worldwide basis and do not differ according to geographic region.¹⁹⁹
- (298) In the past, the Commission found that markets for various aerospace systems and components were worldwide in scope for reasons broadly consistent with those put forward by the Notifying Party.²⁰⁰ The outcome of the market investigation has confirmed that all markets, including for spare parts and maintenance, for commercial aircraft (sub-)systems and components relevant to the assessment of the Proposed Concentration are worldwide in scope in the eyes of both aircraft manufacturers and suppliers, due to the global organisation of procurement and supply.²⁰¹ Only isolated comments pointed to a tendency of certain Russian, Chinese and Indian aircraft manufacturers to source locally, at least for certain

195 Replies to question 217 of eQuestionnaire 1 – Competitors, question 24 of eQuestionnaire 2 – Airlines and question 146 of eQuestionnaire 3 – Airframers.

196 Form CO, paras. 368, 478, 658, 860, 1177-1178, 1309 and 1913.

197 Form CO, paras. 368, 477, 659, 860, 914, 1017, 1178, 1310, 1574, 1698, 1780 and 1915.

198 *Idem.*

199 *Idem.*

200 See, e.g., Case M.290 – *Sextant/BGT-VDO*; Case M.368 – *Snecma/IT*; Case M. M.697 – *Lockheed Martin/Loral corporation*; Case M.2168 – *Snecma/Hurel-Dubois*; Case M.2220 – *General Electric/Honeywell*; Case M.4561 – *GE/Smiths*; Case M.5426 – *Dassault Aviation/TSA/Thales*; Case M.6410 – *UTC/Goodrich*; Case M.6844 – *GE/Avio*.

201 Replies to questions 6-7 and 11 of eQuestionnaire 1 – Competitors; replies to questions 4-5 and 9 of eQuestionnaire 3 – Airframers.

systems, and to the facts that transport costs may still matter or that prices may sometimes vary across regions.

- (299) In contrast, with respect to defence systems and equipment the Notifying Party submits that the relevant markets are national in scope because, in light of their strategic importance, States prefer to rely on domestic suppliers for their sourcing. Specifically, the Notifying Party submits that the markets for strategic and tactical missiles, missile propulsion systems, telemetry equipment for strategic missiles, defence optronics, drones, ejection seats and components for ejection seats are national in scope, although they note that instances of broader geographic competition exist in relation to certain equipment (e.g. optronics).
- (300) In the past, the Commission has left open the possibility to define markets for specific military and defence applications on an EEA-wide or national basis due to, e.g., the existence of specific government regulations (such export restrictions) or national security-related preferences for local suppliers.²⁰² The geographic market definition of the relevant defence systems and equipment markets can also be left open for the purpose of the present decision since the Transaction does not lead to serious doubts as to its compatibility with the internal market under any plausible alternative definition.²⁰³
- (301) As regards systems and equipment for space launchers, the Commission found in the past that competition for (sub-)systems and components for ESA launcher programmes takes place at European level, notably due to the selection of suppliers based on the "*juste retour*" principle.²⁰⁴ In the absence of indications to the contrary, the Commission understands that this is still the case so that the relevant geographic markets for prime contracting for ESA space launchers, telemetry and valves equipment for space launchers can be considered as EEA-wide for the purpose of the present decision.

7. COMPETITIVE ASSESSMENT

- (302) The present section assesses successively whether and the extent to which the Proposed Concentration is likely to give rise to horizontal, vertical and conglomerate non-coordinated effects on the markets examined in Sections 4 and 5 above. As noted, however, the Transaction does not lead to affected markets with respect to APU generators (section 5.1.1.3), battery systems (section 5.1.4), APUs (section 5.6.3) and flight control actuation (section 5.8.2); as a result, these markets are not further discussed below.

²⁰² Case COMP/M.4653 - *MBDA/Bayern- Chemie*, paras. 21 and 23; Case COMP/M.5032 - *Roxel/Protac*, para. 33; Case COMP/M.1309 - *Matra/Aerospatiale*, para. 45; Case COMP/M.1745, *EADS*, para. 163.

²⁰³ The outcome of the market investigation indicates that the relevant geographic scope very much depends on the system in question, the type of technology and how critical it is from a strategic point of view. Thus procurement does appear to take place on a worldwide basis based on technical, industrial and commercial competitiveness for commodity products while competition can be outplaced by other considerations of a public policy nature for more sensitive systems in case there is domestic or regional (i.e., EEA) supply capabilities.

²⁰⁴ Case M.5426 - *Dassault Aviation/TSA/Thales*, para. 11. Case M.7353 - *Airbus/Safran/JV*, paras. 94-97

7.1. Horizontal non-coordinated effects

7.1.1. Electrical generation systems

- (303) Depending on the precise product market definition ultimately retained, the Transaction gives rise to horizontally affected markets. Particularly, the following plausible sub-segments will be affected: (i) Main DC LV – all types of aircraft; (ii) Main DC LV – Helicopters; (iii) Main AC VF – Helicopters.
- (304) On each of the above plausible segments, the increment brought about by the Transaction is limited and the merged entity will continue to face competition from a number of credible competitors. Particularly, the estimated market shares of the Parties and their competitors are as follows:

Table 1: Market for Main DC LV – all types of aircraft (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
SAFRAN	[30-40]%
ZODIAC	[0-5]%
THALES AES	[20-30]%
SKURKA	[20-30]%
AMETEK	[5-10]%
MEGGITT	[5-10]%
ASTRONICS	[0-5]%
UNKNOWN	[5-10]%

Table 2: Market for Main DC LV – Helicopters (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
SAFRAN	[30-40]%
ZODIAC	[5-10]%
SKURKA	[30-40]%
THALES AES	[10-20]%
MEGGITT	[0-5]%
UNKNOWN	[0-5]%

Table 3: Market for Main AC VF – Helicopters (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
SAFRAN	[20-30]%
ZODIAC	[0-5]%
HONEYWELL	[30-40]%
THALES AES	[10-20]%
UTAS	[0-5]%
ASE SPA	[0-5]%
UNKNOWN	[20-30]%

- (305) The Notifying Party claims that (i) the Transaction will result in an insignificant overlap in the parties’ activities, with a very limited increment in market shares, (ii) post-Transaction the parties will continue to face strong competitors on each and every relevant market for generation systems, and (iii) aircraft manufacturers will continue to exert strong bargaining power over the merged entity.
- (306) The market structure illustrated above indeed indicates that the merged entity will continue to face competition from large competitors and that the increment brought about by Zodiac is below [5-10]% under any plausible market definition. More specifically, on the market for Main DC LV – all type of aircrafts, the merged entity will have a combined market share of [30-40]% and it will continue to face competition from Thales ([20-30]%) and Skurka (20-30)%). On this market Zodiac presence is minimal, at [0-5]%. On the remaining affected markets, the merged entity will continue to face competitors having similar (Main DC LV – Helicopters) or significantly larger (Main AC VF – Helicopters) market shares.
- (307) The structural data provided by the Notifying Party supports the claim that Zodiac is not a significant competitive force on these markets, and this claim is also supported by the result of the market investigation. All competitors and the vast majority of customers (airframers) responding to the market investigation in fact indicated that they consider Zodiac as a marginal player in all the plausible markets for main generators, including the ones affected by this Transaction.²⁰⁵
- (308) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to Main DC LV – all types of aircraft, Main DC LV – Helicopters and, Main AC VF – Helicopters.

²⁰⁵ Replies to questions 27 and 28 of eQuestionnaire 1 – Competitors and 25 and 26 of eQuestionnaire 3- Aiframers.

7.1.2. *Electrical distribution systems and components*

7.1.2.1. Electrical distribution systems

(309) The Transaction gives rise to horizontally affected markets regarding electrical distribution systems. On an overall market for electrical distribution systems, and depending on the market share calculation methodology employed,²⁰⁶ the Parties have a combined market share of close to [30-40]%, with an overlap of around [0-5]%, over the 2016 - 2020 period. On a market for primary distribution systems, the Parties' combined market share is of [40-50]% in 2016, with an overlap of [0-5]% (Safran). If the market for primary distribution systems is further segmented according to type of aircraft, the Transaction only leads to a horizontally affected market in relation to smaller aircraft, and in particular business aircraft, on which Safran has a market share of [10-20]%, and Zodiac a share of [30-40]% in 2016. [...].

Table 4: Market for primary distribution systems (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
Safran	[0-5]%
Zodiac (including B787 sales) ²⁰⁷	[40-50]%
GE Aviation	[10-20]%
UTAS	[10-20]%
Honeywell	[5-10]%
Astronics	[0-5]%
Others (ASE Spa, Esterline's Leach, AVIC SAEC,...)	[10-20]%

(310) The Notifying Party submits that the Transaction does not create competition concerns on the market for primary distribution systems because (i) Safran is a minor supplier of distribution systems, (ii) the merged entity will face strong competitive constraints from established suppliers like UTAS, GE Aviation and Honeywell, as well as smaller players (Astronics, Esterline) and new entrants like AVIC SAEC and AVIC SAE.²⁰⁸

(311) Post-Transaction, in addition to the merged entity, the main suppliers of primary distribution systems will be UTAS, GE Aviation and Honeywell, which are active across the entire range of aircraft sizes and applications. The majority of

²⁰⁶ On the Boeing 787 programme UTAS is the Tier-1 supplier of the whole electrical system, including generation and distribution. The primary distribution system was outsourced to Zodiac, which thus acts as Tier-2 supplier to UTAS. For the calculation of market shares for the purpose of the present decision, the sales of primary distribution system of the B787 have been attributed to Zodiac.

²⁰⁷ If the B787 sales of primary distribution systems are allocated to UTAS instead of Zodiac, UTAS' market share is [30-40]% and Zodiac's [20-30]%.

²⁰⁸ Form CO, paras. 515 – 520.

respondents to the market investigation noted that Safran competes with Zodiac and other players in this market but that it is not a significant supplier of primary distribution systems.²⁰⁹ The large majority of market participants considered that the merged entity will continue to face strong competition for primary distribution on all aircraft categories and that the Transaction will not have a negative impact on the intensity of competition or price level in the market for primary distribution systems²¹⁰ as a result of horizontal effects.²¹¹

- (312) On the market for secondary distribution systems, the Parties' combined market share was [10-20]% in 2016, with an overlap of [0-5]% (Safran). If the market for secondary distribution systems is further segmented according to type of aircraft, the Transaction only leads to a horizontally affected market in relation to smaller aircraft, and in particular business aircraft, on which Safran has a market share of [10-20]%, and Zodiac a share of [10-20]% in 2016. [...].

Table 5: Market for secondary distribution systems (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
Safran	[0-5]%
Zodiac	[5-10]%
UTAS	[30-40]%
GE Aviation	[20-30]%
Honeywell	[10-20]%
Astronics	[0-5]%
Others (ASE Spa, AVIC SAE,...)	[10-20]%

- (313) UTAS, GE Aviation and Honeywell are the leading suppliers on the market for secondary distribution and will continue to exert a significant competitive constraint on the Parties post-Transaction. The large majority of respondents to the market investigation considered that the merged entity will continue to face strong competition for secondary distribution on all aircraft categories and that the Transaction will not have a negative impact on the intensity of competition or

²⁰⁹ Replies to question 51 of eQuestionnaire 1 – Competitors and question 43 of eQuestionnaire 3- Aiframers.

²¹⁰ Replies to questions 53, 73 and 74 of eQuestionnaire 1 – Competitors and questions 45, 56 and 57 of eQuestionnaire 3- Aiframers.

²¹¹ Several market participants expressed concerns about the potential impact on the market for distribution systems that an integrated supplier of electrical systems can have. This issue is discussed in section 7.3.1 on conglomerate effects.

price level in the market for secondary distribution systems²¹² as a result of horizontal effects.²¹³

- (314) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to primary and secondary distribution systems under any of the alternative product market definitions.

7.1.2.2. Electrical distribution components

- (315) The Parties' activities overlap in the manufacturing and supply of electrical distribution components. Safran supplies contactors, circuit breakers and RCCBs. [...]. Zodiac also supplies contactors, relays, fuses and circuit breakers. [...].
- (316) The Transaction only leads to affected markets if each distribution component is considered to constitute a distinct relevant product market and the only affected market under such segmentation is that for contactors, on which Safran and Zodiac have a market share of [10-20]% and [30-40]%, respectively. The Notifying Party indicates that its main competitors on the supply of contactors are Esterline/Leach, TE Connectivity, Kissling and Ametek. The Notifying Party however submits that it is not in a position to identify the supplier of contactors on platforms on which the Parties are not active and it is therefore unable to provide their competitors' market shares²¹⁴.
- (317) The Notifying Party submits that the Transaction will not give rise to competition concerns on the market for contactors because the market is highly competitive, with several significant suppliers offering competitive products. The Notifying Party also submits that each of the distribution components they supply, including contactors, is available from other suppliers on the market with at least the same or higher quality and technical performances.²¹⁵
- (318) The market investigation revealed that the Parties' main competitors for the supply of contactors are Esterline/Leach, TE Connectivity and Ametek.²¹⁶ The competitors and airframers responding to the market investigation furthermore confirmed that Esterline/Leach, TE Connectivity and Ametek offer the same type of contactors as those supplied by the Parties and there are no contactors which Safran and Zodiac both supply²¹⁷ and others do not.²¹⁸ The market investigation

212 Replies to questions 53, 73 and 74 of eQuestionnaire 1 – Competitors and questions 45, 56 and 57 of eQuestionnaire 3- Airframers.

213 Several market participants expressed concerns about the potential impact on the market for distribution systems that an integrated supplier of electrical systems can have. This issue is discussed in section 7.3.1 on conglomerate effects.

214 Form CO, para. 499.

215 Form CO, para. 555.

216 Replies to questions 50 and 52 of eQuestionnaire 1 – Competitors, and question 44 of eQuestionnaire 3 - Airframers.

217 One market participant indicated that Zodiac supplies high-power contactors which are not available from other suppliers. Safran however does not supply high-power contactors. The

furthermore suggests that there is a certain degree of differentiation between the Parties' products and that other suppliers are closer competitors to Zodiac than Safran is. Indeed, Safran only supplies low to medium power contactors, whereas Zodiac's portfolio includes high power contactors,²¹⁹ on which it competes closely with Esterline/Leach and TE Connectivity. The Commission also notes that Safran and Zodiac did not compete against each other in any of the tenders for contactors in which any of them participated over the last [...] years.²²⁰ The Parties therefore do not appear to be particularly close competitors on the potential market for the supply of contactors.

- (319) In assessing the effects of the Transaction on competition for the supply of contactors for future aircraft platforms, the Commission also takes into account the fact that electromechanical components, including contactors, are progressively being replaced by electronic SSPCs,²²¹ which would thus represent an additional competitive constraint on suppliers of contactors.
- (320) Finally, while certain respondents expressed concerns about the merged entity's incentive to restrict the supply of contactors to its competitors for distribution systems,²²² a large majority of participants in the market investigation however indicated that there will be sufficient sources of supply of contactors available post-Transaction.²²³ Indeed, the vast majority of respondents considered that the increased concentration on the market for contactors will not affect the intensity of competition and the price level on the market for contactors, which respondents expect will remain the same after the Transaction.²²⁴
- (321) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market as a result of horizontal effects on the market for distribution components or the narrower segments for contactors, under any alternative product market definitions.

7.1.3. Cockpit control panels and cockpit components

- (322) With regard to flight controls, the Transaction gives rise to horizontally affected markets regarding cockpit control panels and cockpit components.

concerns expressed in relation to high-power contactors are discussed in section 7.2.1. on vertical effects.

218 Replies to questions 56 and 58 of eQuestionnaire 1 – Competitors, and question 44 of eQuestionnaire 3 - Airframers Non-confidential minutes of a call with a competitor of 26 July 2017.

219 High power contactors are contactors with either high voltage (230V) or normal voltage (115V) but strong current (above 330 Amp.)

220 Form CO, Annex 46.

221 Form CO, paras. 424-425.

222 These concerns are discussed in section (366) on vertical effects.

223 Replies to questions 200 of eQuestionnaire 1 – Competitors and 133 of eQuestionnaire 3 – Airframers.

224 Replies to questions 202 of eQuestionnaire 1 – Competitors and 135 and 136 of eQuestionnaire 3 – Airframers.

7.1.3.1. Cockpit control panels

(323) Safran and Zodiac both design, develop and supply cockpit control panels for all types of aircrafts. The market shares of the Parties and their competitors are as follows.

Table 6: Market for cockpit control panels (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
Safran	[0-5]%
Zodiac	[20-30]%
Korry / Esterline	[20-30]%
Sirio Panel / Finmeccanica	[20-30]%
BAE	[10-20]%
Honeywell	[0-5]%
Others (Staco Systems, Aerospace Optics, Astronics Corporation, UTAS...)	[10-20]%

(324) The combined market shares of the Parties are [20-30]%, with a very limited increment ([0-5]%) brought about by Safran. Two competitors (Korry/Esterline and Sirio Panel/Finmeccanica) with comparable market shares to the merged entity will remain on the market. Furthermore, BAE – with a market share of [10-20]% – as well as other smaller competitors will continue to exert a competitive constraint on Safran post-transaction.

(325) A large majority of participants in the market investigation also indicated that there will be sufficient number of competitors remaining post-transaction²²⁵ and that the intensity of competition or the price level on the market for cockpit control panels will remain the same.²²⁶

(326) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to cockpit control panels.

7.1.3.2. Cockpit components

(327) Safran and Zodiac are both suppliers of various cockpit components. Safran manufactures in particular illuminated push-button annunciator switches, designed for use in the crew stations of commercial and military aircraft, shipboard systems, ground moving vehicles and industrial applications. Safran

²²⁵ Replies to questions 200 of eQuestionnaire 1 – Competitors and 133 of eQuestionnaire 3 – Airframers.

²²⁶ Replies to questions 202 of eQuestionnaire 1 – Competitors and 135 and 136 of eQuestionnaire 3 – Airframers.

designs, develops and manufactures sunlight readable, NVIS-compatible, incandescent and LED lighted pushbutton switches and indicators, as well as some more basic switches such as toggles, rockers, push-buttons, etc.

- (328) Zodiac supplies light plates, toggle switches and push-buttons (also LAMP and LED ones) for both aircraft and helicopters. Its products can be customized and adapted with NVIS Technology for specific military needs. Zodiac can also supply any accessories linked to toggle switches and push-buttons.
- (329) The market shares of the Parties and their competitors are as follows.

Table 7: Market for cockpit components (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
Safran	[0-5]%
Zodiac	[20-30]%
Esterline (Korry, Janco, Mason)	[20-30]%
Otto	[5-10]%
Sirio Panel / Finmeccanica	[0-5]%
Honeywell	[0-5]%
Aerospace Optics	[0-5]%
Spectralux	[0-5]%
FTG	[0-5]%
Luminescent Systems	[0-5]%
Others (including IEC, Cole, Grayhill, Aero Maoz, Photo Etch)	[20-30]%

- (330) The combined market shares of the Parties are [20-30]%, with a very limited increment of [0-5]% brought about by Safran. Esterline will remain the market leader post-transaction, with a market share of [20-30]%. Numerous other competitors will also continue to exert a competitive constraint on the merged entity post-transaction.
- (331) A large majority of participants in the market investigation also indicated that there will be sufficient number of competitors remaining post-transaction²²⁷ and that the intensity of competition or the price level on the market for cockpit components will remain the same.²²⁸
- (332) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal

²²⁷ Replies to questions 201 of eQuestionnaire 1 – Competitors and 134 of eQuestionnaire 3 – Airframers.

²²⁸ Replies to questions 202 of eQuestionnaire 1 – Competitors and 135 and 136 of eQuestionnaire 3 – Airframers.

market with respect to cockpit components under any alternative product market definitions.

7.1.4. Fans for ECS

- (333) The Transaction gives rise to a horizontal overlap on the market for the manufacturing and supply of fans for ECS. Safran provides a range of fans for use in the air conditioning of both commercial aircraft and small aircraft. Zodiac supplies fans for small aircraft and is not active in the commercial aircraft segment.
- (334) On a worldwide market for ECS fans for small aircraft, Safran and Zodiac have a market share of [10-20]% and [10-20]%, respectively, thus together accounting for a quarter of the worldwide sales of fans for ECS for small aircraft in 2016. Their main competitors are Ametek Rotron (with a market share of [40-50]%) and LMB ([20-30]%).²²⁹ A number of other suppliers, such as Electromech Technologies, Curtiss Wright, Honeywell, are also active on the market.
- (335) The market shares of the Parties are similar under alternative market segmentations. Specifically, if the market for fans for ECS is segmented according to power technology rather than aircraft size, the Transaction only results in an overlap on the DC electrical fans segment, on which Safran has a market share of [10-20]% and Zodiac has [10-20]%.²³⁰ If a further segmentation into fans used for air conditioning and fans used for bleed air control is considered, the market shares remain similar on the air conditioning segment. Safran does not supply fans for bleed air control, and Zodiac only has limited sales in this area.²³¹
- (336) The Notifying Party submits that the Transaction will not lead to competition concerns on the market for fans for ECS for small aircraft (or any other plausible relevant segment of the ECS fans market) because the merged entity will continue to face strong competition from the other market players, in particular Ametek Rotron and LMB, which offer a wide range of fans for VCS systems, comparable to those of the Parties, at competitive prices. The Notifying Party further submits that the manufacturing of VCS fans requires basic technology and the barriers to enter this market are thus relatively low.²³²
- (337) The market investigation has confirmed that ECS fans for small aircraft are supplied by several other manufacturers, whose products are comparable to those of the Parties, and that there are no specific fan types on which the Parties are particularly close competitors.²³³ The tender data submitted by the Parties also suggests that they Parties do not appear to be particularly close competitors on

229 Form CO, para. 1583.

230 Zodiac does not supply mechanical fans or AC fans.

231 Notifying Party's reply to question 13 of RFI I.4 of 4 December 2017.

232 Form CO, paras. 1593 and 2768.

233 Replies to questions 188 of eQuestionnaire 1 – Competitors and 118 of eQuestionnaire 3 – Airframers.

fans for ECS for small aircraft: out of a total of [...] tenders in which Safran and Zodiac participated in [...], they bid against each other in only [...] of them.²³⁴

- (338) Market participants also confirmed that the type of fans supplied by both Safran and Zodiac are based on a relatively basic technology and considered that other equipment manufacturers, in particular providers of fans for commercial aircraft, could relatively easily start supplying them.²³⁵
- (339) Finally, the market investigation did not reveal any concerns²³⁶ on the part of customers or competitors as a result of the concentration in the market for fans for ECS.²³⁷
- (340) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to fans for ECS under any of the alternative product market definitions.

7.1.5. *Wiring systems and components*

- (341) The Parties' activities overlap in the supply of wiring systems. However, Safran's business focuses on general harnesses, whereas Zodiac's business focuses on harsh environment harnesses for landing gears, engines, nacelles and ammunitions (missiles). Safran does manufacture some harsh environment harnesses but only for internal use; likewise, Safran is not active on the merchant market for wiring components.
- (342) On a worldwide market for wiring systems combining general and harsh environment harnesses, the Notifying Party estimates that Safran currently holds a [40-50]% market share, compared to [0-5]% for Zodiac. That market is therefore affected but the increment brought about by the Transaction would be limited and significant competitors would continue to exercise effective competitive constraints on the merged entity, including Fokker Elmo, Latecoere, Ducommun, Glenair, GE/Unison, Ultra Electronics or New Chapel Electronics, while various aircraft manufacturers and system suppliers would retain in-house capabilities. When considering the different types of aircraft (i.e., commercial, regional, business jets, helicopters, military planes), only the commercial and regional aircraft segments are affected and the increment resulting from the integration of Zodiac with Safran would remain limited ([0-5]%), except for regional aircrafts ([10-20]%). However, Safran's share of wiring systems for regional aircraft ([20-30]%) is significantly lower than at aggregate level and the overall value of such a market is comparatively small compared to other segments due to the fact that

234 Form CO, Annex 51.

235 Non-confidential minutes of a call with a competitor of 8 November 2017.

236 One competitor expressed concerns about the potential impact on the market for ECS (including fans) that an integrated supplier of electrical systems can have. This issue is discussed in section 7.3.2 on conglomerate effects.

237 Replies to questions 192 and 193 of eQuestionnaire 1 – Competitors and 125 and 126 of eQuestionnaire 3 – Airframers.

general wiring systems for a number of major regional programmes are procured in-house and thus not accounted for in the market size.

- (343) On a separate worldwide market for general wiring systems, Safran's share is significant ([40-50]%) but the increment brought about by the Transaction is very limited ([0-5]%) and remains limited irrespective of the aircraft type ([0-5]%). As noted, Safran is not active on a distinct worldwide market for harsh environment harnesses and Zodiac's position remains modest ([10-20]%) on such market, though it varies across aircraft types and appears significant for commercial aircraft ([30-40]%) and regional platforms ([40-50]%). However, when considering different end-applications, it appears that Zodiac's position is significant only in relation to landing gear wiring systems ([90-100]%) but remains limited on the other segments of engines, nacelles or ammunitions wiring systems, including across aircraft types ([0-5]%).
- (344) In relation to wiring components, Zodiac supplies backshells and fittings, on the one hand, and conduits and sleeves, on the other hand, but does not manufacture or supply cables or connectors. At aggregate worldwide level, Zodiac's market share amounts to [5-10]% for backshells and fittings and [10-20]% for conduits and sleeves;²³⁸ on each of these markets, Zodiac competes with TE Connectivity, Glenair, Amphenol, Esterline, Federal Mogul and others. Safran is not present on the merchant market for wiring components.
- (345) The complementarity of Safran and Zodiac's wiring systems has been confirmed by the market investigation. In particular, a majority of respondents including various competing suppliers consider that the Parties are not close competitors in the supply of wiring systems or components, irrespective of the segment considered.²³⁹ Similarly, a majority of respondents believe that the intensity of competition will remain the same or increase post-merger across all of the markets considered and none of them finds it likely that prices will increase as a result of the Transaction,²⁴⁰ with one exception arising out of customer foreclosure concerns in relation to conduits and sleeves, as dealt with in section 7.2.8. below.
- (346) In line with the Notifying Party's submission, the market investigation has also confirmed that a number of competing suppliers are active in wiring systems and components, across the various segments considered.²⁴¹ Likewise, both airframers

238 The Commission did request and obtain wiring component market data split by segment from which it results that: (i) Zodiac only supplies backshells and fittings for general harnesses ([5-10]%) ; (ii) Zodiac's share of conduit and sleeves is significant for landing gear harsh environment harnesses ([40-50]%) but remains modest (<[10-20]%) for general wiring systems or other harsh environment segments.

239 Replies to question 87 of eQuestionnaire 1 – Competitors; Replies to question 69 of eQuestionnaire 3 - Airframers. This is irrespective of the fact that, once a supplier of wiring system has been selected, be it Safran, Zodiac or another supplier, switching may be hampered by technical/design constraints that may require efforts and time to overcome.

240 Replies to questions 91 and 92 of eQuestionnaire 1 – Competitors; Replies to questions 72 and 73 of eQuestionnaire 3 - Airframers.

241 Replies to question 85 of eQuestionnaire 1 – Competitors; minutes of conference call with Fokker Elmo on 29 August 2017, para. 17.

and system suppliers appear to have in-house capabilities.²⁴² Overall, major wiring system customers submit that *"many suppliers exist for these products"* and therefore that *"there is a lot of competition on the market"*, with the consequence that *"there is sufficient competition today to prevent Safran/Zodiac from increasing prices post-transaction"*.²⁴³

- (347) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to unilateral effects on the worldwide markets for wiring systems and components (including on possible separate markets for general harnesses on the one hand and harsh environment harnesses on the other hand, segmented by type of aircraft or by end application), under any alternative product market definitions.

7.1.6. MRO services

- (348) The Parties' activities overlap with regard to the provision of component maintenance.
- (349) Aftermarket sales related to aerospace components represent a significant value given the long life cycle of an aircraft. In 2016, Safran achieved component MRO revenues of EUR [...], of which EUR [...] related to MRO services and EUR [...] related to spare parts. Zodiac on the other hand achieved component MRO revenues of EUR [...] in 2016, of which EUR [...] related to MRO services and EUR [...] related to spare parts.²⁴⁴ The lucrative nature of the aftermarket was also confirmed by several market participants in the market investigation.
- (350) The Notifying Party claims that the Parties are unable to provide market share data separately for MRO services and spare parts, as well as broken down according to aircraft types. On an overall MRO market – encompassing all MRO services and spare part supply across all aircraft segments – Safran and Zodiac achieved a market share of [5-10]% and [0-5]% in 2016, respectively. On an overall component maintenance market Safran's and Zodiac's market shares were respectively [5-10]% and [5-10]%.²⁴⁵ The Notifying Party submits that the Parties do not produce any component with regard to which third parties are not able to provide MRO services.²⁴⁶
- (351) Due to a lack of market share data on the narrowest possible product market, the Commission has taken a conservative approach and analysed the possible effects of the Transaction on all plausible MRO markets. However, the Commission considers that Transaction does not raise competition concerns with respect to MRO services even based on the narrowest possible product market definition

242 Replies to question 85 of eQuestionnaire 1 – Competitors; Replies to question 72 of eQuestionnaire 3 – Airframers.

243 Replies to questions 88 of eQuestionnaire 1 – Competitors; Replies to questions 69 and 73 of eQuestionnaire 3 - Airframers.

244 [...].

245 Para. 1923 of the Form CO.

246 Notifying Party's reply to question 5 of pre-notification RFI03.

(separate component maintenance markets for each aircraft type) because of the following reasons.

- (352) First, the Parties do not service each other's components, therefore irrespective of their achieved market shares, they are not currently directly competing with each other. Indeed, Safran and Zodiac only occasionally service third party components when solicited by the customer.²⁴⁷
- (353) Second, although some respondents indicated in the market investigation that the enlargement of the product portfolio could potentially increase the market power of the merged entity vis-à-vis customers, the Commission considers that the Transaction will not change the competitive landscape because the additional increment would not enable the merged entity to provide NTT MRO services and alternative MRO service providers will remain available post-transaction.
- (354) Indeed, the merged entity will continue to face competition from the different players active on the MRO market with regard to its own components. The competitive strength of the third party MRO service providers is well-illustrated by the fact that they are servicing a large proportion of the Parties' components.²⁴⁸
- (355) The Commission notes that the above assessment remains valid even for military MRO services defined as national in scope.
- (356) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to MRO services under any of the alternative product market definitions.

7.1.7. Spare parts

- (357) The Parties' activities overlap with regard to the supply of spare parts.
- (358) As noted above in section 7.1.6, the Notifying Party claims that the Parties are unable to provide market share data separately for MRO services and spare parts, as well as broken down according to aircraft types. On an overall MRO market – encompassing all MRO services and spare part supply across all aircraft segments – Safran and Zodiac achieved a market share of [5-10]% and [0-5]% in 2016, respectively. On an overall component maintenance market Safran's and Zodiac's market shares were respectively [5-10]% and [5-10]%.²⁴⁹
- (359) Due to a lack of market share data on the narrowest possible product market, the Commission has taken a conservative approach and analysed the possible effects of the Transaction on all plausible markets for spare parts. However, the

²⁴⁷ Paras. 1884-1886 and 1894-1895 of the Form CO; para. 24 of the minutes of a meeting with the Parties on 27.10.2017.

²⁴⁸ Safran estimates that third party MRO service providers provide [...] % of the services with regard to its electrical systems and ventilation for commercial and regional aircraft and [...] % with regard to nacelles. Zodiac estimates that it captures only [...] % of the MRO services with regard to its own components.

²⁴⁹ Para. 1923 of the Form CO.

Commission considers that Transaction will not change the competition landscape even based on the narrowest possible product market definition (separate relevant product market for spare parts) because of the following reasons.

- (360) First, the Parties do not manufacture each other's components for the aftermarket, therefore irrespective of their achieved market shares, they are not currently directly competing with each other. Indeed, Safran and Zodiac do not manufacture spare parts for third party components.
- (361) Furthermore, the merged entity will continue to face competition from alternative spare parts that can be used instead of their original products, developed and manufactured by third party spare parts suppliers (see section 5.13.1.3). Zodiac estimates that the market penetration of these spare parts suppliers is almost 30%.

Figure 16: Market penetration of the different types of spare parts manufacturers in relation to Zodiac's product portfolio (source: Form CO)

[...]

- (362) The Parties further consider that alternative spare part suppliers are present on all product segments (including critical components such as the engines) and that with the ageing fleet of some aircraft and associated retirement, there will be in the future an increase of second-hand spare parts availability.²⁵⁰
- (363) However, it should be also noted that some respondents indicated in the market investigation that the lifetime and reliability of spare parts of different origin may vary which can increase maintenance cost and decrease overall aircraft safety.²⁵¹
- (364) The Commission therefore considers that the competitive constraint exerted by non-original spare parts is currently limited. In this regard, the Commission takes note of the concerns raised in the market investigation indicating the customers' dependency on the OEM spare part manufacturers and the merged entity's alleged ability to use its leverage to increase prices. However, the Commission considers that these concerns are unrelated to the Transaction but inherent in a possible single-sourcing strategy chosen by the airframer/airline given that Safran and Zodiac do not compete with each other in the provision of specific spare parts but only supply their own components.
- (365) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to spare parts under any of the alternative product market definitions.

250 Paras. 18 and 19 of the minutes of a meeting with the Parties on 27.10.2017.

251 Replies to questions 217.1 of eQuestionnaire 1 – Competitors and 146.1 of eQuestionnaire 3-Aframers.

7.2. Vertical non-coordinated effects

- (366) Zodiac (and Safran to a lesser extent) produces and supplies components that can be used as input for aircraft equipment and systems produced by Safran (and Zodiac to a lesser extent). In addition, Safran and Zodiac both supply spare parts to other aftermarket service providers. In this section, the Commission assesses the possible non-coordinated effects resulting from these vertical links.
- (367) In its assessment, the Commission considers whether it is likely that the merged entity would engage in input or customer foreclosure strategies. In doing so, the Commission in principle analyses the ability and the incentives of the merged entity, as well as the possible effects of such strategies on the markets in question. Since they are intrinsically connected, these factors are often examined together.²⁵²

7.2.1. Electrical distribution systems and components

7.2.1.1. Market structure

- (368) Safran and Zodiac supply different electrical distribution components to third-parties, while Zodiac and to a much lesser extent Safran are also active in the supply of primary and secondary electrical distribution systems for various aircraft types, though Safran's limited distribution activities focus on business jets. The Transaction therefore gives rise to vertical relations between the Parties' activities on the upstream markets for electrical distribution components and the downstream markets for electrical distribution systems, irrespective of the fact that the Parties were already vertically integrated prior to the Transaction.
- (369) Specifically, Safran supplies contactors, circuit breakers and RCCBs to third-party distributors, Tier-1 suppliers of distribution systems and aircraft manufacturers (e.g., when they retain the manufacturing of distribution systems for certain platforms or purchase directly components that are then directly delivered to the distribution system supplier).²⁵³ The contactors supplied by Safran include low- and mid-power contactors[...].²⁵⁴ Zodiac supplies mainly contactors but also relays, fuses and circuit breakers to aircraft manufacturers, distributors and Tier-1 suppliers of distribution systems.²⁵⁵ Zodiac's range of contactors includes high-power contactors [...].²⁵⁶
- (370) Based on the market share estimates submitted by the Notifying Party, the upstream markets for distribution components ([10-20]%) and contactors ([40-

252 Guidelines on the assessment of non-horizontal mergers, paras. 32 and 59.

253 Form CO, para. 451.

254 Form Co, para. 452.

255 Form CO, para. 453.

256 Form CO, para. 420. According to the Notifying Party: "high-power contactors are used in aircraft with the highest generated electrical power, *i.e.* at least, for commercial platforms, in Airbus A330, A350, A380 and Boeing 777 and 787 platforms. These high-power contactors are used mainly for the direct connection with the main generator, with the APU generator and with the ground power."

50]%) are respectively affected in their vertical relation with the downstream markets for distribution systems ([20-30]%) and primary distribution systems ([40-50]%), including for commercial, business and helicopter aircrafts, and for secondary distribution systems for business jets and helicopters. The market for contactors ([40-50]%) is also affected in its vertical relation with the downstream markets for primary distribution systems for regional and military aircrafts, and for secondary distribution systems ([10-20]%), including for commercial, regional and military aircrafts.

(371) As a result, the Commission has investigated whether input or customer foreclosure risks could arise as a result of the Transaction.

7.2.1.2. Input foreclosure

(372) The Notifying Party submits that input foreclosure concerns should be dismissed in view of the limited increment brought about by the Transaction on the markets for distribution components and distribution systems, on which Safran is a minor player, which is unlikely to affect materially the merged entity's ability and incentive to foreclose rivals.²⁵⁷

(373) In addition, the Notifying Party indicates that the bulk of Safran's sales of components are made to distributors and aircraft manufacturers, whereas competing suppliers of distribution systems represents a mere [...] of component purchases from Safran.²⁵⁸ Likewise, purchases by third-party distribution system suppliers represent [...] of Zodiac's sales of components and are made pursuant to supply contracts entered into [...].²⁵⁹ Conversely, Safran and Zodiac also purchase certain components from competing distribution system suppliers, such as [...].²⁶⁰ In any event, an input foreclosure strategy is bound to result in losses of revenues given the inability of Safran's limited distribution system business to absorb diverted sales of Zodiac's distribution components.²⁶¹ These revenues would accrue to competing distribution component suppliers, including Esterline, TE, Ametek, Sensata and others, including for contactors and high-power contactors.

(374) While a majority of respondents indicated that the implementation of input foreclosure strategies post-Transaction was unlikely to materialise, the market investigation also elicited specific concerns relating to Zodiac's continuous supply of contactors and high-power contactors.²⁶² One respondent particularly emphasized that Zodiac's high-power contactors are "uniquely capable of switching higher loads, which is increasingly more important as planes become

257 Form CO, para. 560.

258 Form CO, para. 562.

259 Form CO, para. 564.

260 Form CO, para. 566.

261 Form CO, para. 565.

262 Replies to question 56 of eQuestionnaire 1 – Competitors.

more and more electric".²⁶³ At the same time, the same respondent indicated that its concerns related less to ongoing contracts than to future platforms and acknowledged that Esterline and TE Connectivity also supply high-power contactors²⁶⁴.

- (375) The market investigation equally revealed that certain aircraft manufacturers pre-select the Tier-2 supplier(s) of certain types of distribution components, notably contactors.²⁶⁵ For example, Airbus expressly indicated that distribution components such as contactors and high-power contactors "are also supplied by pre-selected tier-2 suppliers to tier-1 system suppliers".²⁶⁶ In the Commission's view, this testifies of the sophistication of procurement strategies in the industry and of the interest of aircraft manufacturers to ensure the maintenance of a stable and reliable basis of suppliers. Overall, aircraft manufacturers did not express concerns about the availability of distribution components post-Transaction but rather indicated their confidence in the sufficient breadth and competitiveness of the remaining supplier base.²⁶⁷
- (376) With respect to future platforms, the Commission also understands that electromechanical components, including contactors, are progressively being replaced by electronic SSPCs.²⁶⁸ While the outcome of the market investigation indicated that SSPCs are currently used for secondary distribution purposes involving the switching of smaller electric loads, and are thus not yet available for primary distribution,²⁶⁹ the Notifying Party has made a plausible case to the effect that even high-power contactors are likely to be replaced by SSPCs on the new generation of aircraft to be tendered out over the 2025-2035 period.²⁷⁰ Though there are technical challenges to overcome, this technological evolution is also such as to mitigate possible risks of hypothetical input foreclosure strategies with respect to contactors in the future.
- (377) Eventually, the Commission doubts the merger specificity of the concerns expressed with respect to the continuous supply of Zodiac's high-power contactors. As noted, Zodiac is already vertically integrated and is already a prominent supplier of distribution systems. Conversely, it is unclear how a combination with Safran's limited distribution activities, which do not appear to

263 Replies to question 58 of eQuestionnaire 1 – Competitors. One other respondent indicated that Zodiac's SSPCs were specific but the market investigation has otherwise revealed, to the contrary, that there was a competitive basis of SSPCs supplier available, notably from the point of view of aircraft manufacturers (see replies to question 47 of eQuestionnaire 3 – Airframers). The existence of a competitive supplier base for SSPCs was also highlighted by the Notifying Party in the Form CO (para. 427).

264 Replies to question 52 of eQuestionnaire 1 – Competitors.

265 Replies to question 63 of eQuestionnaire 1 – Competitors.

266 Replies to question 161 of eQuestionnaire 3 – Airframers.

267 Replies to questions 44, 45 and 47 of eQuestionnaire 3 – Airframers.

268 Form CO, paras. 424-425.

269 Replies to question 45 of eQuestionnaire 1 – Competitors.

270 Form CO, para. 431.

relate to any recent program and whose portfolio precisely lacks high-power contactors, would affect the merged entity's incentives to foreclose. In that respect, the Commission also notes that sales of high-power contactors generate [...] margins for Zodiac,²⁷¹ thereby raising additional doubts about its incentive to forego such sales by engaging in uncertain foreclosure strategies.

- (378) Hence, the Commission concludes that Safran is unlikely to have the ability and incentive to engage in input foreclosure following the implementation of the Transaction and, in any event, any such strategy is unlikely to result in significant anticompetitive effects.

7.2.1.3. Customer foreclosure

- (379) The Notifying Party submits that customer foreclosure concerns should be dismissed in view of the limited increment brought about by the Transaction on the markets for distribution systems, on which Safran is a minor player, which is unlikely to modify materially the merged entity's ability and incentive to foreclose rival component suppliers.²⁷²
- (380) Thus, as a result of its limited distribution system business, Safran's volume of purchases of distribution components from third-parties is very low, whereas it already sources part of its requirements in-house and [...].²⁷³ Zodiac's purchases of distribution components are equally very limited since it is also vertically integrated; they essentially consist in [...].²⁷⁴ In any event, according to the Notifying Party, distribution component suppliers will continue to benefit from a large customer basis, including UTAS, GE Aviation, Honeywell and others that are not or only partly vertically integrated into distribution components.²⁷⁵
- (381) The outcome of the market investigation has not revealed material concerns in terms of customer foreclosure for distribution components. To the contrary, certain component suppliers indicated that they were not selling components to the Parties at all, or that they considered unlikely that the Parties would stop purchasing components in the future.²⁷⁶ One supplier did raise concerns about losing some business with Safran but acknowledged that it was not significant and otherwise confirmed that a sufficient customer base would remain for all distribution components post-Transaction.²⁷⁷
- (382) Otherwise, the outcome of the market investigation supports the Notifying Party's claim that a competitive basis of distribution system suppliers will remain post-

271 E-mail of Zodiac's counsel on 5 December 2017.

272 Form CO, paras. 560 and 576.

273 Form CO, paras. 573-574.

274 Form CO, para. 575.

275 Form CO, para. 577.

276 Replies to question 60 of eQuestionnaire 1 – Competitors.

277 Replies to question 59, 60 and 61 of eQuestionnaire 1 – Competitors.

Transaction.²⁷⁸ Likewise, the Commission notes that certain distribution components, including contactors, are also used in other industries, including the defence, energy and railway transportation industries.²⁷⁹ Hence, the Commission concludes that Safran would have limited ability and incentive to engage in customer foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

7.2.1.4. Conclusion

- (383) In view of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to vertical effects involving the markets for distribution systems, on the one hand, and those for distribution components, on the other hand, under any of the alternative product market definitions.

7.2.2. *Landing gears and components*

- (384) Although the Parties' activities do not horizontally overlap with regard to landing gears, the Transaction gives rise to a number of vertically affected markets due to Zodiac's activities as a Tier 2 supplier of several components. In particular, the Transaction gives rise to vertically affected markets with regard to the upstream markets for (i) wiring systems (see section 7.2.8.2.); (ii) conduits and sleeves (see section 7.2.8.2.); (iii) blackshells and fittings (see section 7.2.8.2.); (iv) aerospace hose and tube assemblies (see section 7.2.2.1); (v) externally located electrical boxes (see section 7.2.2.2) and (vi) small sub-components (see section 7.2.2.3).
- (385) On the market for landing gears – where Zodiac is not active – Safran is the market leader, followed by UTAS. Other recent players – such as Héroux-Devtek and Liebherr – are also present.

²⁷⁸ Replies to question 61 of eQuestionnaire 1 – Competitors.

²⁷⁹ Form CO, para. 500.

Table 8: Market for landing gears (worldwide, 2016-2020, source: Form CO)

Contractor	Market share (in value), %				
	2016	2017	2018	2019	2020
SAFRAN LS	[50-60]	[60-70]	[60-70]	[60-70]	[50-60]
UTAS	[30-40]	[30-40]	[20-30]	[20-30]	[20-30]
HEROUX-DEVTEK	[0-5]	[0-5]	[5-10]	[5-10]	[5-10]
LIEBHERR	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
ELEB	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
SUMITOMO SPP	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
IAI	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
HYDROMASH	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
AVIC	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]

7.2.2.1. Aerospace hose and tube assemblies (upstream) and landing gears (downstream)

- (386) In landing gears, an assembly comprising hoses and tubes delivers the high pressure hydraulic fluid needed to operate devices including brakes and the retraction actuator. As such, aerospace hose and tube assemblies are input products for landing gears.
- (387) Zodiac's activities as a supplier of aerospace hose and tube assemblies are limited. In 2016, with a revenue of USD [...],²⁸⁰ it achieved a market share below [0-5]%.

Table 9: Market for aerospace hose and tube assemblies (worldwide, 2016, source: Form CO)

Contractor	Market share (in value) %
Eaton	[10-20]%
Titeflex	[10-20]%
PFW Aerospace	[10-20]%
Parker Aerospace	[5-10]%
Legett & Platt	[5-10]%
Unison Industries (GE Aviation)	[5-10]%
Fine Tubes	[0-5]%
Sigma Precision Components	[0-5]%
Stelia	[0-5]%
Zodiac	[0-5]%
Others	approx. [30-40]%

280 Para. 874 of the Form CO.

- (388) Indeed, aerospace hose and tube assemblies are not Zodiac's core business; its activity is limited to the supply to landing gear manufacturers which [...].²⁸¹
- (389) It should be also mentioned that Zodiac only manufactures a small quantity of aerospace hose and tube assemblies itself, [...].²⁸²
- (390) The Commission considers that based on the limited activities of Zodiac on the upstream market for aerospace hose and tube assemblies, the merged entity will not have the ability to engage in input foreclosure post-transaction. Furthermore, Zodiac already achieves [amount] of its revenues with regard to these products with Safran.²⁸³ The market investigation did not reveal any competition concerns with regard to input foreclosure.²⁸⁴
- (391) Furthermore, the Commission takes the view that it is unlikely that the Transaction will result in customer foreclosure given the commodity nature of aerospace hose and tube assemblies, which as a result can be used in other components than landing gears. The market investigation did not reveal any concerns in this regard.²⁸⁵
- (392) The Commission considers that the above assessment remains valid even if the downstream market for landing gears is further segmented according to aircraft types.
- (393) In light of the above considerations and the fact that no concerns were raised during the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for aerospace hose and tube assemblies (upstream) and Safran's activities on the market for landing gears (downstream) under any of the alternative product market definitions.

7.2.2.2. Externally located electrical boxes (upstream) and landing gears (downstream)

- (394) Zodiac manufactures and supplies two types of externally located electrical boxes: landing gear maintenance boxes and nose wheel steering deactivation boxes, the former being an input product to landing gears.
- (395) If the product market is defined as encompassing all types of externally located electrical boxes, Zodiac has a market share of [10-20]%.²⁸⁶ On a market only for

281 In particular, [...].

282 Para. 813 of the Form CO.

283 Para. 874 of the Form CO.

284 Replies to question 100 of eQuestionnaire 1 – Competitors.

285 Replies to question 98 of eQuestionnaire 1 – Competitors.

286 The market share provided by the Notifying Party is based on its estimates of the size of the two segments where Zodiac is active. Given that there are other externally located electrical boxes that Zodiac does not supply, the market share of Zodiac is likely even lower on the overall market for externally located electrical boxes.

landing gear maintenance boxes, its market share is slightly lower, [10-20]%. Other suppliers of externally located electrical boxes are Glenair, Ultra Electronics, Unison and Ducommun.

- (396) The Commission considers that the Transaction will not result in either input or customer foreclosure for the following reasons.
- (397) Input foreclosure is unlikely given the presence of other competitors, the standardised nature of the product and the fact that Zodiac – [...].²⁸⁷
- (398) Similarly, customer foreclosure is unlikely to occur as Safran already sources [to a large extent] its externally located boxes from Zodiac ([information on alternative suppliers]). Indeed, the market investigation did not reveal any concerns in this regard.²⁸⁸
- (399) The Commission considers that the above assessment remains valid even if the downstream market for landing gears is further segmented according to aircraft types.
- (400) In light of the above considerations and the fact that no concerns were raised during the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for externally located electrical boxes (upstream) and Safran's activities on the market for landing gears (downstream) under any of the alternative product market definitions.

7.2.2.3. Small sub-components (upstream) and landing gears (downstream)

- (401) Zodiac manufactures small-subcomponents such as seals, couplings, check valves, caps, etc., which can be also used in landing gears. Its market shares on the overall market for small sub-components as well as with regard to each small sub-component are below [0-5]%.
- (402) The Commission considers that the Transaction will not result in input foreclosure based on the limited market share of Zodiac on the upstream market and the commodity nature of these products. It should be further noted that these small sub-components constitute [0-10]% of the total cost of production of landing gears. Moreover, no downstream competitor of Safran expressed any concerns with regard to input foreclosure in the market investigation.²⁸⁹
- (403) Furthermore, the Commission takes the view that it is unlikely that the merged entity will have the ability to engage in customer foreclosure as these commodity products can be used in many other equipment/systems. The large majority of the suppliers of small sub-components confirmed in the market investigation that

287 In particular, it supplies [...].

288 Replies to question 98 of eQuestionnaire 1 – Competitors.

289 Replies to question 100 of eQuestionnaire 1 – Competitors.

there will be a sufficient base of alternative customers should Safran decide to stop sourcing from them post-transaction.²⁹⁰

- (404) The Commission considers that the above assessment remains valid even if the downstream market for landing gears is further segmented according to aircraft types.
- (405) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for small sub-components (upstream) and Safran's activities on the market for landing gears (downstream) under any of the alternative product market definitions.

7.2.3. Brakes/wheels and components

- (406) Although the Parties' activities do not horizontally overlap with regard to brakes and wheels, the Transaction gives rise to vertically affected markets. In particular the Transaction gives rise to vertically affected markets with regard to the upstream markets for (i) wiring systems (see section 7.2.8.2.) and (ii) small sub-components (see section 7.2.3.1).
- (407) Regarding brakes and wheels, Safran is focusing on the segment of large commercial aircraft, where it achieves the highest market share. The market shares of Safran and its competitors are summarised below.

²⁹⁰ Replies to question 98 of eQuestionnaire 1 – Competitors.

Table 10: Market for brakes and wheels (worldwide, 2016-2020, source: Safran's reply to question 16 of RFI01)

Segment	Contractor	Equipped fleet in service, number of a/c as of Dec 2016	Share (%) as of Dec 2016
All segments	<i>SAFRAN LS</i>	[...]	[10-20]
	<i>JV SAFRAN LS/UTAS</i>	[...]	[0-5]
	UTAS	[...]	[5-10]
	HONEYWELL	[...]	[0-5]
	MEGGITT	[...]	[0-5]
	UNKNOWN	[...]	[60-70]
	TOTAL	[...]	100.0
Commercial	<i>SAFRAN LS</i>	[...]	[30-40]
	<i>JV SAFRAN LS/UTAS</i>	[...]	10-20]
	UTAS	[...]	10-20]
	HONEYWELL	[...]	[5-10]
	MEGGITT	[...]	[0-5]
	UNKNOWN	[...]	[20-30]
	TOTAL	[...]	100.0
Regional	<i>SAFRAN LS</i>	[...]	[5-10]
	MEGGITT	[...]	[5-10]
	UNKNOWN	[...]	[80-90]
	TOTAL	[...]	100.0
Military	<i>SAFRAN LS</i>	[...]	10-20]
	UNKNOWN	[...]	[80-90]
	TOTAL	[...]	100.0
Helicopters	<i>SAFRAN LS</i>	[...]	10-20]
	UNKNOWN	[...]	[80-90]
	TOTAL	[...]	100.0

7.2.3.1. Small sub-components (upstream) and brakes and wheels (downstream)

- (408) Zodiac manufactures small-subcomponents such as seals, couplings, check valves, caps, etc., which can be also used in brakes and wheels. Its market shares on the overall market for small sub-components as well as with regard to each small sub-component are below [0-5]%.
- (409) Therefore, the Transaction leads to vertically affected markets only if the downstream market for brakes and wheels were to be further segmented according to aircraft types, given that Safran has a market share of [40-50]% on the market for brakes and wheels for large commercial aircraft.
- (410) The Commission considers that the Transaction will not result in input foreclosure based on the limited market share of Zodiac on the upstream market and the commodity nature of these products. It should be further noted that these small sub-components constitute less than [0-10]% of the total cost of production

of brakes and wheels. Indeed, no issues were raised from current customers of Zodiac in this regard in the market investigation.²⁹¹

- (411) With regard to customer foreclosure, a supplier of Safran replied that although "[t]here are other suppliers of wheels and brakes, but Safran is one of the largest and therefore [the decision of Safran of stop sourcing from them post-transaction] would affect our ability to service this market."²⁹² However, the Commission takes the view that it is unlikely that the merged entity will have the ability to engage in customer foreclosure as these commodity products can be used in many other equipment/systems.
- (412) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for small sub-components (upstream) and Safran's activities on the market for brakes and wheels (downstream) under any of the alternative product market definitions.

7.2.4. Control systems and equipment

- (413) Although the Parties' activities do not horizontally overlap with regard to any control systems and equipment since Zodiac is not active on these markets, the Transaction gives rise to vertically affected markets with regard to landing gear extension/retraction systems, braking control systems and steering control systems.

7.2.4.1. Landing gear extension/retraction systems and components

- (414) The Transaction leads to vertically affected markets only if the downstream market were to be further segmented according to aircraft types as Safran has a market share above 30% with regard to regional aircraft. In particular, the Transaction gives rise to vertically affected markets with regard to the upstream markets for (i) pilot controls (see section 7.2.4.1. 0); (ii) solenoid valves (see section 7.2.4.1. (b)); (iii) utility actuators (see section 7.2.4.1. (c)); (iv) sensors (see section 7.2.4.1. (d)) and (v) small sub-components (see section 7.2.4.1. (e)).
- (415) The position of Safran and its competitors on the market for landing gear extension/retraction systems is summarised below.

291 Replies to question 112 of eQuestionnaire 1 – Competitors.

292 Replies to question 110.1 of eQuestionnaire 1 – Competitors.

**Table 11: Market for landing gear extension/retraction systems
(worldwide, 2016-2020, source: Safran's reply to question 17 of RFI01)**

Segment	Contractor	Share (in number of shipsets installed, %)				
		2016	2017	2018	2019	2020
[5-10] ALL	SAFRAN	[5-10]	[5-10]	[10-20]	[5-10]	[5-10]
	TRIUMPH	10-20]	10-20]	10-20]	[5-10]	[5-10]
	[5-10] CRANE	[5-10]	[5-10]	[5-10]	[5-10]	[0-5]
	LIEBHERR	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	GE	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[60-70]	[60-70]	[60-70]	[70-80]	[70-80]
COMMERCIAL	SAFRAN	10-20]	10-20]	10-20]	10-20]	10-20]
	TRIUMPH	[50-60]	[40-50]	[30-40]	[20-30]	[20-30]
	CRANE	10-20]	10-20]	10-20]	10-20]	10-20]
	LIEBHERR	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	GE	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[10-20]	[10-20]	[20-30]	[40-50]	[40-50]
REGIONAL	SAFRAN	[30-40]	[40-50]	[40-50]	[40-50]	[40-50]
	UNKNOWN	[60-70]	[50-60].	[50-60].	[50-60].	[50-60].
BUSINESS JETS	SAFRAN	[10-20]	[10-20]	[10-20]	[5-10]	[10-20]
	UNKNOWN	[80-90]	[80-90]	[80-90]	[90-100]	[90-100]
MILITARY	SAFRAN	[0-5]	[0-5]	[5-10]	[5-10]	[5-10]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]
HELICOPTERS	SAFRAN	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]

a. Pilot controls (upstream) and landing gear extension/retraction systems for regional aircraft (downstream)

(416) Safran and Zodiac are both active on the market for pilot controls, the Parties' and their competitors' market shares are as follows.

Table 12: Market for pilot controls (worldwide, 2016, source: Form CO)

Operator	Market share (in value)
Safran	[0-5]%
Zodiac	[0-5]%
Woodward / MPC	[20-30]%
UTAS / Ratier Figeac	[20-30]%
Rockwell Collins / Kaiser	[10-20]%
SKF	[5-10]%
Others	[20-30]%

- (417) Should the market for pilot controls be defined on a component-by-component basis, Safran's market share would remain below [0-5]%. Zodiac's market share would be [10-20]% on handle levers, below [0-5]% on stick dampers and below [0-5]% on throttles.
- (418) The Commission considers that the Transaction will not result in input foreclosure given the small combined upstream position of the Parties and the limited increment brought about by the Transaction. Furthermore, the Commission considers that no customer foreclosure will occur post-transaction for the following reasons.
- (419) First, although Safran's market shares are indeed steadily around [40-50]% with regard to regional aircraft, it should be noted that this segment represents at most [0-10]% of the total market. Second, pilot controls can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of the Parties would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy. Third, Safran currently manufactures only [...] controls in-house (e.g. it sources [...]% of its pilot controls from Zodiac). Given Zodiac's limited market share on the upstream market, it is unlikely that the merged entity would have the incentive to deter from this multi-sourcing strategy.
- (420) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between the Parties' activities on the market for pilot controls (upstream) and Safran's activities on the market for landing gear extension/retraction systems for regional aircraft (downstream) under any of the alternative product market definitions.

b. Solenoid valves (upstream) and landing gear extension/retraction systems for regional aircraft (downstream)

- (421) Zodiac manufactures solenoid valves that can be used as an input product for landing gear extension/retraction systems. In 2016, it has achieved a market share of [0-5]%. The Notifying Party submits that this market share estimate provides an accurate view even if the market were to be further segmented between solenoid valves sold on a stand-alone basis on the one hand and in manifolds on the other hand.²⁹³ Its main competitors on the market are Eaton Aerospace, Parker, Triumph, Transdigm, Woodward and Meggit.
- (422) The Commission considers that the Transaction will not result in input foreclosure given the very limited upstream position of Zodiac and the commodity nature of solenoid valves. It should be further noted that Zodiac's market share on a global – non-aerospace specific – solenoid valve market would be even lower.
- (423) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction for the following reasons.
- (424) First, although Safran's market shares are indeed steadily around [40-50]% with regard to regional aircraft, it should be noted that this segment represents at most [0-10]% of the total market shares.
- (425) Second, solenoid valves can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of Zodiac would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy.
- (426) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for solenoid valves (upstream) and Safran's activities on the market for landing gear extension/retraction systems for regional aircraft (downstream) under any of the alternative product market definitions.

c. Utility actuators (upstream) and landing gear extension/retraction systems for regional aircraft (downstream)

- (427) The landing gear extension/retraction system includes several utility actuators. EMA valves are used to control the commutation of the emergency valves for the release of the landing gear. EMA uplocks are located on the doors of the nose landing gear (to unlock the doors of the nose landing gear in case of failure of the main system), on the nose landing gear itself (to unlock the extension of the nose landing gear) as well on the doors of the main landing gear (to unlock its doors). EMA unlocks control the extension of the main landing gear in emergency mode in case of failure of the main hydraulic actuator on which it is fitted.

²⁹³ The Notifying Party's reply to question 8 of RFI04.

- (428) Both Safran and Zodiac are active on the upstream market for utility actuators, achieving a market share below [0-5]% and [0-5]% in 2016, respectively. Should the market be defined narrower, encompassing only EMA valves/uplocks/unlocks, Safran's market share would not significantly differ while the market share of Zodiac would be even lower, approximately [0-5]%.²⁹⁴ Their main competitors are UTAS and Triumph (both with a market share above [10-20]%), as well as Woodward (market share above [5-10]%).
- (429) The Commission considers that the Transaction will not result in input foreclosure given the small combined upstream position of the Parties and the very limited increment (below [0-5]%) brought about by Safran.
- (430) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction for the following reasons.
- (431) First, although Safran's market shares are indeed steadily around [40-50]% with regard to regional aircraft, it should be noted that this segment represents at most [0-10]% of the total market shares.
- (432) Second, utility actuators – and specifically EMA valves/uplocks/unlocks - can be used as an input product in other systems/equipment as well.²⁹⁵ Therefore, upstream competitors of Zodiac would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy.
- (433) Third, Safran currently manufactures only [...] in-house (e.g. it sources [...]% of its utility actuators from Zodiac).²⁹⁶ Given Zodiac's limited market share on the upstream market, it is unlikely that the merged entity would have the incentive to deter from this multi-sourcing strategy.
- (434) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between the Parties' activities on the market for utility actuators (upstream) and Safran's activities on the market for landing gear extension/retraction systems for regional aircraft (downstream) under any of the alternative product market definitions.
- d. Sensors (upstream) and landing gear extension/retraction systems for regional aircraft (downstream)
- (435) Zodiac supplies sensors that can be used as an input product for landing gear extension/retraction systems. In 2016, it has achieved a market share less than [0-5]%. Should the market be defined narrower, encompassing only position sensors, Zodiac's market share remains below [5-10]%.²⁹⁷ Its competitors are *inter alia* TE Connectivity, Crane, Meggitt, Crouzet and Honeywell.

²⁹⁴ The Notifying Party's reply to question 10 of RFI04.

²⁹⁵ The Notifying Party's reply to question 9 of RFI04.

²⁹⁶ Other suppliers of utility of utility actuators include Meggitt, Triumph, Woodward and Moog.

²⁹⁷ The Notifying Party's reply to question 11 of RFI04.

- (436) The Commission considers that the Transaction will not result in input foreclosure given the limited upstream position of Zodiac and the commodity nature of sensors.
- (437) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction for the following reasons.
- (438) First, although Safran's market shares are indeed steadily around [40-50]% with regard to regional aircraft, it should be noted that this segment represents at most [0-10]% of the total market shares.
- (439) Second, sensors – and specifically position sensors²⁹⁸ - can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of Zodiac would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy.
- (440) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for sensors (upstream) and Safran's activities on the market for landing gear extension/retraction systems for regional aircraft (downstream) under any of the alternative product market definitions.
- e. Small sub-components (upstream) and landing gear extension/retraction systems for regional aircraft (downstream)
- (441) Zodiac manufactures small-subcomponents such as seals, couplings, check valves, caps, etc., which can be also used in landing gear extension/retraction systems. Its market shares on the overall market for small sub-components as well as with regard to each small sub-component are below [0-5]%.
- (442) The Commission considers that the Transaction will not result in input foreclosure based on the limited market share of Zodiac on the upstream market and the commodity nature of these products.
- (443) Furthermore, the Commission takes the view that it is unlikely that the merged entity will have the ability to engage in customer foreclosure as these commodity products can be used in many other equipment/systems.
- (444) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for small sub-components (upstream) and Safran's activities on the market for landing gear extension/retraction systems for regional aircraft (downstream) under any of the alternative product market definitions.

298 Position sensors are used inter alia in the engines, steering control systems and flight controls.

7.2.4.2. Braking control systems and components

- (445) The Transaction leads to vertically affected markets only if the downstream market were to be further segmented according to aircraft types as Safran has a market share above 30% with regard to large commercial aircraft. In particular, the Transaction gives rise to vertically affected markets with regard to the upstream markets for (i) pilot controls (see section 7.2.4.2 (a)); (ii) servo-valves (see section 7.2.4.2. (b)) and (iii) small sub-components (see section 7.2.4.2. (c)).
- (446) The market position of Safran and its competitors on the market for braking control system is as follows.

**Table 13: Market for braking control systems
(worldwide, 2016-2020, source: Safran's reply to question 18 of RFI01)**

Segment	Contractor	Share (in number of shipsets installed, %)				
		2016	2017	2018	2019	2020
ALL	SAFRAN	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]
	CRANE	[5-10]	[10-20]	[10-20]	[10-20]	[10-20]
	MEGGITT	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UTAS	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[70-80]	[70-80]	[60-70]	[60-70]	[60-70]
COMMERCIAL	SAFRAN	[50-60]	[50-60]	[50-60]	[50-60]	[40-50]
	CRANE	[30-40]	[30-40]	[30-40]	[40-50]	[40-50]
	MEGGITT	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UTAS	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[10-20]	[10-20]	[5-10]	[0-5]	[0-5]
REGIONAL	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]
BJ	SAFRAN	[5-10]	[5-10]	[5-10]	[0-5]	[0-5]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]
MILITARY	SAFRAN	[0-5]	[5-10]	[5-10]	[5-10]	[5-10]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]
HELICOPTERS	SAFRAN	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]

- a. Pilot controls (upstream) and braking control systems for large commercial aircraft (downstream)

- (447) The Commission considers that the Transaction will not result in input foreclosure given the small combined upstream position of the Parties and the limited increment brought about by Zodiac (see section 7.2.4.1). The market investigation did not raise any concerns either with regard to input foreclosure.²⁹⁹

²⁹⁹ Replies to question 125 of eQuestionnaire 1 – Competitors.

- (448) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction because pilot controls can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of the Parties would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy. Indeed, no concerns were raised in the market investigation regarding customer foreclosure with respect to pilot controls for braking control systems.³⁰⁰
- (449) Moreover, [...].³⁰¹ Given Zodiac's limited market share on the upstream market, it is unlikely that the merged entity would have the incentive to deter from this multi-sourcing strategy.
- (450) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between the Parties' activities on the market for pilot controls (upstream) and Safran's activities on the market for braking control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.
- b. Servo-valves (upstream) and braking control systems for large commercial aircraft (downstream)
- (451) Zodiac supplies servo-valves that can be used in braking control systems. In 2016, it has achieved a market share of [0-5]%. The market position of Zodiac would not significantly differ if the market were to be further segmented between servo-valves sold on a stand-alone basis on the one hand and in manifolds on the other hand. Zodiac's main competitors are Moog, Parker, Woodward and Crane.
- (452) The Commission considers that the Transaction will not result in input foreclosure given the limited upstream position of Zodiac and the commodity nature of servo-valves. It should be further noted that Zodiac's market share on a global – non-aerospace specific – servo-valve market would be even lower. The majority of respondents stated in the market investigation that there would be a sufficient number of alternative suppliers, should the merged entity stop supplying or supply at worst conditions post-transaction.³⁰²
- (453) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction because servo-valves can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of Zodiac would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy. Indeed, no concerns were raised in the market investigation regarding customer foreclosure with regard to servo-valves for braking control systems.³⁰³

300 Replies to question 123 of eQuestionnaire 1 – Competitors.

301 [...].

302 Replies to question 125 of eQuestionnaire 1 – Competitors.

303 Replies to question 123 of eQuestionnaire 1 – Competitors.

- (454) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for servo-valves (upstream) and Safran's activities on the market for braking control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.
- c. Small sub-components (upstream and braking control systems for large commercial aircraft (downstream))
- (455) Zodiac manufactures small-subcomponents such as seals, couplings, check valves, caps, etc., which can be also used in braking control systems. Its market shares on the overall market for small sub-components as well as with regard to each small sub-component are below [0-5]%.
(456) The Commission considers that the Transaction will not result in input foreclosure based on the limited market share of Zodiac on the upstream market and the commodity nature of these products. It should be further noted that these small sub-components constitute less than [0-10]% of the total cost of production of the braking control system.
(457) The majority of respondents stated in the market investigation that there would be a sufficient number of alternative suppliers, should the merged entity stop supplying or supply at worst conditions post-transaction.³⁰⁴
(458) Furthermore, the Commission takes the view that it is unlikely that the merged entity will have the ability to engage in customer foreclosure as these commodity products can be used in many other equipment/systems. The majority of the suppliers of small sub-components indeed stated in the market investigation that they would have a sufficient alternative customer base should Safran decide to stop sourcing from them post-transaction.³⁰⁵
(459) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for small sub-components (upstream) and Safran's activities on the market for braking control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.

7.2.4.3. Steering control systems and components

- (460) The Transaction leads to vertically affected markets only if the downstream market were to be further segmented according to aircraft types as Safran has a market share above 30% with regard to large commercial aircraft. In particular, the Transaction gives rise to vertically affected markets with regard to the upstream markets for (i) pilot controls (see section 7.2.4.3. (a)); (ii) servo-valves (see section 7.2.4.3. (b)); (iii) externally located electrical boxes (see section

304 Replies to question 125 of eQuestionnaire 1 – Competitors.

305 Replies to question 123 of eQuestionnaire 1 – Competitors.

7.2.4.3. (c)); (iv) sensors (see section 7.2.4.3. (d)) and (v) small sub-components (see section 7.2.4.3. (e)).

(461) The market position of Safran and its competitors on the market for steering control system is as follows.

**Table 14: Market for steering control systems
(worldwide, 2016-2020, source: Safran's reply to question 19 of RFI01)**

Segment	Contractor	Share (in number of shipsets installed, %)				
		2016	2017	2018	2019	2020
ALL	SAFRAN	[10-20]	[20-30]	[20-30]	[20-30]	[10-20]
	GE	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	LIEBHERR	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	TRIUMPH	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UTAS	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[70-80]	[70-80]	[70-80]	[70-80]	[70-80]
COMMERCIAL	SAFRAN	[40-50]	[40-50]	[50-60]	[40-50]	[40-50]
	GE	[5-10]	[5-10]	[5-10]	[5-10]	[5-10]
	LIEBHERR	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	TRIUMPH	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UTAS	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNALLOCATED	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	[40-50]	UNKNOWN	[40-50]	[30-40]	[30-40]	[40-50]
REGIONAL	SAFRAN	[5-10]	[10-20]	[10-20]	[10-20]	[5-10]
	UNKNOWN	[90-100]	[80-90]	[80-90]	[80-90]	[90-100]
BJ	SAFRAN	[10-20]	[10-20]	[10-20]	[10-20]	[10-20]
	UNKNOWN	[80-90]	[80-90]	[80-90]	[80-90]	[80-90]
MILITARY	SAFRAN	[0-5]	[5-10]	[5-10]	[5-10]	[5-10]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]
HELICOPTERS	SAFRAN	[0-5]	[0-5]	[0-5]	[0-5]	[0-5]
	UNKNOWN	[90-100]	[90-100]	[90-100]	[90-100]	[90-100]

- a. Pilot controls (upstream) and steering control systems for large commercial aircraft (downstream)
- (462) Safran and Zodiac are both active on the market for pilot controls, achieving a market share of [0-5]% and [0-5]%, respectively. Should the market for pilot controls be defined on a component-by-component basis, Safran's market share would remain below [0-5]%. Zodiac's market share would be [10-20]% on handle levers, below [0-5]% on stick dampers and below [0-5]% on throttles.
- (463) The Commission considers that the Transaction will not result in input foreclosure given the small combined upstream position of the Parties and the limited increment. Indeed, no concerns were raised in the market investigation regarding input foreclosure with regard to pilot controls for steering control systems.³⁰⁶
- (464) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction for the following reasons.
- (465) First, pilot controls can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of the Parties would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy. Indeed, no concerns were raised in the market investigation regarding customer foreclosure with regard to pilot controls for steering control systems.³⁰⁷
- (466) Second, [...].
- (467) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between the Parties' activities on the market for pilot controls (upstream) and Safran's activities on the market for steering control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.
- b. Servo-valves (upstream) and steering control systems for large commercial aircraft (downstream)
- (468) Zodiac supplies servo-valves that can be used in steering control systems. In 2016, it has achieved a market share of [0-5]%. The market position of Zodiac would not significantly differ if the market were to be further segmented between servo-valves sold on a stand-alone basis on the one hand and in manifolds on the other hand. Zodiac's main competitors are Moog, Parker, Woodward and Crane.
- (469) The Commission considers that the Transaction will not result in input foreclosure given the limited upstream position of Zodiac and the commodity nature of servo-valves. It should be further noted that Zodiac's market share on a global – non-aerospace specific – servo-valve market would be even lower.

306 Replies to question 129 of eQuestionnaire 1 – Competitors.

307 Replies to question 127 of eQuestionnaire 1 – Competitors.

Indeed, no concerns were raised in the market investigation regarding input foreclosure with regard to servo-valves for steering control systems.³⁰⁸

(470) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction because servo-valves can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of Zodiac would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy. Indeed, no concerns were raised in the market investigation regarding customer foreclosure with regard to servo-valves for steering control systems.³⁰⁹

(471) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for servo-valves (upstream) and Safran's activities on the market for steering control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.

c. Externally located electrical boxes (upstream) and steering control systems for large commercial aircraft (downstream)

(472) Zodiac manufactures and supplies two types of externally located electrical boxes: landing gear maintenance boxes and nose wheel steering deactivation boxes, the latter being an input product to steering control systems.

(473) If the product market is defined as encompassing all types of externally located electrical boxes, Zodiac has a market share of [10-20]%.³¹⁰ On a market only for nose wheel steering deactivation boxes, its market share is however higher, [30-40]%. Other suppliers of externally located electrical boxes are Glenair, Ultra Electronics, Unison and Ducommun.

(474) The Commission considers that the Transaction will not result in either input or customer foreclosure for the following reasons.

(475) Input foreclosure is unlikely given the presence of other competitors, the standardised nature of the product and the fact that Zodiac – already before the Transaction – [...] supplies Safran with externally located electrical boxes.³¹¹

(476) Similarly, customer foreclosure is unlikely to occur as Safran already sources [to a large extent] its externally located electrical boxes from Zodiac [...]. Indeed, no concerns were raised in the market investigation regarding customer

308 Replies to question 129 of eQuestionnaire 1 – Competitors.

309 Replies to question 127 of eQuestionnaire 1 – Competitors.

310 The market share provided by the Notifying Party is based on its estimates of the size of the two segments where Zodiac is active. Given that there are other externally located electrical boxes that Zodiac does not supply, the market share of Zodiac is likely even lower on the overall market for externally located electrical boxes.

311 [...].

foreclosure with regard to externally located electrical boxes for steering control systems.³¹²

(477) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for externally located electrical boxes (upstream) and Safran's activities on the market for steering control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.

d. Sensors (upstream) and steering control systems for large commercial aircraft (downstream)

(478) Zodiac supplies sensors that can be used as an input product for steering control systems. In 2016, it has achieved a market share less than [0-5]%. Should the market be defined narrower, encompassing only position sensors, Zodiac's market share remains below [5-10]%.³¹³ Its competitors are for example TE Connectivity, Crane, Meggitt, Crouzet and Honeywell.

(479) The Commission considers that the Transaction will not result in input foreclosure given the limited upstream position of Zodiac and the commodity nature of sensors. Indeed, no concerns were raised in the market investigation regarding input foreclosure with regard to sensors for steering control systems.³¹⁴

(480) Furthermore, the Commission considers that no customer foreclosure will occur post-transaction because sensors (and position sensors) can be used as an input product in other systems/equipment as well. Therefore, upstream competitors of Zodiac would have a sufficient alternative customer base should the merged entity engage in a foreclosure strategy. Indeed, no concerns were raised in the market investigation regarding customer foreclosure with regard to sensors for steering control systems.³¹⁵

(481) In light of the above considerations and the fact that no concerns were raised in the market investigation, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for sensors (upstream) and Safran's activities on the market for steering control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.

312 Replies to question 127 of eQuestionnaire 1 – Competitors.

313 The Notifying Party's reply to question 11 of RFI04.

314 Replies to question 129 of eQuestionnaire 1 – Competitors.

315 Replies to question 127 of eQuestionnaire 1 – Competitors.

- e. Small sub-components (upstream) and steering control systems for large commercial aircraft (downstream)
- (482) Zodiac manufactures small-subcomponents such as seals, couplings, check valves, caps, etc., which can be also used in steering control systems. Its market shares on the overall market for small sub-components as well as with regard to each small sub-component are below [0-5]%.³¹⁶
- (483) The Commission considers that the Transaction will not result in input foreclosure based on the limited market share of Zodiac on the upstream market and the commodity nature of these products. It should be further noted that these small sub-components constitute [0-10]% of the total cost of production of steering control systems. Indeed, no concerns were raised in the market investigation regarding input foreclosure with regard to small sub-components for steering control systems.³¹⁶
- (484) Furthermore, the Commission takes the view that it is unlikely that the merged entity will have the ability to engage in customer foreclosure as these commodity products can be used in many other equipment/systems. Indeed, the majority of respondents stated that there would be a sufficient number of alternative customers should Safran decide to stop sourcing from them post-transaction.³¹⁷
- (485) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for small sub-components (upstream) and Safran's activities on the market for steering control systems for large commercial aircraft (downstream) under any of the alternative product market definitions.

7.2.5. *Nacelles, thrust reversers and nacelles sub-components*

7.2.5.1. Market structure

- (486) The Transaction does not give rise to any horizontal overlap between the Parties' activities. Depending on the market definition retained, the Transaction gives rise to a number of vertically affected markets between the activities of Zodiac as supplier of nacelles sub-components and Safran's activities as supplier of nacelles and thrust reversers.
- (487) Particularly, the Transaction gives rise to affected markets between the upstream markets for (i) thrust reverser cascades, (ii) scoops for thrust reversers, (iii) flexible metal hoses and (iv) wiring systems, where Zodiac is active and the downstream markets for nacelles for regional aircraft and thrust reversers for regional aircraft. Furthermore, the Transaction gives rise to vertically affected markets between the upstream markets for (i) high-temperature/high pressure ducting assemblies and (ii) utility actuators and the downstream market for nacelles.

316 Replies to question 129 of eQuestionnaire 1 – Competitors.

317 Replies to question 127 of eQuestionnaire 1 – Competitors.

- (488) If the downstream market was to be defined as encompassing all nacelles, than the Transaction will not give rise to vertically affected market. On this broad market, Safran has a market share of [10-20]%.
- (489) If the market for nacelles were to be further segmented according to the aircraft type, than the Transaction would give rise to vertically affected market as Safran's 2016 market share on the plausible market for nacelles for regional aircraft is [50-60]%. On the other plausible segments where Safran is active – large commercial aircraft and business jets – its market share is [10-20]% and [10-20]%, respectively.
- (490) If the downstream market was to be defined as encompassing all thrust reversers, than the Transaction will not give rise to vertically affected market. On this broad market, Safran has a market share of slightly below [20-30]% in 2016, which will significantly decrease to an estimated [5-10]% in value by 2020. This expected decrease can be explained by the expected decreasing rate of production of [...], for which Safran supplies thrust reversers and TRAS – [...].
- (491) If the market for thrust reversers were to be further segmented according to the aircraft type, than the Transaction would give rise to vertically affected market as Safran's 2016 market share on the plausible market for thrust reversers for regional aircraft is [60-70]%. On the other plausible segments where Safran is active – large commercial aircraft and business jets – its market share is [20-30]% and [20-30]%, respectively.
- (492) On the various upstream markets affected by the Transaction, Zodiac's position is rather limited. More precisely: (i) on the market for thrust reverser cascades, Zodiac's 2016 share is [5-10]% ; (ii) on the market for scoops for thrust reversers, Zodiac's 2016 share is below [0-5]% ; (iii) on the market for flexible metal hoses, Zodiac's 2016 share is below [0-5]% ; (iv) on the market for wiring system, Zodiac's 2016 share is [0-5]% and below [0-5]% on the sub-segment for general wiring systems and [10-20]% on the sub-segment for harsh environment harnesses;³¹⁸ (v) on the market for high temperature/high pressure ducting assemblies, Zodiac's 2016 share is [0-5]% ; and, (vi) on the market for utility actuators, Zodiac's 2016 share is below [0-5]%.³¹⁹

7.2.5.2. Input foreclosure

- (493) The Commission takes the view that post-transaction the merged entity will not have the ability to engage in input foreclosure. This is for the following reasons.
- (494) First, Zodiac's market share on each individual upstream market for nacelles sub-components is limited. Hence, the merged entity will not have a significant degree of market power on the upstream market.

318 See sections 7.1.5. and 7.2.8.1.

319 Should the market for utility actuators be further sub-segmented and defined on a component-by-component basis, Zodiac's market share on the market for fan cowl opening maintenance actuators is even lower, less than [0-5]% (the Notifying Party's reply to question 10 of RFI04).

- (495) Second, on each of the individual upstream markets the merged entity will face competition from a number of significantly larger competitors most of which not vertically integrated. The Commission therefore takes the view that, even if it would stop selling to its downstream competitors, the merged entity will not be able to have the ability to negatively affect the overall availability of upstream products.
- (496) This corresponds with the views expressed by respondents to the market investigation. The vast majority of respondents indicated that they would have sufficient alternative suppliers should the merged entity stop supplying them or supply them at significantly worse conditions.³²⁰
- (497) In light of the above, the Commission concludes that the merged entity will not have the ability to foreclose its downstream competitors' access to inputs.

7.2.5.3. Customer foreclosure

- (498) If the downstream market was considered to encompass nacelles for all types of aircraft, Safran's position is below [30-40]% and therefore no vertically affected market would arise. However, if the downstream market definition ultimately retained is narrower, then Safran's market share on the plausible market for nacelles for regional jets is of [50-60]%.
- (499) Similarly, if the downstream market was considered to be encompassing thrust reversers for all types of aircraft, Safran's position is below [30-40]% and therefore no vertically affected market will arise. On the contrary, if the downstream market definition ultimately retained is narrower, then Safran's market share on the plausible market for thrust reversers for regional jets is of [60-70]%.
- (500) Notwithstanding the significant market share, the Commission considers that the merged entity will not be in the position to foreclose its upstream competitors' access to a sufficient customer base.
- (501) First, albeit not entirely conclusive, the market investigation indicated that suppliers of inputs to nacelles and thrust reversers consider that post-transaction they will have sufficient alternative customers. Only one supplier claims that it possibly will not have sufficient alternative customers. However that customer indicated that potential customers do exist, and that its assessment does not reflect the overall market situation, but rather its own industrial situation.³²¹
- (502) Second, many of the sub-components for nacelles are not specific to nacelles/thrust reversers for regional aircrafts and therefore the customer base they target is broader than the market as defined for antitrust purposes. For the purposes of this assessment it is therefore more appropriate to assess the merged entity's ability to foreclose on the basis of its position on a broader market for nacelles/thrust reversers for all types of aircraft. As already mentioned above, Safran's position on that market is considerably smaller. Under this framework of assessment, the merged entity will lack the ability to foreclose a sufficiently large customer base.

320 Replies to question 143 and 144 of eQuestionnaire 1 – Competitors.

321 Replies to question 146.1 of eQuestionnaire 1 – Competitors.

(503) This is also consistent with the indication of the market investigation. One player active across the nacelles value chain in fact indicated that "*there are several suppliers of nacelles, nacelles components and nacelles sub-components.*" Another supplier further indicated that it "*(...) does not expect that the Transaction will have material impact on the level of competition and hence on pricing (...).*"³²²

7.2.5.4. Conclusion

(504) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the market for nacelles sub-components (upstream) and Safran's activities on the markets for nacelles and thrust reversers (downstream), under any alternative product market definitions

7.2.6. Engines, engine components and engine sub-components

(505) In the engines product area, the Transaction gives rise to the following vertically affected markets:

- a. upstream, the markets for (i) wiring systems, (ii) utility actuators, (iii) air valves, (iv) solenoid valves, (v) servo-valves, (vi) high-temperature/high-pressure ducting assemblies, (vii) flexible metal hoses, (viii) acoustic panels, (ix) scoops for engines, (x) sensors and (xi) small sub-components; and, downstream, the market for engines and
- b. upstream, the market for small sub-components and, downstream, the market for front bearing compartments;
- c. upstream, the markets for (i) small sub-components and (ii) electrical and mechanical oil debris collectors and detectors and, downstream the market for lubrication units;
- d. upstream, the market for small sub-components and, downstream the market for mechanical power transmission systems.

7.2.6.1. Engines and engine sub-components

a. Market structure

(506) The Transaction would lead to an affected vertical relationship only if the market was to be segmented by type of engine as Safran achieved a market share of [30-40]% on the market for turbofan engines in 2016. Furthermore, should the market be further segmented according to the type of aircraft, the plausible market for

322 Replies to question 152.1 of eQuestionnaire 1 – Competitors.

turbofan for large commercial aircraft (narrow body) is affected as Safran's share is above [30-40]%, at [70-80]%.³²³

(507) On the upstream markets, Zodiac's share is limited, and particularly: (i) wiring systems: [0-5]%; (ii) utility actuators: less than [0-5]%; (iii) air valves: [0-5]%; (iv) solenoid valves: [0-5]%; (v) servo-valves: [0-5]%; (vi) high-temperature/high-pressure ducting assemblies: [0-5]%; (vii) flexible metal hoses: less than [0-5]%; (viii) acoustic panels: [5-10]%; (ix) scoops for engines: less than [0-5]%; (x) sensors: less than [0-5]%; (xi) small sub-components: less than [0-5]%.³²⁴

b. Input foreclosure

(508) The Commission takes the view that post-transaction the merged entity will not have the ability to engage in input foreclosure. This is for the following reasons.

(509) First, on each individual market for engine sub-components Zodiac's position is limited, below [5-10]% under any plausible market definition. Hence, the merged entity will not have a significant degree of market power on the upstream market.

(510) Second, on each of the individual upstream markets the merged entity will face competition from a number of significantly larger competitors most of whom are not vertically integrated. The Commission therefore takes the view that, even if the merged entity would stop selling to its downstream competitors, the merged entity will not be able to negatively affect the overall availability of upstream products.

(511) This is consistent with the information obtained from respondents to the market investigation, the vast majority of which indicated that they would have alternative suppliers in the event the merged entity would stop supplying the sub-components in question or supply them under worse commercial conditions.³²⁵

(512) In light of the above, the Commission concludes that the merged entity will not have the ability to foreclose its downstream competitors' access to inputs.

c. Customer foreclosure

(513) The Commission takes the view that the merged entity will not have the ability to foreclose its upstream competitors' access to a sufficient customer base.

³²³ In number of engines sold. These are the only market currently vertically affected by the Transaction, however the market for turboshaft engines (used in helicopters) may become an affected market as of 2018. On this plausible market, Safran's 2016 share is of [20-30]%, however it will exceed [30-40]% as of 2018 ([30-40]% in 2018, [30-40]% in 2019 and [40-50]% in 2020). Given that is not currently an affected market it will not be assessed in this decision, however the assessment carried out in this section applies *mutatis mutandis* to that market.

³²⁴ The Notifying Party confirmed that its market share would remain below [0-5]% also on a small-sub component by small sub-component basis.

³²⁵ Replies to question 179 of eQuestionnaire 1 – Competitors.

- (514) As submitted by the Notifying Party and confirmed in the market investigation,³²⁶ the upstream engine sub-components supplied by Zodiac are not specific to turbofan engines for large commercial aircraft (narrow body). Rather most of the sub-components supplied by Zodiac for the purposes of the vertical relationship under analysis are used in all aircraft engines as well as as inputs to other systems and components of an aircraft.
- (515) The customer base targeted by the merged entity's upstream competitors of (i) wiring systems, (ii) utility actuators, (iii) air valves, (iv) solenoid valves, (v) servo-valves, (vi) high-temperature/high-pressure ducting assemblies, (vii) flexible metal hoses, (viii) acoustic panels, (ix) scoops for engines, (x) sensors and (xi) small sub-components, is therefore significantly wider than the affected downstream market.
- (516) Notwithstanding its large market share in the downstream market for turbofan engines for large commercial aircraft (narrow body), therefore, the merged entity will not have the ability to foreclose its upstream competitors access to a sufficiently large customer base. In fact, if a wider market encompassing all turbofan engines was to be considered, Safran's market share was [30-40]% in 2016, expected to remain substantially stable in the next four years (expected share in 2020 estimated at [30-40]%). If the analysis was to be broadened to all types of engines, Safran's share would be even smaller as its share on the other types of engines is even more limited.
- (517) This conclusion is also corroborated by the results of the market investigation. The majority of suppliers of upstream inputs in fact indicated that they do not sell to Safran.³²⁷ Also, the respondents that do supply Safran confirmed that post-Transaction they consider that they will continue to have a sufficient number of customers should Safran stop purchasing from them.³²⁸

d. Conclusion

- (518) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the markets for (i) wiring systems, (ii) utility actuators, (iii) air valves, (iv) solenoid valves, (v) servo-valves, (vi) high-temperature/high-pressure ducting assemblies, (vii) flexible metal hoses, (viii) acoustic panels, (ix) scoops for engines, (x) sensors and (xi) small sub-components for nacelles sub-components (upstream) and Safran's activities on the markets market for turbofan engines for large commercial aircraft (narrow body) (downstream).

326 Replies to questions 90, 168, 205 of eQuestionnaire 1 – Competitors.

327 Replies to question 176 of eQuestionnaire 1 – Competitors.

328 Replies to question 177 of eQuestionnaire 1 – Competitors.

7.2.6.2. Front bearing compartments and markets for small sub-components

a. Market structure

- (519) The Transaction generates an affected vertical relationship irrespective of the precise market definition adopted as on the downstream market for bearing compartments, Safran has a [market share of 90-100].
- (520) [...]. Indeed engine manufacturers most of the time build their front bearing compartments internally, subcontracting parts thereof to subcontractors (manufacturing such parts on a build-to-print basis).
- (521) On the upstream market for small sub-components, Zodiac's market share is below [0-5]% under any plausible market definition.

b. Assessment

- (522) The Commission takes the view that, notwithstanding its [...] position on the downstream market, the merged entity will not have the ability to foreclose access to customers to its upstream competitors. This is because Safran's supply of front bearing compartments, and therefore its very activity on this market, [...]. Also, the Notifying Party confirmed that [...].³²⁹
- (523) In light of the above, the very future existence of the downstream market is doubtful. In any event, the merged entity will not have the ability to foreclose its upstream competitors as (i) [...] and, (ii) for the existing contract [...] contractual relationships for the supply of inputs are already in place, and therefore any switching is unlikely.
- (524) Furthermore, the Commission takes the view that the Transaction will not lead to input foreclosure given the limited market share ([0-5]%) of Zodiac on the upstream market for small sub-components. Indeed, the market investigation did not reveal any concerns with regard to input foreclosure.
- (525) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the markets for small sub-components and Safran's activities in the downstream market for front bearing compartments.

7.2.6.3. Lubrication units and small sub-components

a. Market structure

- (526) The Transaction would lead to an affected vertical relationship only if the downstream market for lubrication units was to be segmented by type of aircraft: only on the plausible market for lubrication units for large commercial aircraft (narrow body), Safran's share is above [30-40]%, at [70-80]%. On a broader

³²⁹ Notifying Party reply to RFI 1.

market encompassing lubrication units for all type of aircraft, Safran's 2016 share was [10-20]%.

(527) Input to this products supplied by Zodiac are small engine sub-components, as well as electrical and mechanical oil debris detectors and collectors. On each of these markets, Zodiac's share is below [0-5]%, irrespective of the exact market segmentation.

b. Input foreclosure

(528) The Commission takes the view that post-transaction the merged entity will not have the ability to engage in input foreclosure. This is for the following reasons.

(529) First, Zodiac's market share on the market for engine sub-components is limited, below [0-5]% under any plausible market definition. Hence, the merged entity will not have a significant degree of market power on the upstream market.

(530) Second, on the upstream market the merged entity will face competition from a number of significantly larger competitors most of whom are not vertically integrated. The Commission therefore takes the view that, even if it would stop selling to its downstream competitors, or sell at worse commercial conditions, the merged entity will not be have the ability to negatively affect the overall availability of upstream products.

(531) This is consistent with the information obtained from respondents to the market investigation, the vast majority of the respondents to the market investigation indicated that they would have alternative suppliers in the event the merged entity would stop supplying the components in question or supply them under worse commercial conditions.³³⁰

(532) In light of the above, the Commission concludes that the merged entity will not have the ability to foreclose its downstream competitors' access to inputs.

c. Customer foreclosure

(533) The Commission takes the view that the merged entity will not have the ability to foreclose its upstream competitors' access to a sufficient customer base.

(534) The Commission understands that all the upstream small engine sub-components supplied by Zodiac are not specific to the specific downstream product (in this case, lubrication units for narrow body commercial engines). Rather most of the small sub-components supplied by Zodiac for the purposes of the vertical relationship under analysis are almost commodity products used as inputs to a variety of other systems and components of an aircraft.

(535) The customer base targeted by the merged entity's upstream competitors of small sub-components, is therefore significantly wider than the customers present in the downstream market discussed here.

330 Replies to question 179 of eQuestionnaire 1 – Competitors.

(536) Notwithstanding its large market share in the downstream market for lubrication unit for large commercial aircraft (narrow body), therefore, the merged entity will not have the ability to foreclose its upstream customers access to a sufficiently large customer base. In fact, if a wider market encompassing lubrication units for all type of aircrafts was to be considered, Safran's market share was [10-20]% in 2016. Upstream competitors of the merged entity will therefore have sufficient economic alternatives to sell their products.

(537) This conclusion is also corroborated by the results of the market investigation. The majority of suppliers of upstream inputs in fact indicated that they do not sell to Safran.³³¹ Also, the majority of respondent confirmed that post-transaction they consider that they will continue to have a sufficient number of customers should Safran stop purchasing from them.³³²

d. Conclusion

(538) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the markets for small sub-components (upstream) and Safran's activities on the markets market for turbofan engines for lubrication units for large commercial aircraft (narrow body) (downstream).

7.2.6.4. Mechanical power transmission systems and, upstream, the markets for small sub-components

a. Market structure

(539) The Transaction would lead to an affected vertical relationship only if the downstream market for mechanical power transmission systems were to be segmented by type of aircraft or by type of transmission system and by type of aircraft: (i) on the plausible market for transmission systems for commercial aircraft (wide body) Safran's share is [40-50]%; (ii) on the plausible market for transmission systems for commercial aircraft (narrow body) Safran's share is [70-80]%; and, (iii) on the plausible market for ADTs for commercial aircraft Safran's share is [60-70]%.

(540) On the contrary, if the downstream market were to be considered wider, Safran's 2016 market share would be [20-30]% on a market encompassing ADTs for all type of aircraft or on a market encompassing all mechanical power transmission units.

(541) Input to this products supplied by Zodiac are small engine sub-components, as well as electrical and mechanical oil debris detectors and collectors. On each of these markets, Zodiac's share is below [0-5]%, irrespective of the exact market segmentation.

331 Replies to question 176 of eQuestionnaire 1 – Competitors.

332 Replies to question 177 of eQuestionnaire 1 – Competitors.

b. Input foreclosure

- (542) The Commission takes the view that post-transaction the merged entity will not have the ability to engage in input foreclosure. This is for the following reasons.
- (543) First, Zodiac's market share on the market for engine sub-components is limited, below [0-5]% under any plausible market definition. Hence, the merged entity will not have a significant degree of market power on the upstream market.
- (544) Second, on the upstream market the merged entity will face competition from a number of significantly larger competitors most of whom are not vertically integrated. The Commission therefore takes the view that, even if it would stop selling to its downstream competitors or sell at worse commercial conditions, the merged entity will not be have the ability to negatively affect the overall availability of upstream products.
- (545) This is consistent with the information obtained from respondents to the market investigation, the vast majority of which indicated that they would have alternative suppliers in the event the merged entity would stop supplying the sub-components in question or supply them at worse commercial conditions.³³³
- (546) In light of the above, the Commission concludes that the merged entity will not have the ability to foreclose its downstream competitors' access to inputs.

c. Customer foreclosure

- (547) The Commission takes the view that the merged entity will not have the ability to foreclose its upstream competitors access to a sufficient customer base.
- (548) As already discussed earlier in this section 7.2.5., the small-sub components sold by Zodiac and input to – inter alia – mechanical power transmission systems are commodity products, inputs to a variety of systems on the aircraft (and the very fact that are inputs to all the downstream products discussed in this section 7.2.5. is evidence of that). The customer base of the merged entity's upstream competitors is therefore broader than the manufacturers of ADTs or mechanical power transmission units more generally. Upstream competitors of the merged entity will therefore have sufficient economic alternatives to sell their products.
- (549) As already explained in sections 7.2.5.3(c) and 7.2.5.2(c) above, this conclusion is also corroborated by the results of the market investigation as majority of suppliers of upstream inputs in fact indicated that they do not sell to Safran³³⁴ and indicated that they will continue to have a sufficient number of customers should Safran stop purchasing from them.³³⁵

333 Replies to question 179 of eQuestionnaire 1 – Competitors.

334 Replies to question 176 of eQuestionnaire 1 – Competitors.

335 Replies to question 177 of eQuestionnaire 1 – Competitors.

d. Conclusion

(550) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between Zodiac's activities on the markets for small sub-components (upstream) and Safran's activities on the markets market for (i) mechanical power transmission units for large commercial aircraft (wide body), (ii) mechanical power transmission units for large commercial aircraft (narrow body) and (iii) ADTS for large commercial aircraft (downstream), under any alternative product market definitions.

7.2.7. *Environmental control systems and fans for ECS*

(551) Zodiac is active on the market for ECS systems for small aircraft, based on vapour cycling (VCS) technology, which is downstream from the market for fans for ECS systems. The Notifying Party submits that in the small aircraft segment fans for ECS systems are typically purchased directly by airframers which manufacture their own ECS system and therefore do not constitute an upstream product market from ECS systems. Nevertheless the Commission notes that manufacturers of fans for ECS for small aircraft, including Safran, provide them also to Tier-1 suppliers of ECS systems for small aircraft.³³⁶ As such, a vertical relationship exists between the market for manufacture and supply of fans for ECS for small aircraft (upstream) on which both Safran and Zodiac are active, and that for the manufacture and supply of ECS for small aircraft (downstream) on which only Zodiac is active.³³⁷

(552) However the Transaction only results in vertically affected markets if the individual systems making up the ECS are considered as distinct relevant markets. The downstream market thus affected is that for vapour cycling-based air conditioning systems for small aircraft, on which Zodiac has a market share of [30-40]%. Its main competitors are Liebherr ([20-30]%) and AirComm ([30-40]%); smaller suppliers also exist.³³⁸

(553) On the upstream market for fans for ECS for small aircraft, Safran has a market share of [10-20]% and Zodiac has a market share [10-20]%. Their main competitors are Ametek Rotron (with a market share of [40-50]%) and LMB ([20-30]%).³³⁹ A number of other suppliers, such as Electromech Technologies, Curtiss Wright, Honeywell, are also active on this market. If the market for fans for ECS for small aircraft is further segmented according to end use, the market structure is largely the same on a plausible relevant market for VCS fans for air conditioning.³⁴⁰

336 Form CO, para. 1545.

337 Safran is not active as an ECS supplier, for either commercial aircraft or small aircraft. Zodiac is only active in the small aircraft segment.

338 Notifying Party's reply to question 20 of RFI I.1 of 23 November 2017.

339 Form CO, para. 1583.

340 Notifying Party's reply to question 14 of RFI I.4 of 4 December 2017.

- (554) The Notifying Party submits that the Transaction will not result in input foreclosure as Safran is a modest player on the upstream market for fans for ECS for small aircraft.
- (555) As also described in section 7.1.4, post-Transaction the merged entity will have a market share of [20-30]% on the market for fans for ECS for small aircraft. Its main competitors will be Ametek Rotron and LMB. As confirmed in the market investigation, ECS fans for small aircraft are supplied by several other manufacturers, whose products are comparable to those of the Parties, and there are no specific fan types on which the Parties are particularly close competitors.³⁴¹ Zodiac's competitors on the downstream market for ECS for small aircraft thus have alternative sources of supply for fans, therefore the Transaction is unlikely to create a risk of input foreclosure.
- (556) As regards customer foreclosure, [...],³⁴² therefore the Transaction will not have an impact on competing fan suppliers.
- (557) Finally, the market investigation did not reveal any concerns³⁴³ on the part of customers or competitors as a result of the vertical relationship between the Parties in respect of fans for ECS for small aircraft and ECS for small aircraft.³⁴⁴
- (558) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the upstream market for fans for ECS for small aircraft and the downstream market for VCS-based ECS for small aircraft under any of the alternative product market definitions.

7.2.8. *Wiring systems and components*

7.2.8.1. Wiring systems and wiring components

a. Market structure

- (559) Zodiac supplies different wiring systems components, namely backshells and fittings and conduits and sleeves, while Safran and Zodiac are both active in the manufacture and supply of general harnesses (focus of Safran's business) and harsh environment harnesses (focus of Zodiac's business), for various aircraft types and end-applications.³⁴⁵ The Transaction therefore gives rise to vertical relations between the Parties' activities.

341 Replies to questions 188 of eQuestionnaire 1 – Competitors and 118 of eQuestionnaire 3 – Airframers.

342 Form CO, para. 1597.

343 One competitor expressed concerns about the potential impact on the market for ECS that an integrated supplier of electrical systems can have. This issue is discussed in section 7.3.2 on conglomerate effects.

344 Replies to questions 192 and 193 of eQuestionnaire 1 – Competitors and 125 and 126 of eQuestionnaire 3 – Airframers.

345 See sections 5.10 and 7.1.5 above.

(560) Specifically, based on the market share estimates submitted by the Notifying Party, the upstream markets for backshells and fittings ([5-10]%) and conduits and sleeves ([10-20]%) are respectively affected in their vertical relation with the downstream markets for wiring systems ([40-50]%), general wiring systems ([40-50]%), and harsh environment wiring systems for commercial and regional aircrafts and for landing gear applications across all aircraft types.

(561) As a result, the Commission investigated possible foreclosure risks arising from the Parties' position on these vertically affected markets.

b. Input foreclosure

(562) The Notifying Party submits that input foreclosure concerns should be dismissed in view of Zodiac's modest market position in the supply of both backshells and fittings ([5-10]%) and conduits and sleeves ([10-20]%), respectively, and the existence of various competitors with similar product portfolios and capabilities, including TE, Glenair, Federal Mogul, Esterline or Amphenol.³⁴⁶ Any input foreclosure strategy would therefore benefit these competitors and are unlikely to hamper competition in the various markets for wiring systems, notably since wiring system suppliers and aircraft manufacturers often qualify more than one component supplier and airframers engaging in "make" strategies typically source components by means of open and competitive tenders.³⁴⁷

(563) The outcome of the market investigation has confirmed that the merged entity is unlikely to engage in input foreclosure strategies in the future. In fact, no single respondent to the market investigation considered that Safran would have an incentive to cease supplying components or materially change supply conditions as a result of the Transaction.³⁴⁸ Conversely, respondents pointed to the existence of a sufficiently wide supplier base to counter such strategies.³⁴⁹ In the Commission's view, the results of the market investigation therefore support the limited ability and incentive of Zodiac to foreclose downstream rivals resulting from its modest upstream market shares.

c. Customer foreclosure

(564) Safran is a significant supplier of wiring systems and general wiring systems, as well as systems embedding harsh environment harnesses, but does not have in-house component manufacturing capabilities. As a result, Safran is an important purchaser of wiring components, including of backshells and fittings and conduits and sleeves of the types currently offered by Zodiac. In fact, Zodiac already supplies Safran with backshells and fittings (for [...] of Safran's 2017 purchases) and conduits and sleeves (for [...] of Safran's 2017 purchases). In addition, Safran

346 Form CO, paras. 703-706.

347 Form CO, paras. 707-709.

348 Replies to question 88 of eQuestionnaire 1 – Competitors.

349 Idem.

sources from various other suppliers including backshells and fittings from [...], and conduits and sleeves from [...].³⁵⁰

(565) The Notifying Party denies that it would have the capacity and incentive to engage in customer foreclosure as a result of the Transaction because:³⁵¹

(i) as a supplier of general harnesses to airframers under a "build-to-print" model, Safran does not intervene in the selection of component suppliers; it is the aircraft manufacturer that is in charge of their selection and qualification, [...]. In addition, qualifying Zodiac for various platforms on which Safran is active as a wiring system supplier would require at least [...];

(ii) while Zodiac is already a supplier of components to Safran for the in-house manufacturing of harsh harnesses, Safran has established sourcing relationships with other suppliers and expanding Zodiac's qualification for any new component would take [...]. Moreover, Safran's competitiveness is dependent on sourcing inputs under competitive terms and this will not change as a result of the Transaction. In practice, it is also doubtful that [...]; and

(iii) any increased reliance on Zodiac as a component supplier is unlikely to affect competition given the large purchaser base for such components and the fact that many of wiring system suppliers are not vertically integrated into component manufacturing (e.g., Fokker Elmo, Latecoere, GE/Unison, Ducommun).

(566) In response to the market investigation, none of Safran's supplier of backshells and fittings raised customer foreclosure concerns.³⁵² While the pre-selection of component suppliers appears to be less systematic than presented by the Notifying Party and to rather depend on each airframer's procurement practice and on the type of component in question, suppliers do not expect that business opportunities will be affected by the Transaction.³⁵³

(567) For conduits and sleeves, one supplier of Safran raised foreclosure concerns in response to the market investigation.³⁵⁴ That company considers that Safran will have an economic incentive to internalise (part of) its procurement of conduits and sleeves post-merger, thereby foreclosing (part of) the demand for components with the likely effect of inducing price increases as a result of a reduction of competition.³⁵⁵ The Commission has investigated this concern and has come to the conclusion that, on balance, this concern is unlikely to give rise to anticompetitive effects, for the following main reasons:

350 Form CO, para. 712.

351 Form CO, paras. 713-717.

352 Replies to question 90 of eQuestionnaire 1 – Competitors.

353 Replies to questions 89 and 90 of eQuestionnaire 1 – Competitors.

354 Replies to questions 91, 92, 93 and 228 of eQuestionnaire 1 – Competitors.

355 Idem.

- (i) Zodiac is already the largest supplier of conduits and sleeves to Safran so that only part of Safran's demand internalisation (approx. [...]%) could be deemed merger-specific.³⁵⁶ Moreover, the complaint appears to relate to Safran's demand of components to be integrated in wiring systems designed for one particular aircraft manufacturer, *i.e.*, only part of Safran's requirements beyond Zodiac;³⁵⁷
- (ii) the two other main suppliers of conduits and sleeves to Safran have not raised similar concerns in response to the market investigation;³⁵⁸
- (iii) Zodiac's manufacturing plant for conduits and sleeves [...] currently operates at a [...]% capacity utilisation rate, which prevents significant increase in production in the short term, e.g., in pursuance of an hypothetical decision by Safran to internalise wiring component procurement.³⁵⁹ [...], which is therefore unconnected with the Transaction. Any decision to switch additional Safran requirements to Zodiac would therefore require a further increase in plant capacity.
- (iv) the market investigation has confirmed that other prominent wiring system suppliers are not vertically integrated into component manufacturing so that significant demand from non-integrated wiring system suppliers will remain available;³⁶⁰
- (v) the qualification of component suppliers by airframers, combined with security of supply considerations and the fact that at least two suppliers are often qualified for each type of wiring component, as well as the fact that airframers sometimes negotiates prices and volumes directly with the relevant component suppliers, is such as to mitigate risks of anticompetitive foreclosure;
- (vi) the complaining supplier is active across a range of industries and is thus engaged in the supply of wiring components beyond the aerospace sector. Even though technical differences exist across industries, the complainant indicated that it is already experiencing convergence between the requirements applicable to wiring systems across industries.³⁶¹

(568) As a result, the Commission considers that Safran would have limited ability and incentive to engage in customer foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in any significant anticompetitive effects.

356 Form CO, para.

357 Replies to question 90 of eQuestionnaire 1 – Competitors.

358 Replies to question 90.1 of eQuestionnaire 1 – Competitors.

359 Reply to question 10 of pre-notification RFI 8.

360 Replies to question 85 of eQuestionnaire 1 – Competitors.

361 Replies to question 83 of eQuestionnaire 1 – Competitors.

d. Conclusion

(569) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to vertical effects involving the markets for wiring systems and components under any alternative product market definitions.

7.2.8.2. Wiring systems and engines, nacelles, landing gears, brakes and missiles

a. Market structure

(570) Zodiac is a supplier of harsh environment harnesses designed to equip a number of aircraft systems, including engines, nacelles, landing gears and certain types of brakes, and ammunitions. Safran is not active on the merchant market for harsh environment harnesses but does supply a range of aircraft systems, including engines, nacelles, landing gears, brakes and missiles. The Transaction therefore gives rise to vertical relations between the Parties' activities in wiring systems, on the one hand, and other equipment, on the other hand.

(571) Specifically, based on the market share estimates submitted by the Notifying Party, the upstream markets for wiring systems ([40-50]%), harsh environment wiring systems ([10-20]%) and harsh environment wiring systems for landing gears ([90-100]%), possibly segmented per aircraft types, are respectively affected in their vertical relation with the downstream markets for engines ([20-30]%), nacelle thrust reverses ([20-30]%), landing gears ([50-60]%), brakes ([40-50]%) and missiles (n.a.), and related sub-segments.

(572) As a result, the Commission has investigated possible foreclosure risks arising from the Parties' position on the vertically affected markets.

b. Input foreclosure

Wiring systems and landing gears

(573) Zodiac has a very significant market position in the supply of harsh environment harnesses for landing gears, across all aircraft segments. However, the Notifying Party submits that risks of anticompetitive input foreclosure should be dismissed given the large and expanding base of wiring systems suppliers for landing gears, including Ultra Electronics, New Chapel Electronics, Glenair or Latecoere, and the procurement by means of competitive merits-based tender procedures.³⁶² As a result, Zodiac would have no incentive to refuse supplying wiring systems for landing gears or to bid at less competitive conditions since it would directly benefit competing suppliers.

(574) Moreover, wiring systems represent only between [0-10]% and [0-10]% of the costs of production of a landing gear and selected suppliers are continuously challenged over the duration of a program pursuant to "competitiveness clauses"

³⁶² Form CO, paras. 724-727.

provided for in supply agreements,³⁶³ so that anticompetitive effects on the markets for supply of landing gears are unlikely to arise.

- (575) The outcome of the market investigation supports the lack of input foreclosure risks arising from the Transaction in relation to the supply of wiring systems for landing gears. In effect, none of the other landing gear system suppliers who procure harnesses from Zodiac raised concerns to that effect.³⁶⁴ To the contrary, Liebherr indicated that "there are enough competitors on the market" for wiring systems;³⁶⁵ UTAS was equally dismissive and Eaton did not highlight any particular issue in that respect.³⁶⁶
- (576) This overall lack of concern reflects structural elements in spite of Zodiac's significant market share, notably the fact that Safran only represents [...]% of Zodiac sales of wiring systems for landing gears, whereas sales to third party landing gear manufacturers, including UTAS, Liebherr and Eaton, represent almost [...]. Moreover, Zodiac's margins for landing gear harnesses are [...], thereby limiting the incentive to forego sales.³⁶⁷ Furthermore, Safran's total requirements for landing gear wiring systems amount to approx. [...]% of Zodiac's total sales so that any foreclosure strategy could not be compensated economically by sales to Safran. This is notably because landing gear system suppliers have confirmed that they could turn to alternative sources of supply for harnesses (from, e.g., Latécoère, Glenair, Ultra Electronics, New Chapel Electronics, or even UTAS), which is consistent with the outcome of the market investigation.³⁶⁸
- (577) Hence, the Commission concludes that Safran would have limited ability and incentive to engage in input foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

363 Idem.

364 Replies to questions 91 and 92 of eQuestionnaire 1 – Competitors.

365 See also minutes of the call with Liebherr on 8 November 2017, para. 14: "*Liebherr sources landing gear harnesses from Zodiac. Liebherr does not consider the proposed transaction to be problematic with respect to the procurement of this product considering the commodity nature thereof and the numerous suppliers – i.e. Fokker Elmo and others in the US – from which it could source. Furthermore, starting manufacturing this product would not require extensive investments from aerospace wiring suppliers such as Latécoère*".

366 Replies to questions 91 and 92 of eQuestionnaire 1 – Competitors.

367 Form CO, para. 722.

368 See, e.g., minutes of a conference call with Liebherr on 8 November 2017, para. 14; minutes of a conference call with Latécoère on 25 October 2017; Replies to question 85 of eQuestionnaire 1 – Competitors. Likewise, in line with the above considerations put forward in relation to wiring components, it is unlikely that Zodiac would have an incentive to withhold supply of wiring components for landing gear harnesses in case another supplier of harnesses would have been selected by the landing gear system supplier since it would otherwise lose all possible revenues for the system and platform in question.

Wiring systems and brakes

- (578) Aircraft brakes remain until today primarily hydraulic. Only two commercial platforms in the world currently use electrical brakes, namely the Bombardier C-series and the Boeing 787. [...]. It is therefore unclear whether a separate market can be deemed to exist for brake harnesses at this point, distinct from landing gear harnesses, and the current structure of supply cannot be assumed to reflect future competition.³⁶⁹
- (579) In the framework of the Commission's market investigation, Liebherr expressed confidence that there were sufficient alternative suppliers of harsh environment harnesses for landing gear systems, independently of the Transaction. [...], it is likely that sufficient alternative suppliers of brake harnesses will be available in the future. [...] also illustrates that in any event alternative suppliers exist for e-brake harnesses, [...] in this particular case, and others such as all landing gear harnesses suppliers. Moreover, [...] was entered into as a result of a competitive tender process for the lifetime of the aircraft program and provided for various mechanisms limiting Zodiac's freedom to set prices, thereby limiting its ability to engage in input foreclosure at this point.³⁷⁰
- (580) In view of the above elements and of the outcome of the market investigation, including as summarised hereinabove in relation to landing gear harnesses, and the lack of concerns expressed either by Liebherr or UTAS, or any other landing gear and/or brake suppliers, the Commission concludes that Safran would have limited ability and incentive to engage in input foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

Wiring systems and engines

- (581) Zodiac is a minor supplier of harsh environment harnesses for engines, respectively to [...].³⁷¹ As a result, the Notifying Party estimates Zodiac's market share for the supply of harsh environment harnesses for engines at [0-5]% overall and only at [0-5]% for business jets and [0-5]% for helicopters. As noted, the Notifying Party also estimates Zodiac's market position at [0-5]% on a general market for wiring systems and [10-20]% on a market for harsh environment wiring system.
- (582) In view of these structural elements, the Commission considers that Zodiac does not have market power in relation to the supply of harsh environment harnesses, in particular for engine applications. Moreover, the market investigation did not reveal material concerns in relation to engine harnesses or harsh environment wiring system in general. As a result, the Commission concludes that Safran would have limited ability and incentive to engage into input foreclosure strategies following the implementation of the Proposed Concentration and that any such strategy is unlikely to result in significant anticompetitive effects.

369 Form CO, paras. 745-746.

370 Form CO, para. 744.

371 Form CO, para. 762.

Wiring systems and nacelles

- (583) Zodiac is also a minor supplier of harsh environment wiring systems for nacelles, including thrust reversers, since it [...] supplies [...]. As a result, the Notifying Party estimates Zodiac's market share for the supply of harsh environment harnesses for nacelles at [0-5]% overall and at [0-5]% for commercial aircrafts.³⁷² According to the Notifying Party, Zodiac derives profits from supplying [...], whereas [...] could readily find an alternative supplier in case Zodiac was to discontinue supplies, in breach of its ongoing contract.³⁷³
- (584) In view of these elements, the Commission considers that Zodiac does not have market power in relation to the supply of harsh environment harnesses, in particular for nacelle applications, or would have incentives to engage in input foreclosure. Moreover, the market investigation did not reveal material concerns in relation to nacelle harnesses or harsh environment wiring system in general. As a result, the Commission concludes that Safran would have limited ability and incentive to engage in input foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

Wiring systems and missiles

- (585) Zodiac has very limited sales of harnesses for ammunition application amounting to EUR [...] in 2016, [...]. According to the Notifying Party, Zodiac's share of supply of harsh environment harnesses for ammunitions can therefore be estimated at [0-5]%. As a result, in spite of the specificities of the procurement of military ammunitions, the Commission considers that Zodiac cannot be deemed to have market power in relation to the supply of harsh environment harnesses for such application. Moreover, the market investigation did not reveal material concerns in relation to missile/ammunition harnesses or harsh environment wiring system in general. As a result, the Commission concludes that Safran would have limited ability and incentive to engage into input foreclosure strategies following the implementation of the Proposed Concentration and that any such strategy is unlikely to result in significant anticompetitive effects.

c. Customer foreclosure

Wiring systems and landing gears

- (586) Safran is a significant supplier of landing gears for various aircraft types, with a market share of [50-60]%. However, the Notifying Party submits that risks of anticompetitive customer foreclosure should be dismissed given that Zodiac is already the most important supplier of landing gear harnesses to Safran, accounting for approx. [...]% of Safran's requirements,³⁷⁴ and that Safran has a

³⁷² Form CO, paras. 65-666.

³⁷³ Form Co, para. 756.

³⁷⁴ Form CO, para. 727.

strong incentive to continue multi-sourcing wiring systems for security of supply purposes.³⁷⁵

- (587) Moreover, the Notifying Party submits that alternative suppliers [...] and, to a lesser extent, [...], as well as any future suppliers, are unlikely to be harmed by any possible internalisation of Safran's procurement of landing gear harnesses.³⁷⁶ Firstly, suppliers of wiring systems have a broad range of customers to turn to including alternative landing gear suppliers such as UTAS, Heroux-Devtek, Liebherr or Eleb, suppliers of other aerospace equipment (e.g., engine and nacelle manufacturers) and equipment manufacturers for other industries.³⁷⁷ Secondly, supply of landing gear wiring system to Safran amounts to an insignificant share of [...] aerospace revenues.
- (588) The market investigation did not uncover particular concerns in relation to customer foreclosure in the supply of landing gear wiring systems. One alternative supplier pointed to a risk of internalisation but without anticompetitive impact in the form of a likely price increase, whereas others confirmed that they would have access to a sufficiently broad customer base even in the absence of Safran.³⁷⁸ As a result, the Commission concludes that Safran would have limited ability and incentive to engage in customer foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

Wiring systems and brakes

- (589) As noted in paragraph 573 above, brakes remain largely hydraulic up until today for only two platforms are currently outfitted with electric brakes supplied by Meggitt with harnesses embedded in the landing gear system supplied by Liebherr for the Bombardier C-series, and Safran and UTAS for the Boeing 787. Safran is therefore one among other suppliers of e-brakes, whereas it remains unclear whether harnesses for e-brakes can be distinguished from harnesses for landing gears at this point.
- (590) In view of these elements and of the outcome of the market investigation, including as summarised hereinabove in relation to landing gear harnesses, and the lack of specific concerns expressed by suppliers of harsh environment harnesses, including Glenair, the Commission concludes that Safran would have limited ability and incentive to engage in customer foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

375 Form CO, para. 738.

376 Form CO, para. 736.

377 Idem.

378 Replies to questions 91 and 92 of eQuestionnaire 1 – Competitors. See also the minutes of the call with Latecoere on 25 October 2017, para. 12.

Wiring systems and engines

- (591) Safran is an established supplier of aircraft engines, with a market share estimated by the Notifying Party at [5-10]% for turboprop engines, [30-40]% for turbofan engines and [20-30]% for turboshaft engines, with variances across aircraft segments.³⁷⁹ Nowadays, Safran sources most of its requirements for engine wiring systems [...].³⁸⁰ Aside from Zodiac, Safran's main third-party supplier is [...].³⁸¹ According to the Notifying Party, Safran's choice of supplier is exclusively driven by competitiveness considerations in relation to quality, reliability and price, and Safran will continue sourcing on pure merit grounds post-merger.³⁸²
- (592) The market investigation did not uncover specific customer foreclosure concerns in relation to harsh environment wiring systems and for engines in particular. In particular, [...],³⁸³ which account for an insignificant share of its overall revenues. Moreover, [...] submitted that any foreclosure strategy on Safran's part was unlikely to drive prices upward.³⁸⁴ As a result, and [...], the Commission concludes that Safran would have limited ability and incentive to engage in customer foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

Wiring systems and nacelles

- (593) Safran is an established supplier of nacelles and nacelle thrust reversers, with 2016 market shares estimated by the Notifying Party at respectively [10-20] and [20-30]%. Nowadays, Safran does not source nacelle wiring systems from Zodiac.³⁸⁵ Instead, it sources harnesses from third-parties as a result of open tender procedures, as well as internally [...].³⁸⁶ According to the Notifying Party, [...], suppliers of harnesses for nacelles would still retain a broad customer basis of nacelle thrust reverser suppliers (such as Spirit, GE and Nordam) and suppliers of other equipment in case Safran was to start sourcing from Zodiac.³⁸⁷
- (594) In view of these elements, notably Safran's lack of business with Zodiac for nacelles at this point and Safran's long-term relationships with third-party suppliers, combined with the lack of specific concern expressed by suppliers of harsh environment harnesses, the Commission concludes that Safran would have

379 Form CO, paras. 1488-1492.

380 Form CO, para. 766.

381 Idem.

382 Form CO, para. 768.

383 Minutes of the call with Latécoère on 25 October 2017, para. 13.

384 Latécoère's reply to questions 91 of eQuestionnaire 1 – Competitors.

385 Form CO, para. 758.

386 Form CO, para. 760.

387 Form CO, para. 761.

limited ability and incentive to engage in customer foreclosure following the implementation of the Transaction and that any such strategy is unlikely to result in significant anticompetitive effects.

Wiring systems and missiles

- (595) Safran is a supplier of ammunitions, in particular strategic and tactical missiles to the French Ministry of Defence. In France, the sourcing policy of missiles and missile sub-systems and components is a matter of essential security interest.³⁸⁸ As a result, procurement is dictated by the Direction Générale de l'Armement (DGA) based on a range of considerations, including of a strategic nature.
- (596) Given the close involvement of the DGA in the selection of sub-system and component suppliers for missiles and the range of interests at stake, the Commission concludes that Safran would have limited ability on its own to distort competition in the procurement of harnesses for ammunition applications and that any foreclosure of demand to that effect is unlikely to be merger-specific.

d. Conclusion

- (597) In view of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to vertical effects involving the markets for wiring systems, on the one hand, and those for engines, nacelles, landing gears, brakes and missiles, on the other hand, under any alternative product market definitions.

7.2.9. *Space launchers*

7.2.9.1. Telemetry equipment (upstream) and prime contracting for ESA space launchers (downstream)

- (598) Zodiac supplies telemetry equipment to ArianeGroup, a joint venture between Safran and Airbus, for integration into space launchers. There is thus a vertical relationship between the upstream market for telemetry equipment for space launchers, on which Zodiac is active, and the potential downstream market for prime contracting for ESA space launchers, on which Safran is active via ArianeGroup.³⁸⁹
- (599) On the upstream market for the supply of telemetry equipment for space launchers, Zodiac is [...],³⁹⁰ [...]. Other suppliers exist at worldwide level, including Curtiss Wright, L3 and local players in Korea, India and China.³⁹¹

388 Form CO, para. 1796.

389 The Parties do not overlap horizontally on the supply of telemetry equipment for space launchers.

390 This will change in the future [...]

391 Zodiac estimates its market share to be [10-20]% on a global market for telemetry equipment for space launchers.

- (600) Downstream, on the potential market for prime contracting for ESA launchers, ArianeGroup is ESA's sole prime contractor for all Ariane space launcher programmes.³⁹²
- (601) The Notifying Party submits that the Transaction does not raise competition concerns on the market for telemetry equipment or prime contracting since there will be no open market for telemetry equipment in the foreseeable future. The Notifying Party submits that in any event, for any ESA project and/or program, the prime contractor must follow ESA's best practices for the selection of suppliers, which provide that invitations to tender are managed at ESA level when one of the bidders is directly or indirectly related to the prime contractor.
- (602) The Commission considers that the Transaction does not give rise to input or customer foreclosure concerns since Zodiac [...] and there is no new product in development for which a telemetry equipment supplier needs to be selected in the foreseeable future.³⁹³
- (603) Furthermore, as also found by the Commission in case M.7353 – *Airbus/Safran/JV*, the selection of suppliers for launcher components by prime contractors is made according to ESA's Procurement Rules and ESA's Best Practices which ensure that ESA effectively exercises control of the selection process, validates and approves key elements of the tender documentation, and retains important veto rights with respect to the final selection decision.³⁹⁴
- (604) In particular, ESA's Best Practices provide that a prime contractor must prepare and submit for ESA's approval an industrial procurement plan which indicates, for each component to be procured, the procurement method and if relevant its justification, a list of potential tenderers and the indicative budget. For contracts allocated through open competitive tenders, the selection of contractor is made by an evaluation board, on which ESA is always represented so as to ensure the fairness of the selection process. Moreover, in situations of conflict of interest, notably when the prime contractor (or any of its affiliates) wishes to participate in the bidding for any element for which the prime contractor will carry out the competitive tendering procedure, ESA shall in the interest of impartiality exclude the prime contractor from the evaluation of tenders submitted.³⁹⁵
- (605) Given that Zodiac is [...], the competitive assessment remains the same also under an alternative market definition, whereby the individual telemetry transmitters and receivers are considered as constituting distinct relevant product markets.
- (606) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market due to the vertical relationship between the Parties as regards the market for telemetry

³⁹² The prime contractor for the Vega launcher programme is ELV.

³⁹³ Form CO, para. 1758.

³⁹⁴ M.7353 – *Airbus/Safran/JV*, paras. 151-159.

³⁹⁵ Best Practices for the Selection of Subcontractors by Prime Contractors in the frame of ESA's Major Procurements.

equipment for space launchers and the potential market for prime contracting for space launchers in Europe under any of the alternative product market definitions.

7.2.9.2. Valves equipment (upstream) and prime contracting for ESA space launchers (downstream)

- (607) Zodiac supplies non-cryogenic valves to ArianeGroup for integration into space launchers. There is thus a vertical relationship between the upstream market for valves for space launchers and the potential downstream market for prime contracting for ESA space launchers.
- (608) As described above, on the potential downstream market for prime contracting for ESA launcher, ArianeGroup is ESA's sole prime contractor for all Ariane space launcher programmes.
- (609) As regards the upstream market for the supply of valves for space launchers, Zodiac [...] supplies non-cryogenic valves to ArianeGroup for Ariane 5 space launchers. [...]. On the segment of non-cryogenic valves for Ariane 5 launchers, Zodiac has a market share of [5-10]%. The other main suppliers of non-cryogenic valves for Ariane 5 are [...]. Safran also supplies non-cryogenic valves for Ariane 5 launchers, directly via Safran Aero Boosters ([0-5]%) and through ArianeGroup ([5-10]%).³⁹⁶
- (610) The Notifying Party submits that the Transaction does not raise competition concerns on the market for valves equipment or prime contracting since there will be no open market for valves equipment in the foreseeable future. The Notifying Party submits that in any event, for any ESA project and/or program, the prime contractor must follow ESA's best practices for the selection of suppliers, which provide that invitations to tender are managed at ESA level when one of the bidders is directly or indirectly related to the prime contractor.
- (611) The Commission considers that the Transaction does not give rise to input or customer foreclosure concerns since valves suppliers on the Ariane 5 and Ariane 6 launchers have already been selected and there is no new product in development for which a valves equipment supplier needs to be selected in the foreseeable future.³⁹⁷
- (612) Indeed, as also found by the Commission in case M.7353 – *Airbus/Safran/JV* and described in section 7.2.9.1 above, the prime contractor's ability to source components internally is thus limited as the selection of suppliers for launcher components is made according to ESA's Procurement Rules and ESA's Best Practices which ensure that ESA effectively exercises control of the selection process, validates and approves key elements of the tender documentation, and retains important veto rights with respect to the final selection decision.³⁹⁸

³⁹⁶ Safran and Zodiac are both active as suppliers of non-cryogenic valves for space launchers but in light of their limited combined market shares, this segment is not horizontally affected.

³⁹⁷ Form CO, para. 1758.

³⁹⁸ M.7353 – *Airbus/Safran/JV*, paras. 151-159.

(613) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market due to the vertical relationship between the Parties as regards the market for valves equipment for space launchers and the potential market for prime contracting for space launchers in Europe under any of the alternative product market definitions.

7.2.10. Defence systems and equipment

7.2.10.1. Telemetry equipment for strategic missiles (upstream) and strategic missiles (downstream)

(614) Zodiac provides telemetry equipment to ArianeGroup, a joint venture between Safran and Airbus, for its manufacturing of strategic missiles. There is thus a vertical relationship between the Parties as regards the upstream market for telemetry equipment for strategic missiles and the downstream market for the development and manufacturing of strategic missiles.

(615) ArianeGroup is prime contractor for the development and manufacturing of strategic missiles on behalf of the French General Directorate for Armament ("DGA"). ArianeGroup is the only supplier of strategic missiles in France and it is not active in this market outside France.

(616) Zodiac is ArianeGroup's [...] supplier of telemetry equipment. Apart from ArianeGroup, Zodiac supplies telemetry equipment to the [...]. Zodiac is not active in this market outside France.

(617) On the downstream market for the development and manufacturing of strategic missiles, ArianeGroup has no competitors in France and is not active in other countries. The Transaction therefore does not therefore give rise to input foreclosure concerns. Neither does the Transaction create competition concerns of customer foreclosure, as ArianeGroup [...].

(618) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market due to the vertical relationship between the Parties as regards the market for telemetry equipment for strategic missiles and the market for strategic missiles under any of the alternative product or geographic market definitions.

7.2.10.2. Servo-valves (upstream) and tactical missile propulsion systems (downstream)

(619) Zodiac supplies Safran with servo-valves to be integrated in the engines of tactical missiles. The servo-valves supplied by Zodiac to Safran for integration in tactical missiles are [...] (see also section 5.10.5). There is thus a vertical relationship between the Parties as regards the upstream market for servo-valves and the downstream market for tactical missile propulsion systems.

(620) On the upstream worldwide market for servo-valves, Zodiac has a market share of [0-5]%.

(621) On the downstream market for the development and manufacturing of tactical missile propulsion systems, Safran is active through Safran Power Units for turbojet missile propulsion systems, and through ArianeGroup (a joint venture

between Safran and Airbus) and Roxel (a joint venture between Safran and MBDA) for solid rocket motor missile propulsion systems. [...].

- (622) In light of Zodiac's limited market share on the upstream market for servo-valves, the Transaction does not give rise to input foreclosure concerns.
- (623) The Commission takes the view that the Transaction does not create a risk of customer foreclosure either since the servo-valves integrated in the engines of missiles [...], and [...] numerous alternative customers exist.
- (624) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market due to the vertical relationship between the Parties as regards the upstream market for servo-valves and the downstream market for tactical missile propulsion systems under any of the alternative product or geographic market definitions.

7.2.10.3. Electrical motors and seals (upstream) and sights (downstream)

- (625) [...].
- (626) On the upstream worldwide market for electrical motors, Zodiac's market share is below [0-5]%. Zodiac's market share remains below [0-5]% even if the narrow sub-segment of the defence industry is considered.
- (627) On the upstream market for seals, Zodiac's market share is below [0-5]%.
- (628) Downstream, on the plausible relevant market for sights, Safran estimates its market share to be [60-70]% in France and lower on a wider geographic market ([30-40]% at European level, and less on a global level).³⁹⁹
- (629) In light of Zodiac's limited market share on the upstream markets for electrical motors and for seals, the Commission considers that the Transaction does not create a risk of input foreclosure.
- (630) The Commission takes the view that the Transaction does not create a risk of customer foreclosure either since electrical motors and seals are used in numerous other applications outside the defence industry (in particular in the aerospace sector but not only).
- (631) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market due to the vertical relationship between the Parties as regards the upstream markets for electrical motors and seals and the downstream market for optronic sights under any of the alternative product or geographic market definitions.

7.2.10.4. Seals (upstream) and drones (downstream)

- (632) Zodiac supplies Safran with jet seals to be integrated in drones. The jet seals supplied by Zodiac to Safran for integration in drones are the same as those

³⁹⁹ Form CO, para. 1826.

placed in the engines of aircraft (see also section 5.10.3). There is thus a vertical relationship between the Parties as regards the upstream markets for seals and the downstream market for drones.

- (633) On the upstream market for seals, Zodiac's market share is below [0-5]%.
(634) On the downstream market, Safran is active in France, where the other main suppliers of drones are Thales and EADS, and – upon export authorisation by the French government – also in a number of other European countries and Canada, where it competes against Thales, Textron Systems, Elbit Systems, IAI, Leonardo.⁴⁰⁰
(635) In light of Zodiac's limited market share on the upstream markets for seals, the Commission considers that the Transaction does not create a risk of input foreclosure.
(636) The Commission takes the view that the Transaction does not create a risk of customer foreclosure either since jet seals are a commodity product for which many applications exist outside the defence industry (in particular in the aerospace sector but not only).
(637) In light of the above, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market due to the vertical relationship between the Parties as regards the upstream markets for seals and the downstream market for drones under any of the alternative product or geographic market definitions.

7.2.10.5. Components for ejection seats (upstream) and ejection seats (downstream)

- (638) Safran, through a joint-venture with Martin Baker UK called SMBF, supplies ejection seats for the last generation of French military aircraft Rafale produced by Dassault.⁴⁰¹ Zodiac does not manufacture or supply ejection seats but supplies components for ejection seats to SMBF, for approximately [...] % of SMBF's purchases, including parachutes, buckles and textile components such as harnesses, lines, bridles, cushions and packs.⁴⁰² As a result, the Transaction gives rise to a vertical relation between the Parties, which is affected given SMBF's [position] on the supply of ejection seats for [...].
(639) SMBF is Zodiac's sole customer for ejection seat components.⁴⁰³ Hence, the Proposed Concentration cannot give rise to any input foreclosure concerns. SMBF's other main component supplier is Martin Baker, for approximately [...] % of SMBF's purchases.⁴⁰⁴ Since Martin Baker is the co-owner with Safran of SMBF, customer foreclosure concerns can also be excluded for structural reasons,

400 Form CO, para. 1845-1850.

401 Form CO, para. 1606.

402 Form CO, paras. 1610-1611.

403 Form CO, para. 1610.

404 Form CO, para. 1609.

notably because SMBF's selection of a component supplier requires approval by both parents.⁴⁰⁵ The remaining [...] % of components supplied to SMBF originate from [...] but foreclosure concerns can also be excluded in that case given that Zodiac supplies the vast majority of its ejection seats components under [...].⁴⁰⁶ In the Commission's view, that structural element is such as to deprive the merged entity of the ability and incentive to engage in customer foreclosure strategies.

(640) In view of the above, the Commission concludes that the Proposed Concentration is unlikely to affect market dynamics for the supply of ejection seats and related components and thus does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between the Parties' activities on the markets for ejection seat components (upstream) and their ejection seats (downstream) under any of the alternative product or geographic market definitions.

7.2.11. Supply of spare parts (upstream) and provision of MRO services (downstream)

(641) Given that spare parts, as well as related documentation (such as the Component Maintenance Manual), IP rights, tooling, testing equipment and maintenance data are necessary in order to provide MRO services, there is a vertical relationship between the upstream market for spare parts and the downstream market for the provision of MRO services. The market investigation confirmed that these inputs are essential for third party MRO service providers. The majority of airlines and airframers respondents indicated that inputs related to the spare parts can be obtained only from the component OEM.⁴⁰⁷

(642) Due to a lack of market share data on the narrowest possible product markets and in view of the market investigation, the Commission has taken a cautious approach and analysed the possible effects of the Transaction on the MRO and spare parts markets; even if based on the available market share data submitted by the Notifying Party, the Transaction does not lead to affected markets with regard to this vertical link.

(643) Given that the Parties service third party components only on an ad hoc basis and the lack of concerns expressed in the market investigation, the Commission considers that it is unlikely that the Transaction would lead to customer foreclosure.

(644) However, the market investigation identified some concerns with regard to a possible input foreclosure strategy by the merged entity.

(645) Regarding the ability of the merged entity to engage in input foreclosure, the majority of market participants confirmed that component OEMs have a spare parts supply obligation as part of the product support based on the end-customers'

405 Form CO, para. 1643.

406 Form CO, para. 1630. [...].

407 Replies to questions 218 of eQuestionnaire 1 – Competitors, questions 25 of eQuestionnaire 2 – Airlines and questions 147 of eQuestionnaire 3 – Airframers.

delegation letter.⁴⁰⁸ Indeed, component OEMs are under contractual obligation vis-à-vis the airframers to provide product support to airlines usually until five aircraft from the platform are still in operation. This obligation includes the supply of spare parts with specific performance obligations but also updating the technical documentation relating to the components procured, obsolescence management and customer support/training.⁴⁰⁹ As a result, component OEMs have the obligation to supply spare parts to all MRO service providers chosen by the airline acting based on the delegation letter on its behalf, in accordance with the support obligation provided by the original contract between the component OEM and the airframer.⁴¹⁰

- (646) Notwithstanding the above, a number of MRO service providers have pointed out in the market investigation instances where OEMs restricted or frustrated access to spare parts or other necessary input.⁴¹¹
- (647) In any event however, the Commission considers that any potential ability of the merged entity to engage in input foreclosure would not be related to the Transaction but would come from the limited substitutability of original spare parts (see section 7.1.7). As such, the current Transaction is unlikely to impact the ability of the Parties to restrict or frustrate access to spare parts or other necessary input. This was also confirmed by the majority of respondents to the market investigation.⁴¹²
- (648) Some market participants raised concerns with regard to the changed incentive of the merged entity, indicating that it could use its enlarged portfolio as a leverage vis-à-vis the airlines in order to increase its position and market penetration on the MRO market.
- (649) In this regard, the Notifying Party submits that it is reasonable to assume that the addition of Zodiac's share to Safran's existing share of supply of spare parts will not materially alter the competitive dynamics on the aftermarket on any given platform.⁴¹³ This view was also stated in the market investigation.⁴¹⁴
- (650) The Commission first notes that for existing platforms the merged entity would be bound by its existing contractual obligations.

408 Replies to questions 220 and 221 of eQuestionnaire 1 – Competitors, questions 27 and 28 of eQuestionnaire 2 – Airlines and questions 149 and 150 of eQuestionnaire 3 – Airframers.

409 Para. 15 of the minutes of a meeting with the Parties on 27.10.2017.

410 A similar support obligation may be entered into between the Tier 1 and Tier 2 supplier. The market investigation was inconclusive on whether this could be seen as an industry standard (replies to questions 222 of eQuestionnaire 1 – Competitors, 29 of eQuestionnaire 2 – Airlines and 151 of eQuestionnaire 3 – Airframers).

411 Replies to questions 219 of eQuestionnaire 1 – Competitors, questions 26 of eQuestionnaire 2 – Airlines and questions 148 of eQuestionnaire 3 – Airframers.

412 Replies to questions 223-224 of eQuestionnaire 1 – Competitors, questions 30-31 of eQuestionnaire 2 – Airlines and questions 152-153 of eQuestionnaire 3 – Airframers.

413 The Notifying Party's reply to question 21 of pre-notification RFI03.

414 Replies to question 32.1.1. of eQuestionnaire 2 – Airlines.

- (651) Second, the majority of the respondents to the market investigation were of the view that the Transaction will not change the competitive dynamics with regard to spare parts and MRO services. The majority of respondents stated that the merged entity will not have an incentive to restrict the access to spare part or to increase their prices, and that the merged entity is unlikely to engage in such foreclosure behaviour for existing or future platforms.⁴¹⁵
- (652) As such, even if some incentive to foreclosure were to exist, the Transaction is unlikely to change that incentive, even for future platforms. As an airline explained in the market investigation *"Safran and Zodiac provide both components and corresponding spare parts, and therefore, to the extent that any such incentive exists, they theoretically already have the incentive separately to increase the price or restrict the supply of spare parts, using our reliance on each of them for the component in question as a bargaining chip. The Transaction does not affect or increase the theoretical incentive which each of them already has separately."*⁴¹⁶
- (653) In light of the above considerations, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market with respect to the vertical relationship between the Parties' activities on the market for spare parts (upstream) and their activities on the market for MRO services (downstream) under any of the alternative product or geographic market definitions.

7.3. Conglomerate non-coordinated effects

- (654) Safran and Zodiac each provide a wide range of systems and equipment for different categories of aircraft. The Transaction will create a market player with an even broader portfolio of products than each of the Parties has today. In addition to the systems discussed in the preceding sections of this decision, the merged entity's portfolio will also include seats and other cabin interior solutions (galleys, trolleys, electrical inserts, cargo containers, oxygen systems, waste systems, evacuation slides, life jackets and life vests, etc.), which are currently supplied by Zodiac.
- (655) In this context, a number of market participants indicated that this may afford the merged entity the ability to bundle its products, with potential negative effects on single-product suppliers and their ability to compete. Concerns have in particular been expressed in relation to electrical systems, as regards the bundling of generation, distribution and/or conversions systems into an integrated electrical system, and the bundling of integrated electrical systems with other aircraft systems, in particular the environmental control system. A number of customers also raised some concerns that the merged entity may leverage its position on MRO parts and services to markets for new equipment.
- (656) The concerns brought to the Commission's attention are analysed in the sections below. It should be noted that the fact that the merged entity will have a broad

415 Replies to questions 253-226 of eQuestionnaire 1 – Competitors, questions 32-33 of eQuestionnaire 2 – Airlines and questions 154-155 of eQuestionnaire 3 – Airframers.

416 Reply to question 32.1.1. of eQuestionnaire 2 – Airlines.

portfolio of products does not necessarily, as such, raise competition concerns. In assessing the likelihood of conglomerate effects, the Commission, in principle, examines whether the merged entity would have the ability and incentives to foreclose its rivals, as well as whether a foreclosure strategy would have a significant detrimental effect on competition. In practice, these factors are often examined together as they are closely intertwined.⁴¹⁷ The elements the Commission takes into account in its assessment of conglomerate effects include, but are not limited to, the specific characteristics of the products, the market power of the merged entity, the effectiveness of counter-strategies that rival firms may deploy and countervailing buyer power of customers.⁴¹⁸

7.3.1. *Electrical generation, distribution and conversion systems*

- (657) Several respondents to the market investigation indicated that following the Transaction, the merged entity will be in a position to offer integrated electrical systems, i.e. generation and distribution systems together as a package, potentially also including conversion systems, which may make it difficult to compete for single-system suppliers.
- (658) In order to be able to foreclose competitors, the new entity must have a significant degree of market power in one of the markets concerned. The effects of bundling or tying can only be expected to be substantial when at least one of the merging parties' products is viewed by many customers as particularly important and there are few relevant alternatives for that product.⁴¹⁹
- (659) Although Safran and Zodiac are important suppliers of generation and distribution systems, respectively, their ability to foreclose their single-system/component competitors on these markets by bundling or tying their products appears limited. Notably, as described also in sections 7.1.1 and 7.1.2, their market position in either generation or distribution systems is not such as to make them unavoidable trading partners for any airframer.
- (660) Furthermore, there are other strong suppliers which can already offer both generation and distribution systems and could therefore compete with the merged entity on any bundled offer. As is apparent from the table below, on all segments of the AC generation market⁴²⁰ on which it is active, Safran is facing strong competition from UTAS, as well as GE and Honeywell, all of which also have significant market presence in the distribution market (both as regards primary and secondary distribution). These suppliers could therefore compete with any bundles offered by the merged entity.

417 Guidelines on the assessment of non-horizontal mergers, para. 94.

418 Guidelines on the assessment of non-horizontal mergers, paras. 94-121.

419 Guidelines on the assessment of non-horizontal mergers, para. 99.

420 AC generation is used in large commercial and regional aircraft and represents approximately 85% of the electrical generation sector. Form CO, paras. 373 and 376.

Table 15: Market shares of the Parties and their main competitors on AC generation systems, primary and secondary distribution systems (worldwide, 2016, source: Form CO)

Operator	AC main generators - VF	AC APU generators	Primary distribution	Secondary distribution
SAFRAN	[10-20]%	[10-20]%	[0-5]%	[0-5]%
ZODIAC	[0-5]%	[0-5]%	[40-50]%	[5-10]%
UTAS	[50-60]%	[30-40]%	[10-20]%	[30-40]%
GE AVIATION	[5-10]%	[5-10]%	[10-20]%	[20-30]%
HONEYWELL	[5-10]%	[20-30]%	[10-20]%	[10-20]%

- (661) The market investigation confirmed that similar considerations also apply to the DC low voltage generation segment,⁴²¹ on which Safran faces competition from UTAS, Thales, Skurka and Ametek which also supply primary and secondary distribution systems.⁴²²
- (662) UTAS, GE, Honeywell, Thales, Skurka and Ametek also supply conversion systems, and could thus provide electrical systems packages that include generation, distribution and conversion.⁴²³ In this context it is recalled that Safran does not manufacture conversion devices, whereas Zodiac is a small player on the conversion systems market and only supplies one type of converter, namely TRUs for the 200 to 300 Amp power output range.⁴²⁴ Therefore, the same considerations as made above in relation to electrical generation and distribution systems apply also in relation to the inclusion of conversion systems in a potential integrated electrical package.
- (663) In addition, suppliers which are only active in the supply of either generators, distribution or conversion systems could team up in order to offer integrated solutions in competition with those of the merged entity. Several respondents to the market investigation which are active only in generation or only in distribution confirmed that they would regard such cooperation as a viable option for competing with a hypothetical integrated offering of the merged entity or if so requested by customers.⁴²⁵
- (664) The market investigation also revealed that despite several suppliers' existing ability to supply generation and distribution systems as a package, such offers

421 The DC generation segments accounts for approximately 7% of the overall generation sector. DC technology is mainly used on small aircraft. Form CO, paras. 373 and 378.

422 Replies to questions 15 and 49 of eQuestionnaire 1 – Competitors. Thales only supply primary distribution systems.

423 Replies to question 66 of eQuestionnaire 1 – Competitors.

424 Notifying Party's reply to question 4 of RFI I.1 of 23 November 2017.

425 Replies to questions 32 and 69 of eQuestionnaire 1 – Competitors

have only occurred on an exceptional basis in the past.⁴²⁶ As a supplier of electrical systems explains, *"offering package level discounts are the exception and they are generally ineffective because there are limited cost-based synergies between the various electrical subsystems. There can be technical synergies that make integration of the subsystems less risky if one supplier does multiple subsystems, but the airframe OEMs have generally been unwilling to attribute value to the amount of risk reduction achieved by a single supplier being selected for multiple subsystems. The result is that the airframe OEM selects the subsystem offering that is the best value (of technical and commercial) on its own merit. If a supplier is selected for multiple subsystems it is because the supplier had the best offering for both subsystems and has very little to do with a package offer."*⁴²⁷

- (665) Indeed, the majority of airframers responding to the market investigation indicated that they typically source generation and distribution systems separately and they do not intend to deviate from this practice.⁴²⁸ An important customer explains that *"while the value proposition of a supplier is of course relevant, it is equally important to ensure that there is sufficient competition over time in the procurement process, in particular given the long-term nature of aerospace contracts [...] [Our company] usually sends out straightforward Requests for Proposal ("RFP") and typically does not source on the basis of alternate proposals from suppliers, i.e., outside of the framework set forth by its RFP's, in order to keep control over the procurement process."*⁴²⁹
- (666) Another large customer also confirms that it is *"in control of the procurement process by choosing the work packages it tenders and its strategy will remain to send separate RFPs for generation and distribution systems in order to maintain as much competition as possible."* The same customer also pointed out that, in its view, *"Safran post-transaction would not risk not being awarded with at least part of the electrical systems by trying to bundle."*⁴³⁰ Indeed, it is important to note that the long aircraft lifetime means that winning a tender ensures a long-term revenue stream, and conversely, that losing the tender because of an attempted bundling strategy would come at a high cost, which is likely to limit the merged entity's incentive to engage in such a strategy.
- (667) For the reasons set out above, the Commission considers that the merged entity would be unlikely to have the ability and incentive to bundle generation, distribution and conversion systems with the effect of foreclosing competitors on these markets and that, therefore, conglomerate non-coordinated effects are unlikely to arise. Accordingly, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market in this respect.

426 Replies to questions 31 and 68 of eQuestionnaire 1 – Competitors, and question 51 of eQuestionnaire 3 – Airframers.

427 Reply to question 31 of eQuestionnaire 1 – Competitors.

428 Replies to question 54 of eQuestionnaire 3 – Airframers.

429 Non-confidential minutes of a call with a customer of 7 November 2017.

430 Non-confidential minutes of a call with a customer of 7 November 2017.

7.3.2. Electrical systems and environmental control systems

- (668) In response to the market investigation, a competitor expressed concerns that the merged entity may in the future be able to leverage its position as a supplier of electrical systems into the potential market for electrical ECS for the next generation aircraft.⁴³¹ Specifically, that competitor considers that, following the Transaction, Safran will be able to supply electrical generation, distribution and conversion systems, which may lead airframers to decide to source the whole electrical system from the merged entity as a single package. In such a situation, the competitor contends that the electrical systems supplier "*will be driving several key requirements of the ECS, which will therefore negatively influence the ability of the other ECS suppliers to submit an ECS proposal that is competitive*".⁴³² The competitor further clarified that this could occur in particular due to the links between the power conversion system and the ECS: "*the ability to optimize the ECS is deeply linked to the knowledge of the details of the architecture of the power conversion. The supplier of the power conversion is therefore in a very good, if not the best, position to propose the most optimized, i.e. the most competitive ECS.*"⁴³³
- (669) As discussed in section 7.3.1 above, the Commission considers that the merged entity is unlikely to be able to engage in tying or bundling practices that would result in the foreclosure of single-product suppliers of electrical systems. The Commission has however assessed whether the merged entity would have the ability and incentive, through bundling or tying practices, to leverage its position on the potential market for integrated electrical systems or on any of the markets for individual electrical systems in order to foreclose competitors on the electrical ECS market.
- (670) As described above, Safran will continue to face a number of strong competitors on each of the electrical generation, distribution and conversion markets, as well as on a potential market for integrated electrical systems. Alternative suppliers of electrical systems for all platform types will thus continue to be available to customers. As a result, the merged entity would be unlikely to have sufficient market power on those markets to be able to foreclose competitors in electrical ECS.
- (671) The merged entity's ability to engage in technical tying is further limited by the fact that airframers typically set out detailed technical specifications of both the electrical systems and the ECS, thus leaving little scope for the provider of electrical systems to influence the design of the ECS. This was confirmed in the market investigation⁴³⁴ and is also acknowledged by the complaining competitor mentioned in paragraph (668) above, which acknowledges that "*this risk may be*

431 Environmental control systems in today's aircraft are based on pneumatic technology (bleed air). The only aircraft in operation which uses electrical ECS is the Boeing 787. In line with the general trend for increased electrification in the aerospace industry, the next generation aircraft is expected to have electrical ECS. Notifying Party's presentation to the case team of 6 October 2017.

432 Replies to questions 191 and 194 of eQuestionnaire 1 – Competitors.

433 Competitor's reply to RFI of 1 December 2017.

434 Replies to question 191 of eQuestionnaire 1 – Competitors.

prevented in case the airframers decide to write very detailed technical specifications for both the power conversion and the ECS. This decision is based on each airframer's individual situation. We at [...] advocate that, given the importance of both systems together when considering the aircraft's total energy efficiency, it is worth for the airframer investing time and money into preparing highly detailed specifications for both systems. But it may also be that, in order to save time, money or engineering effort during the aircraft development phase, an airframer decides to issue a so-called high-level specification that provides no detail at all."⁴³⁵ An important competing supplier of power conversion systems however indicated that airframers typically define the technical specifications of the systems they source at a level of detail that limits suppliers' ability to influence the design of related equipment.⁴³⁶

- (672) The same supplier of conversion systems also noted that given that the primary technology and components used to manufacture electrical ECS will be different from those used to supply conversion or other electrical systems, the synergies between supplying the electrical ECS and the electrical generation, distribution or conversion systems are limited and relate mainly to system integration.⁴³⁷
- (673) As noted above, Zodiac is a small supplier of conversion systems. Furthermore, Zodiac does not currently supply an electrical ECS and [...].⁴³⁸ Zodiac submits that [...]. Safran is not active at all as a supplier of ECS and [...].⁴³⁹ However, for there to exist an incentive to engage in a foreclosure strategy towards suppliers of electrical ECS, [...].
- (674) For the reasons set out above, the Commission considers that the merged entity is unlikely to have the ability and incentive to foreclose suppliers of ECS by bundling or tying electrical systems and ECS and that, therefore, conglomerate non-coordinated effects are unlikely to arise. Accordingly, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market in this respect.

7.3.3. MRO services and spare parts and cabin interior equipment

- (675) In response to the market investigation, concerns were expressed by certain customers that the merged entity could take advantage of its position in the aftermarket and link the applicable commercial conditions for spare parts and MRO services to the selection of Zodiac cabin interior equipment.⁴⁴⁰

435 Competitor's reply to RFI of 1 December 2017.

436 Non-confidential minutes of a call with a competitor of 1 December 2017.

437 Non-confidential minutes of a call with a competitor of 1 December 2017.

438 Form CO, Annex 76-2.

439 Notifying Party's reply to question 15 of RFI I.4 of 4 December 2017.

440 Replies to question 36 of eQuestionnaire 2 – Airlines and question 160 of eQuestionnaire 3 - Airframers.

- (676) The Commission takes note of the statements made by several customers that, when faced with the need to replace components during the lifetime of the aircraft, they consider that they have a limited choice of suppliers of spare parts.
- (677) However, first, as discussed also in sections 7.1.6 and 7.1.7 of the present decision, alternative suppliers of both spare parts and MRO services exist. The Parties and, post-Transaction, the merged entity are thus not unavoidable supply sources for any airframer or airline in respect of any component or MRO service.
- (678) Second, both Safran and Zodiac are already active as suppliers of spare parts and MRO services, as well as of BFE equipment selected by airlines. The market investigation however did not reveal any instance whereby a supplier (be it any of the Parties or their competitors) conditioned the provision of spare parts or MRO services on the procurement of any other type of equipment by the customer.⁴⁴¹ In effect, with the exception of one customer which indicated that it was offered better commercial conditions for purchasing two variants of the same cabin interior equipment from the same supplier, and, as noted in section 7.3.1 above, of a customer which indicated an instance of a bundled offer for electrical systems,⁴⁴² the market investigation did not reveal any ongoing or past bundling or tying practices in relation to other types of equipment offered by the Parties and their competitors. Moreover, the information available does not point to the existence of any incentive of the Parties to engage in such strategy post-Transaction.
- (679) For the reasons set out above, the Commission considers that the merged entity would be unlikely to have the ability and incentive to foreclose competitors of cabin interior equipment by conditioning the supply of spare parts or MRO services and that, therefore, conglomerate non-coordinated effects are unlikely to arise. Accordingly, the Commission considers that the Transaction does not raise serious doubts as to its compatibility with the internal market in this respect.

8. CONCLUSION

- (680) For the above reasons, the European Commission has decided not to oppose the notified operation and to declare it compatible with the internal market and with the EEA Agreement. This decision is adopted in application of Article 6(1)(b) of the Merger Regulation and Article 57 of the EEA Agreement.

For the Commission

(Signed)

Margrethe VESTAGER

Member of the Commission

441 Replies to question 35 of eQuestionnaire 2 – Airlines and question 159 of eQuestionnaire 3 - Airframers.

442 Replies to question 35 of eQuestionnaire 2 – Airlines and question 51 of eQuestionnaire 3 - Airframers.

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