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*Case No COMP/M.4403 –
Thales / Finmeccanica /
Alcatel Alenia Space &
Telespazio*

Only the English text is authentic.

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

Article 8 (1)
Date: 04/04/2007



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 04/04/2007
C(2007) 1507 final

PUBLIC VERSION

**COMMISSION DECISION
Of 04/04/2007**

**declaring a concentration to be compatible with the common market
and the EEA Agreement**

(Case No COMP/M.4403 – THALES/FINMECCANICA/ALCATEL ALENIA SPACE &
TELESPAZIO)

Commission Decision
of 04/04/2007
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(Case No COMP/M.4403 – THALES/FINMECCANICA/ALCATEL ALENIA SPACE & TELESPAZIO)

(Only the English text is authentic)

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to the Agreement on the European Economic Area, and in particular Article 57 thereof,

Having regard to Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings¹, and in particular Article 8(1) thereof,

Having regard to the Commission's decision of 28 November 2006 to initiate proceedings in this case,

After consulting the Advisory Committee on Concentrations²,

Having regard to the final report of the Hearing Officer in this case³,

WHEREAS:

- (1) On 6 October 2006, the Commission received notification pursuant to Article 4 of Regulation (EC) No 139/2004 (“the Merger Regulation”) of a proposed concentration by which the undertaking Thales S.A. (“Thales”, France) and Finmeccanica Società per Azioni (“Finmeccanica”, Italy) acquire within the meaning of Article 3(1)(b) of the

¹ OJ L 24, 29.1.2004, p. 1.

² OJ C200. , p....

³ OJ C200. , p....

Merger Regulation joint control of the undertakings Alcatel Alenia Space SAS (“AAS”, France) and Telespazio Holding srl (“Telespazio”, Italy) by way of purchase of shares in two existing joint ventures to which additional assets are contributed.

- (2) After examination of the notification, the Commission has concluded that the notified operation falls within the scope of the Merger Regulation and does not raise concerns as to its compatibility with the common market and the EEA Agreement.

I. THE PARTIES

- (3) Thales is a French company active in the development and integration of critical information systems for the defence, aeronautics and transport industries and for civil security. Thales is a company jointly-controlled by TSA (formerly Thomson-SA, a company wholly-owned by the French State) and Alcatel.
- (4) Finmeccanica is an Italian diversified engineering group active in aerospace, defence systems, energy, communications, transportation and automation. Finmeccanica is a company solely controlled by the Italian State.
- (5) AAS is a French company jointly-controlled by Alcatel and Finmeccanica, which is active in the design, manufacture and supply of ground and space systems, including satellites and subsystems and equipment for satellites used for telecommunications, earth observation and navigation in the commercial, institutional and military fields.
- (6) Telespazio is an Italian company jointly-controlled by Alcatel and Finmeccanica, which provides services and end-user applications using or related to satellite-based solutions and products for telecommunications, earth observation, navigation and other application areas in the commercial, institutional and military fields.

II. THE OPERATION AND THE CONCENTRATION

- (7) Through the proposed operation, Thales will acquire Alcatel’s shareholdings in AAS and Telespazio⁴. In addition, Thales and Finmeccanica will contribute certain of their space activities to AAS or Telespazio. After completion of the operation, Thales and Finmeccanica will jointly control AAS and Telespazio, including the space activities contributed by Thales and Finmeccanica to these two joint ventures, within the meaning of Article 3(1)(b) of the Merger Regulation⁵. The notified operation thus constitutes a concentration within the meaning of the Merger Regulation.

⁴ In 2005, Alcatel and Finmeccanica merged their activities related to space systems through the setting up of two joint ventures, AAS and Telespazio. Alcatel and Finmeccanica respectively held 67% and 33% of AAS capital and 33% and 67% of Telespazio’s capital. The creation of the two joint ventures was cleared by the Commission (See Commission decision of 28 April 2005 in Case COMP/M.3680 – Alcatel/Finmeccanica/Alcatel Alenia Space & Telespazio).

⁵ The proposed transaction does not constitute an internal restructuring of the Alcatel group. Although Alcatel already jointly controls Thales on the one hand and AAS and Telespazio on the other hand, the proposed transaction will also result in the French State, which does not currently have any interests in AAS and Telespazio, acquiring indirect joint control over AAS and Telespazio.

- (8) In parallel to the notified operation, Thales acquired Alcatel's activities relating to rail signalling and supervision and systems integration (See Case COMP/M.4337 - Thales/Alcatel Divisions Transport et Systèmes, which was cleared by the Commission on 7 November 2006). As a result, Alcatel's shareholding in Thales will increase from 9.5% to 21.6%.

III. COMMUNITY DIMENSION

- (9) The undertakings concerned have a combined aggregate worldwide turnover of more than EUR 5,000 million⁶ (Thales EUR 10,245 million, Finmeccanica EUR 10,799 million, AAS EUR [...] million, Telespazio EUR [...] million). Each of the undertakings concerned has a Community-wide turnover in excess of EUR 250 million (Thales EUR [...] million, Finmeccanica EUR [...] million, AAS EUR [...] million, Telespazio EUR [...] million), but they do not achieve more than two-thirds of their aggregate Community-wide turnover within one and the same Member State. The notified operation has therefore a Community dimension.

IV. PROCEDURE

- (10) The merger was notified on 6 October 2006.
- (11) Following its market investigation in first phase, the Commission considered that the operation raised serious doubts as to its compatibility with the common market and the EEA Agreement because of the vertical relationship between the upstream market of Travelling Wave Tubes ("TWTs"), which are produced by Thales' wholly-owned subsidiaries Thales Electron Devices, SA France and Thales ED GmbH (together "TED"), and, on the other hand, markets that are downstream of TWTs at two levels (i) Travelling Wave Tube Amplifiers ("TWTAs") and other TWT-based subsystems such as Microwave Power Modules ("MPMs"), and (ii) satellite prime contracting. In view of the replies of market players, the Commission indeed considered, at this stage of the investigation, that the merger could give rise to an input foreclosure strategy, whereby the new entity would withhold or delay the delivery of TWTs so as to favour its downstream activities in the production of integrated systems (TWTAs and MPMs) and satellite prime contracting⁷. It also considered, in view of the replies of some satellite prime contractors, that the merger might allow AAS to have access to sensitive confidential information that these prime contractors need to provide to TED as a TWT supplier, and that AAS might subsequently this information to its advantage in satellite prime competitions⁸.

⁶ Turnover calculated in accordance with Article 5(1) of the Merger Regulation and the Commission Notice on calculation of turnover under Council Regulation (EEC) No 4064/89 on the control of concentrations between undertakings (OJ C 66, 2.3.1998, p. 25).

⁷ At recital 83 of the Commission's Article 6(1)(c) decision.

⁸ At recital 83 of the Commission's Article 6(1)(c) decision.

* Parts of this text have been edited to ensure that confidential information is not disclosed; those parts are enclosed in square brackets and marked with an asterisk.

- (12) Thales submitted a remedy package on 7 November 2006, which was market tested with third parties. This market test indicated that the proposed remedies were not sufficiently clear-cut to remove the serious doubts raised by the Commission, should the competition concerns identified effectively materialise in the future. A revised remedy package was submitted on 21 November 2006, but could not be market tested at such a late stage. In any event, the Commission took the view that the revised set of remedies failed to address in a "clear-cut" way the serious doubts identified in its first phase investigation.
- (13) The Commission therefore adopted a decision to open an in-depth investigation of the proposed concentration pursuant to Article 6(1)(c) of the Merger Regulation on 28 November 2006 ("the Article 6(1)(c) decision") with a view to assessing the likelihood of input foreclosure, identified in its first phase investigation, post-merger, leading to a significant impediment to effective competition in a substantial part of the common market.
- (14) In 1998, in relation to the creation of the space joint venture Société Commune de Satellites ("SCS") between Alcatel and Thomson CSF (now Thales), the Commission identified a similar risk of foreclosure as regards the market for satellite prime contracting (due to the link between Thales' activities in TWTs through its subsidiary TTE (now TED) and SCS' activities as satellite manufacturer. In the SCS decision⁹, Thomson CSF committed to continue supplying TWTs to third parties at conditions similar to those offered to SCS¹⁰.
- (15) The SCS decision was however a decision adopted in first phase, which therefore did not conclude, on the basis of an in-depth investigation, on the effective likelihood of an input foreclosure strategy by the new entity. At the time time, it was considered, instead, that the serious doubts arising from the possibility of such input foreclosure were in any event removed by the behavioural commitments proposed by the parties.
- (16) In this case, the Commission already stated in its Article 6(1)(c) decision that a number of complex issues needed to be investigated during the second phase with a view to determining the likelihood of input foreclosure as a result of the merger. In particular, it was emphasised that one important issue to be examined was whether the new entity would remain dependent on third parties for its supply of Electronic Power Conditioners

⁹ Commission decision of 18 May 1998 in Case COMP/M.1185 – Alcatel/Thomson-CSF – SCS ("SCS decision").

¹⁰ In the SCS decision, Thomson CSF and TTE had undertaken the following behavioural commitments:

- Thomson CSF/TTE undertook not to discriminate against third parties and to supply them with TWTs at conditions similar to those offered SCS;
- Thomson CSF/TTE created a special committee to be consulted for each TWT supply contract project in excess of EUR 4.58 million;
- Thomson CSF/TTE undertook to submit any dispute with customers to arbitration;
- Thales undertook not to confer any right or power in TTE's TWT activity on SCS and, for five years, not to transfer control of the TWT business of TTE to SCS without the approval of the Commission.

("EPCs"), which are also an essential component for producing TWTAs and MPMs, and whether, in such case, this dependency on other suppliers would limit the new entity's ability to engage in a foreclosure strategy in the near future¹¹. The Commission noted that it needed to investigate the exact EPC, TWTA and LCAMP production capacities of the new entity, the extent to which its new generation EPCs have the required performance and reliability to be integrated with the Thales' TWTs and the investment and time needed for the new entity to expand its EPC, TWTA and LCAMP capacity. The Commission also identified the need to investigate the ability of the new entity to source EPCs from EADS' subsidiary, Tesat SpaceCom GmbH & Co ("Tesat"), or from the U.S. company L3 Communications Electron Technologies, Inc ETI ("L3"), a subsidiary of the group L3 Communications, to pursue a strategy of downstream integration on the markets for TWTAs and MPMs¹².

- (17) A non-confidential summary of the responses of third parties to the requests for information in first phase was provided to the parties on 7, 8 and 11 December 2006.
- (18) The parties submitted their comments on the Article 6(1)(c) decision on 13 December 2006.
- (19) The Commission conducted an in-depth investigation with a view to making a careful assessment of all the complex issues raised by the operation. Three different requests for information were sent to Thales, Finmeccanica and AAS on 4, 5 and 6 December 2006 (regarding respectively, production and sales data, internal documents, and market definition and evolution). The Commission issued further requests for information in reply to the information received from the parties on 20 and 22 December 2006 and on 18 January 2007. In particular, the Commission requested numerous internal documents from Thales and Alcatel Alenia Space.
- (20) The Commission's case team also visited Thales' TWT plant in Ulm, Germany, on 21 December 2006, and the EPC and TWTA plant of AAS' subsidiary in Charleroi, Alcatel Alenia Space ETCA S.A. ("ETCA"), on 12 January 2007.
- (21) The Commission sent detailed requests for information to third-party integrators, prime contractors, satellite operators and space agencies on 22 December 2006, and sent an additional request for information to a third party on 18 January 2007.
- (22) The Commission met with ESA on 9 January 2007. The Commission also had several meetings and conference calls with third-party integrators and prime contractors, and requested additional information from these parties.
- (23) In its opinion of 23 March 2007, the Advisory Committee on Concentrations unanimously approved the draft decision of the Commission.

¹¹ At recitals 91 and 99 of the Commission's Article 6(1)(c) decision.

¹² At recital 99 of the Commission's Article 6(1)(c) decision.

V. RELEVANT MARKETS

A. Relevant product markets

- (24) Alcatel Alenia Space and Telespazio are active in the space sector, and more specifically, the design and manufacture of space systems and related subsystems, equipment and services. The Commission has defined the relevant markets in the space sector in several previous cases¹³, which can be relied upon for the purposes of this Decision.
- (25) In previous decisions, the Commission has identified two main segments for space systems: the space segment and the ground segment. The space and ground segments can both be further divided into launchers, space transportation and space infrastructure, and satellites. The parties followed the Commission's analysis and the market investigation did not provide any indication that could point to alternative relevant segments.

1. Ground Segment

- (26) The ground segment includes all ground products and services that are necessary to support the operation of the space segment, and which are sold separately from space systems. In the ground segment, AAS focuses on ground products, while Telespazio only provides ground services. Thales offers both ground products and services.

(a) Launchers, space transportation and space infrastructure

- (27) AAS has limited activities in ground products for launchers, and in ground products and ground services for space infrastructure. Telespazio is involved in the provision of ground services for launchers (support services for operation and maintenance of the technical ground infrastructure of the Guyana Launch base). Finmeccanica is active in the segment for ground products for launchers through its subsidiary Datamat.
- (28) Thales has no products or services for launchers, space transportation and space infrastructure, nor is it present in markets situated downstream or upstream of launchers, space transportation and space infrastructure. Therefore, these segments will not be discussed further in this Decision.

(b) Satellites

- (29) The SCS decision stated that relevant product markets may be defined on the basis of the function the satellite ground products perform and the types of end-customers they serve (commercial/institutional/military customers). That decision did not however reach a definite view on the market definition.
- (30) The parties submit that a further functional distinction could be made between products and services for command and control and products and services for mission

¹³ See Cases COMP/M.1185 - Alcatel/Thomson-CSF-SCS, 4 June 1998 (hereinafter "SCS decision"), COMP/M.1636 - MMS/DASA/Astrium, 21 March 2000, and COMP/M.3680 - Alcatel/Finmeccanica/Alcatel Alenia Space & Telespazio, 28 April 2005.

exploitation. The latter category can be further divided into earth observation, navigation, and telecommunications.

- (31) With regard to products and services for command and control, the only segment where the parties' activities overlap or are vertically-related is satellite software. Thales, and to a very limited degree also Finmeccanica, are software developers for command and control products produced by AAS, specifically for the institutional market. The market investigation has confirmed that command and control software can be considered as a market in itself, and that this software performs functions such as satellite control, mission control and simulation. The exact scope of this relevant product market can however be left open for the purposes of this Decision since no competition concerns arise in this field.
- (32) With regard to products and services for mission exploitation, the parties have overlapping activities for each of the earth observation, navigation and telecommunications segments, although these activities are limited to supplies made in the context of a specific programme. For earth observation, Thales is active in image processing software while AAS and Finmeccanica produce image processing hardware. For navigation, Thales produces components and supplies services for the EGNOS and Galileo navigation projects. For telecommunications, AAS and Thales have overlapping activities regarding military telecommunications satellites terminals for the French Syracuse 3 programme. Given that the horizontal overlaps and vertical relations are limited to specific institutional/military programmes for which the industrial teams have already been agreed upon by the respective customers (see recital (114)), the final market definition can be left open.
- (33) A specific overlap exists for navigation and infomobility services. Telespazio, and to a marginal extent AAS, provides navigation services, including for fleet management, which consist of providing the geo-positioning of vehicles such as trucks, buses and vans for a variety of customers. Thales also has a fleet management activity through its Telematics subsidiary. However, as the activities of Telespazio and Thales do not overlap on a geographical basis (see recital (95)), it can be left open whether navigation and infomobility services, and particularly such services for fleet management, belong to the same relevant product markets.

2. *Space Segment*

(a) Launchers, space transportation and space infrastructure

- (34) Thales, Finmeccanica and AAS have limited activities in the markets for launchers, space transportation and space infrastructure and there are no horizontal or vertical relationships between the products and services provided by Thales, on the one hand, and AAS, on the other hand. Therefore, these segments will not be discussed further in this Decision.

(b) Satellites

- (35) Satellites are complex spacecrafts composed of the platform, which is the physical infrastructure of the satellite integrating a certain number of control, propulsion, electrical power and thermal control systems, and the payload, which comprises the systems designed to perform the precise tasks for which the satellite was put on orbit.

The payload and the platform are both composed of various subsystems which are, in turn, composed of various components.

- (36) Satellite prime contractors (that is to say, satellite manufacturers supplying satellites to satellite operators) do not manufacture all of the subsystems and equipment that comprise the satellite in-house, although some (in particular the European satellite manufacturers) follow a more vertically-integrated sourcing policy than others. This implies that two different levels of the vertical supply chain can be distinguished, in which different players are active: satellite prime contracting, and subsystems and related equipment (materials and components) installed on satellites.
- (37) AAS is a satellite prime contractor and a supplier of subsystems and components. Finmeccanica and Thales are only active in the supply of subsystems and components to satellite prime contractors or non-vertically integrated subsystem suppliers.

(1) Satellite prime contracting

- (38) With regard to satellites, the Commission has previously distinguished between satellites used for military applications and those used for civil applications. In the civil sector, a further distinction can be made between the commercial segment and the institutional segment. The market investigation has confirmed that each of commercial, institutional and military satellites must be considered as a distinct relevant product market.
- (39) Commercial satellites are used in the field of telecommunications (fixed telephony, mobile telephony, internet, etc.) and for television broadcasting (direct-to-home television, cable head-end feeds, etc.) and are sold to private satellite operators through competitive tendering.
- (40) Military satellites are essentially telecommunications, radar and optical observation and early warning satellites. They are ordered by Ministries of Defence (MoD) or multinational defence organizations such as NATO.
- (41) Institutional satellites contain essentially tailor-made payloads intended for specific missions: earth observation, scientific missions, navigation or telecommunications. They are sourced by national civil space agencies, such as the National Aeronautics and Space Administration (NASA, U.S.), the European Space Agency (ESA, Europe), the Centre National d'Etudes Spatiales (CNES, France) and the Italian Space Agency (ASI, Italy) through specific procurement procedures.

(2) Satellite subsystems and equipment

- (42) The payload and platform of a satellite comprise subsystems and equipment designed to perform the satellite's specific mission. The various subsystems are in turn composed of various components and materials. Each of the subsystems and equipment may be either designed and manufactured internally by the satellite prime contractor or sourced externally from specialised suppliers.
- (43) The platform-related subsystems and equipment are generally identical across the three satellite markets.

- (44) Subsystems and components used in commercial and military payloads for telecommunications satellites are to some degree “standard”, as all telecommunications satellite payloads basically perform the same functions: reception, frequency conversion, channelization, amplification and emission of electromagnetic signals in well-defined frequency bands (mostly C-band, Ku-band, Ka-band and for military satellites X-band). The payload of institutional projects is often a “one of a kind” solution, and is made up of completely different subsystems and equipment from those used for commercial and military payloads.
- (45) In past decisions¹⁴, the Commission has defined relevant product markets according to the functions that subsystems and equipment serve due to the lack of demand-side substitutability. Therefore, for the purposes of this Decision, satellite subsystems and equipment are considered to constitute distinct product markets whenever they perform distinct functions.
- (46) Given that the characteristics of subsystems and equipment used for commercial and military satellite payload on the one hand and subsystems and equipment intended for institutional satellite payload on the other hand are different and that features of demand are different, it can be concluded that a sub-segmentation of equipment and subsystems product markets according to the final customer (institutional, military and commercial) may be considered relevant depending on the equipment and subsystem in question.
- (47) The market investigation has indicated that, although AAS, Finmeccanica and Thales produce a number of satellite subsystems and components (either for in-house use or for supply to other satellite prime contractors), the proposed operation does not lead to any horizontal overlaps (apart from very limited activities of Thales in TWTA assembly¹⁵). However, the proposed operation raises vertical issues due to the fact that Thales, through TED, is a major producer of TWTs which are mission-critical components used in the payload of commercial and military telecommunications satellites.

(a) Travelling Wave Tubes (TWTs)

- (48) A space TWT is an electronic component used to amplify microwave (or radio-frequency (“RF”)) signals received by the satellite before the signals are retransmitted to the earth¹⁶.
- (49) Amplification is produced under vacuum by the interaction between a beam of electrons and the RF wave in a delay line. Electrons emitted by a gun are accelerated and concentrated in the form of a beam injected into the delay line. The signal to be amplified is applied to a circuit in the form of a helix, through which the electron beam passes. Part of the kinetic energy of this electron beam is transferred to the signal, which

¹⁴ See Case COMP/M.1185 Alcatel / Thomson CSF-SCS and Case COMP/M.1636 MMS/DASA/Astrium.

¹⁵ Thales has a capacity to integrate [...]*

¹⁶ Space TWTs are TWTs loaded onto satellites. The Commission has recognized in previous decisions that TWTs for satellites (downlinks) and TWTs for earth stations (uplinks) belong to separate product markets due to the specificities of TWTs loaded onto satellites: because space TWTs cannot be repaired once in orbit, they must have a very high reliability and are subject to extensive tests; their price is also higher than that of TWTs for earth stations. (See Commission decision of 4 June 1998 in Case COMP/M.1185 – Alcatel/Thomson CSF- SCS)

leaves the circuit greatly amplified on its way to the antenna. The unused electrons are slowed and collected by a system of electrodes called the collector, where part of the energy is also recovered. The residual kinetic energy in the electrons is dissipated in the collector in the form of heat¹⁷.

- (50) TWTs are available in different frequencies that determine the radio frequency of the satellite (for example, C-band, Ka-band, Ku-band, L-band). The higher the frequency, the smaller the size of the TWT. There are several TWTs per satellite (generally 40-50, but sometimes up to 60). TWTs of different frequencies are often loaded on the same satellite¹⁸. The market investigation has indicated that more than half of the satellites ordered in the past five years contained TWTs of different frequency bands (such as NigcomSat 1 that contains TWTs covering four frequency bands). Satellites equipped with TWTs for only one frequency band are mostly Ku-band (such as the Eutelsat W2M), S-band (such as the Terrestar 1 MSV) or Ka-band (such as the DirecTV 10/11/12 programmes).
- (51) Another important technical characteristic of TWTs is their level of RF (output) power¹⁹. This is the maximum output power level at which DC energy from the solar arrays is converted into useful radio frequency (RF) energy that carries the communications.
- (52) There are conduction-cooled TWTs and radiation-cooled TWTs. The residual kinetic energy of the electrons is collected in the collector to be dissipated in the form of heat. The collector conducts the heat to be dissipated either by conduction towards an exchanger (conduction-cooled) or directly into space by a self-radiating system (radiation-cooled). Radiation-cooling makes it possible to reduce the thermal load of the satellite and to decrease the overall platform mass for a given RF performance.
- (53) Although space TWTs are available in different power levels and frequencies, the parties claim that TWTs constitute a relevant product market, but that there is no need to further break down the market for TWTs since TWTs of different frequencies and power levels have similar technical specifications, are produced using the same types of designs, technologies, and production facilities, and can be produced by all TWT manufacturers²⁰.
- (54) The Commission's market investigation has confirmed that the relevant product market is the market for the supply of TWTs and not a broader product market encompassing active antennas using solid state power amplifiers (SSPAs). Active antennas using SSPAs are not substitutable with reflector antennas using TWTs and will not be so in

¹⁷ See Thales brochure "SPACE – Helix Traveling Wave Tubes", "TWT fundamentals", e-mail of Thales of 20 December 2006.

¹⁸ See for example, [a market player's]* response to question 1 of the request for information of 22 December 2006: "*more than half communication satellites include TWTs of different frequency bands, most generally sourced from a single supplier. In the majority of satellite projects awarded between 2001 and 2006, the satellite involved at least two bands. (...) [A] single satellite can include four different frequency bands and (...) multiple band satellites concern all operators and all prime contractors.*"

¹⁹ See ESA's response to question 4 of the request for information of 22 December 2006.

²⁰ See Form CO, p. 56; see also the parties' comments on the Article 6(1)(c) decision of 13 December 2006.

the short to medium term (except maybe as regards some low frequency L-band or S-band TWTs, and some low or distributed power applications²¹). In any event, active antennas using SSPAs are currently not advantageous in terms of output power, efficiency, and price.

- (55) The Commission's in-depth investigation has further confirmed that there is a single market for TWTs, although there are differentiations between TWTs depending on the frequency and output power of the TWT²².
- (56) On the demand side, the market investigation has indicated that there is no or very low substitutability between TWTs of different frequencies²³.
- (57) First, TWTs of different frequency bands serve different end applications²⁴:
- a. L-band (1.1 – 1.6 GHz): navigation per satellite/localisation (institutional satellites); telecommunications including radio with mobiles (commercial satellites).
 - b. S-band (2.3 – 2.7 GHz): navigation per satellite/localisation (institutional satellites); telecommunications including video and radio with mobiles (commercial satellites).
 - c. C-band (3.4 – 4.2 GHz): observation (institutional satellites); telecommunications including data, voice, television (commercial satellites).
 - d. X-band (7.25 – 8.5 GHz): data transmission, observation, military telecommunications (military and institutional satellites).
 - e. Ku-band (10.7 – 13 GHz): telecommunications including data and television (commercial satellites); observation (institutional satellites).
 - f. K/Ka-band (18 – 24 GHz and 26-32 GHz): telecommunications including data, voice, and video for internet and very high definition television (commercial satellites); deep space communication (institutional satellites)²⁵.
- (58) It appears that, even within a given frequency band, substitution may not be practical as TWTs are designed to operate at peak efficiency over a small percentage bandwidth²⁶.

²¹ [See responses to question 3 of the request for information to third party integrators and prime contractors of 22 December 2006 and to question 2 of the request for information to satellite operators and space agencies of 22 December 2006]*.

²² See, for example, [a market player's]* response to question 1 of the request for information of 22 December 2006: "*the TWT market should not be segmented by frequency bands.*"

²³ See, for example, [a market player's]* response to question 1 of the request for information of 22 December 2006.

²⁴ C-band and Ku-band are the most common frequency bands.

²⁵ See Thales' and Finmeccanica's response to question 2.1 of the request for information of 13 October 2006, p. 6.

- (59) In addition, other characteristics such as output power and efficiency appear critical for customers. For example, [...]*, a major prime contractor, indicated that: *"it is critical to recognize the TWT limitations and to be able to distinguish between TWT designs of specific power level and efficiency. For example if company A had a TWT design that was 60% efficient and manufacturer B had a TWT design that was 65% efficient, the design of the spacecraft would be directly impacted by the efficiency difference between the two designs. Further there are several reasons to distinguish between power levels of TWTs. Each TWT design has an upper and a lower limitation. Using a high power TWT design will yield either low efficiency or low gain. Using a low power TWT for a high power application will either challenge the critical material thermal limits or challenge the TWTs operating stability."*²⁷ Another customer, [...]*, considers that *"distinctions between TWTs based on such performance criteria are relevant. (...) Especially critical is the output power capability, efficiency and bandwidth."*²⁸
- (60) Secondly, demand for a TWT of a specific frequency is determined not only by the satellite's specific mission but also by frequency coordination or orbital allocation issues²⁹. Frequency bands are scarce resources allocated by public authorities to satellite operators. Frequency bands are managed by the International Telecommunications Union ("ITU"), an agency of the United Nations, which acts as a central registrar of international frequency use. A satellite operator cannot choose a frequency in respect of which it holds no right at a given orbital position, and wants to make the best use of its allocated bands. Therefore, when ordering a satellite, satellite operators detail the exact specifications in terms of frequency band. Prime contractors must comply with these exact specifications and cannot substitute TWTs of one frequency with another.
- (61) However, as mentioned in recital (50), TWTs of different frequencies are often loaded on the same satellite³⁰.
- (62) On the supply side, the Commission's in-depth investigation confirmed that, although there are some differences at the design stage and despite the requirement of a qualification programme and in-orbit heritage for each TWT product, the technology and expertise for TWTs of different frequency bands are similar.

²⁶ See [...]*'s response to question 1 of the request for information of 22 December 2006 indicating that *"[f]or example in the Ku Band spectrum there are operators who need TWTs to provide coverage only in the upper portion of the spectrum (12.2 to 12.75 GHz). There are other operators who need TWTs to cover the entire Ku Band frequency range from 10.7 to 12.75 GHz. These two operators would not use the same TWT for their applications even in the same frequency band. The efficiency of the wideband TWT is significantly lower than a narrow band TWT."*

²⁷ See [...]*'s response to question 5 of the request for information of 22 December 2006.

²⁸ See [...]*'s response to question 5 of the request for information of 22 December 2006.

²⁹ See [...]*'s response to question 1 of the request for information of 22 December 2006: *"Satellite operators are constrained by both available frequency slots and the operators own FCC or ITU license authorizations."*

³⁰ See, for example, [...]*'s response to question 1 of the request for information of 22 December 2006: *"more than half communication satellites include TWTs of different frequency bands, most generally sourced from a single supplier. In the majority of satellite projects awarded between 2001 and 2006, the satellite involved at least two bands. (...) [A] single satellite can include four different frequency bands and (...) multiple band satellites concern all operators and all prime contractors."*

- (63) First, the underlying technology is the same for all frequencies, and manufacturing equipment, production line, testing equipment and qualified personnel are common to the different frequencies³¹ (although certain test benches are limited to certain frequency bands³²).
- (64) Secondly, the two existing TWT suppliers both have the technical expertise to produce TWTs of all frequency bands and output power³³ (although L3 does not currently have qualified³⁴ L-band, commercial Ka-band and high power Ku-band TWTs with in-orbit heritage).
- (65) TED and L3 are both continuously developing new products. The market investigation has confirmed the importance of ongoing research and development to improve the performance of TWTs so as to keep a competitive product offering. This means that while TED or L3 may have developed, qualified and gained heritage on a new TWT product (higher power TWT or TWT with greater efficiency), this is normally only a temporary lead, in particular if there is substantial market demand for the product³⁵. It is true that such first mover advantage may prove important on the market³⁶ but this is

³¹ See ESA's response to question 1 of the request for information of 22 December 2006: "*From demand-side point of view, it is indeed relevant to distinguish between TWTs on the basis of their frequency band. From a supply-side point of view however, it may not be the case as the underlying technology does not significantly change over the frequency band*" and to question 4: "*Yes, this is correct that the underlying technology does not change significantly over frequency bands. As a result, it is obviously in the TWT manufacturer's interest (for industrial and commercial purposes) as well as in the customers' interest (for traceability and heritage purposes) to have a standardised manufacturing and production. TWTs could be further distinguished by their level of RF power and RF/DC efficiency (at saturation), as well as their mode of operation (continuous or pulsed).*"

³² See [...]’s response to question 8 of the request for information of 22 December 2006.

³³ See [...]’s response to question 31 of the request for information of 22 December 2006, and Intelsat's response to question 16 of the request for information of 22 December 2006 [*"The two companies have similar expertise, though one company may have more experience in a given frequency band or a given power level."*]*.

³⁴ Satellite subsystems and components are generally required to pass a qualification programme with the satellite manufacturer, which aims at demonstrating that the subsystem or component meets the performance requirements of the customers.

³⁵ See, for example, [...]’s response to question 9 of the request for information of 22 December 2006; response of ESA to question 5 of the request for information of 22 December 2006 (*"TWT suppliers are closely following market demands and dedicate significant R&D efforts to continuously improve their products. As a result, any performance improvement from a supplier results in a loss of market share for the competitor"*); response of SES to question 5 of the request for information of 22 December 2006 (*"Yes, although temporary may be for 3 to 5 years, which is the length of a typical commercial satellite build. An example of this is Thales vs L3 in S-band currently, where Thales has a proven design of twice the power of L3's similar best. As in other manufacturing processes, limited protection may be achieved by a combination of patents and trade secrets. However a competitive supplier will find alternative techniques in order to achieve similar performances, allowing him to win work on later programs"*); response of Hispasat to question 5 of the request for information of 22 December 2006 (*"TWTs manufacturers are running R&D programs and if one can obtain a better TWT with higher power or greater efficiency, there is no reason to believe that other manufacturer with similar capabilities and sufficient time will not obtain it"*).

³⁶ See [...]’s response to question 9 of the request for information of 22 December 2006; L3's response to question 9 of the request for information of 22 December 2006: "*The size of the lead for being first to market can be minimal or can be significant depending on the technology or performance breakthrough and*

more relevant for competitive assessment than for market definition. The respective technical expertise and current capabilities of TED and L3 are further discussed (in Section VI, B, 4). This however shows that the technology to design and produce TWTs of different frequency bands is similar and mastered by the same suppliers.

- (66) It may take some time for either TED or L3 to be able to commercialize a new TWT product that it does not currently have in its product range. The Commission's investigation has shown that new TWT designs (for example, changed output power) are normally required to pass a new qualification programme and to accumulate in-orbit heritage³⁷. In addition, not only TWTs, but many critical satellite components, including EPCs, require extensive qualification and in-orbit heritage³⁸.
- (67) Thirdly, TWTs are highly customised products based on the detailed performance specifications and testing requirements of the prime contractor and/or of the satellite operator. There is no such thing as a standard TWT. In 1997-1998, TED promoted "flexible" TWTs with an output power that could be tuned within a certain range after purchase of the TWT, but this product has not had much commercial success³⁹.
- (68) The overall process from the date on which a satellite operator issues a request for proposal to prime contractors to the date on which a satellite prime contracting agreement is signed typically lasts for 4 to 6 months⁴⁰. The bidding and contracting process for TWTs including detailed negotiations back-and-forth on the technical specifications and delivery schedule for the TWTs starts before a bid is submitted for the prime contracting of satellite. TWTs are customised to the specific requirements of the satellite prime contractor and operator and their performance is fine-tuned accordingly.

the acceptance by the market. A breakthrough product, while eventually matched by a competitor, can establish a large market share advantage by establishing a history and heritage before the competing product becomes available. This can also be further modified by the nature of the customer community for a selected application. For instance a commercial customer is generally more open to change than a government miltatcom customer. The successful development of a new or competitive product in no way guarantees significant market share will be gained."

³⁷ See responses to question 4 of the request for information of 22 December 2006.

³⁸ See generally responses to questions 4 and 15 of the request for information to third party integrators and prime contractors of 22 December 2006 and to questions 3 and 11 of the request for information to satellite operators and space agencies of 22 December 2006.

³⁹ "Flexible" TWTs and EPCs are TWTs and EPCs for which the output power of the amplifier can be tuned within a certain range. TED's promotion of flexible TWTs was aimed at avoiding production bottlenecks and coping with tight delivery schedules by supplying TWTs that could be used with a certain flexibility in a given power range. However, according to Thales, only one customer, [...], accepted to purchase such TWTs in the past. Up to now, flexible TWTs have not guaranteed the best RF performance (efficiency, gain). Flexible TWTs have also not drastically improved the delivery schedule so far since the TWTA production process remains lengthy when the EPCs are not manufactured in parallel to the TWTs ("flexible" EPCs are only being developed now) (see response of Thales and Finmeccanica to question 10 of the request for information of 22 December 2006).

⁴⁰ See response of Thales and Finmeccanica to question 9 of the request for information of 5 December 2006.

After conclusion of the satellite prime contract and various subcontracts, the production of a TWT then takes about 6 months⁴¹.

- (69) Despite some differences in the production process between the TWTs of different frequency bands, TWT suppliers therefore shift the use of their production capacity to produce TWTs of different frequencies as they are ordered. TWTs of different frequencies are produced using the same "assembly" lines and qualified personnel (even though some different assembly parts and assembly and testing equipment may be used for different frequency bands).
- (70) In conclusion, defining TWTs with different frequency bands as distinct product markets would lead to product markets that are too narrow in the space sector. Similar narrow markets would be required for TWTs with different technical specifications (for example, output power), even within the same frequency band, and for other related satellite components (for example, EPCs or LCAMPs). Taking into account the specificities of the space sector which is characterized by numerous highly complex, high technology products with long lead times for development, production and delivery, it appears more consistent, in line with the Commission's prior practice, to define markets based on the function which a given component or subsystem performs and the expertise of suppliers. In addition, this approach reflects the view of most of the market respondents, including those that have been most critical with regard to the concentration.
- (71) It is therefore concluded that there is a single product market for the supply of TWTs, but with different segments based on the frequency bands and power output of the TWT which are the two most important technical characteristics of TWTs. The competitive assessment will take account of the existence of various segments where the respective TWT suppliers have different strengths.

(b) Electronic Power Conditioners (EPC)

- (72) The market investigation also indicated that there is a single market for Electronic Power Conditioners ("EPCs"). EPCs provide the power supply for the TWTs and must do so to a very high (90%+) efficiency level in order to optimize the TWT's RF output power performance and heat dissipation. The EPC needs to match the satellite's DC power requirements, bus interfaces and voltages and provides command and control functions over the TWT.
- (73) EPCs can be single or dual. Single EPCs provide the energy necessary for one TWT, while dual EPCs provide the energy for two TWTs. Dual EPCs are more advantageous in terms of mass and price, since a dual EPC (including assembly, integration and testing ("AIT") with the TWT) costs only about 25% more than a single EPC (including AIT)⁴² (see Section VI, B, 5).
- (74) EPCs can be further differentiated depending on:

⁴¹ See PowerPoint presentation "European Commission visit, ULM – December 21, 2006", slide 32: "*due to specific space reliability requirements product lead time is rather long: TWT production time 5-6 months, TWTA production time 7-8 months, LCTWTA production time 9-11 months*", and slide 34.

⁴² See response of Thales and Finmeccanica to question 7 of the request for information of 6 December 2006.

- a. The TWT output power;
- b. The adaptability of the EPCs to the satellite platform, mainly to the voltage of the satellite platform ("bus voltage"); and
- c. The output voltage, which depends on the frequency band and output power of the TWT⁴³.

(75) The output power is measured in watts (W). The output power of the EPC is related to the output power of the TWT (for example, a 230 W high power Ku-band TWT will require a high power EPC). Three categories of EPCs can be distinguished on the basis of the output power: low power EPCs (up to 100W), medium power EPCs (100-160 W) and high power EPCs (over 160 W)⁴⁴ (although there are no clear boundaries between what constitutes a low, medium power or high power EPC).

(76) The bus voltage can be unregulated or can be a regulated bus voltage of 28 V, 40 V, 50 V, 70 V, or 100 V.

(77) The output voltage is measured in volts (V). EPC suppliers achieve output voltage of 6,000 to 7,000 V (or 6kV to 7 kV).

(78) EPCs can be further distinguished on the basis of dimensions (in mm), mass (in grammes) and their yield (in %, i.e. the loss).

(79) Table 1 compares the technical characteristics of the EPCs of Tesat, L3 and AAS/ETCA⁴⁵:

Table 1

[...]*

(80) From the demand side, the choice of the EPC does not depend on the frequency band but on the input voltage⁴⁶ and output power of the TWT, and the satellite platform bus. There is therefore some limited demand-side substitutability for EPCs of a given power, voltage and bus, which can be integrated with TWTs of different frequency bands.

(81) As regards supply-side substitutability, the market investigation has confirmed that technology is similar for all EPCs. As for TWTs of different frequency bands, high power EPCs and dual EPCs may require significant design and qualification efforts (notably due to the need to dissipate more calories/heat). Although, as for TWTs, the competitive assessment takes into account the fact that EPC suppliers may not be present on each EPC segment depending on their technical expertise, for the purpose of

⁴³ See response of Thales and Finmeccanica to question 7 of the request for information of 6 December 2006.

⁴⁴ See [...]*'s response to question 10 of the request for information of 22 December 2006.

⁴⁵ See PowerPoint presentation [...]*

⁴⁶ The input voltage of the TWT corresponds to the output voltage of the EPC.

defining the product market, as the technology for EPCs is similar for all EPCs, a single EPC market can be defined with different segments according to the TWT output power, the single/dual feature, and other technical characteristics of the EPC⁴⁷.

(c) *Travelling Wave Tubes Amplifiers ("TWTAs")*

- (82) TWTs and EPCs are integrated to form Traveling Wave Tube Amplifiers (TWTAs). This electronic device is the main transmitter on a satellite, which is used to amplify the radio signal before it is re-broadcasted back to earth.
- (83) Linearisers ("LINs"), channel amplifiers ("CAMPs"), and linearised channel amplifiers ("LCAMPs"), which are fitted to the vast majority of TWTAs in order to improve the linearity and compression of the microwave signal (the linearizer and channel amplifier improve the RF output power and the DC to RF efficiency by enhancing the transmit amplifier capability when the satellite repeater equipment has to cope with multicarrier RF signals), have a less complex underlying technology than TWTs and EPCs⁴⁸.
- (84) As indicated by the parties⁴⁹, a TWTA to which a linearizer is added forms an LTWTA, a TWTA to which a channel amplifier is added forms a CTWTA and a TWTA to which a linearizer and channel amplifier are added forms a LCTWTA.
- (85) Tesat, one of the main manufacturers of such further integrated TWTAs, markets such products as Microwave Power Modules ("MPM"), in which the LIN, CAMP or LCAMP are physically integrated in the same housing as the EPC⁵⁰.

⁴⁷ See, for example, [...]’s response to question 10 of the request for information of 22 December 2006 ("[...]’s consider that the market for EPCs should not be further segmented. The choice of EPC does not depend on the frequency band but on the voltage and output power of the payload. (...) In addition, from the supply side, all main players (i.e., Tesat, Alcatel, Lockheed Martin and L3) can offer a very similar product range, covering in particular all power and voltage segments. This implies a very significant degree of supply-side substitutability."); L3’s response to question 10 of the request for information of 22 December 2006 ("Similar to TWTs, differences between EPC suppliers exist in design availability and maturity as well as established heritage and history. Of the differentiating factors, a demonstrated ability to operate with the specific electrical interface required by a specific TWT type and the ability to operate from the power, command and telemetry interface for a specific satellite bus are most significant."); [...]’s response to question 10 of the request for information of 22 December 2006 ("capability to process DC power and single versus dual EPCs are the primary differentiators for EPC."); [...]’s response to question 10 of the request for information of 22 December 2006 ("There are three EPC suppliers; what is important to distinguish is the availability of dual EPCs."); [...]’s response to question 10 of the request for information of 22 December 2006 ("[...]’s believes that it is not necessary to subdivide the market for EPCs. From a demand-side, there are not different kinds of EPCs that can be found in the market. Even if EPCs have to be customised and tuned to match the TWT subsystem they are intended to serve, their physical and technical characteristics are similar. From a supply-side, it appears that all EPCs producers have the possibility to manufacture any kind of EPCs."); ESA’s response to question 10 of the request for information of 22 December 2006 ("It is not considered relevant to further subdivide the commercial EPC market, neither based on performance, nor on design or operational issues."); response of Intelsat to question 6 of the request for information of 22 December 2006 ("Yes, it is relevant to distinguish between single and dual EPCs and between EPC power levels (...)").

⁴⁸ The market investigation has confirmed that there is a single product market for LCAMPs (see, for example, [...]’s response to question 11 of the request for information of 22 December 2006). Although there are different types of LCAMPs based on frequency bands, the underlying technology is rather simple and all LCAMP suppliers produce the whole range of LCAMPs.

⁴⁹ See parties’ comments on the Article 6(1)(c) decision of 13 December 2006, footnote 7.

- (86) In line with the Commission's SCS decision, the parties consider that TWTAs form a distinct product market, which is downstream of TWTs and upstream of satellite prime contracting.
- (87) The parties, however, do not consider that further-integrated TWTAs (namely LTWTAs, CTWTAs, LCTWTAs or MPMs) constitute (a) separate product market(s), but rather take the view that they are possible variants of TWTAs, since they have the same function of amplification.
- (88) [...] considers that it is relevant to distinguish TWTAs from further integrated products (namely, from MPMs) on the grounds that they correspond to a different level of integration of the same satellite component, some customers request TWTAs and add a linearizer or a channel amplifier internally, whereas other customers request further integrated products, and customers requesting TWTAs and other components separately must perform themselves the integration of these equipment into an MPM, whereas customers directly sourcing MPMs do not have to do so⁵¹.
- (89) The Commission's in-depth investigation has confirmed the parties' view that TWTAs and further integrated TWTAs to which a lineariser and/or a channel amplifier are added (LTWTAs; CTWTAs; and LCTWTAs/MPMs) belong to a single product market⁵².
- (90) First, as regards the demand side, these various TWT-based subsystems all fulfil the same function of amplification, with LTWTAs, CTWTAs and LCTWTAs only providing improved amplification. Improving the linearity of the signal allows the satellite repeater equipment to cope with multicarrier RF signals and as such enhances its flexibility. The Commission's in-depth investigation confirmed that MPMs perform the same function as a TWTA, CTWTA or LCTWTA, the only difference being that the EPC and LCAMP are in a single housing in the case of an MPM (which provides a mass/space advantage).
- (91) Furthermore, there is some degree of demand-side substitutability for TWTA customers who have in-house capabilities for the manufacture of LCAMPs and the further integration of TWTAs. This means that prime contractors can either source a LCTWTA/MPM directly or perform the further integration of the TWTA themselves⁵³.

⁵⁰ See [...]’s response to question 12 of the request for information of 22 December 2006 (*“Strictly speaking, “MPM” is the term used by Tesat to designate its products integrating mechanically TWTs, EPCs, and LCAMPs (or CAMPs or LINs or Converters). The TWT is connected by a cable to the EPC/LCAMP. In other words, and within this meaning, Tesat’s MPMs integrate mechanically in a single box the various components, in order to facilitate the design, testing and mounting of the units on the satellite. Obviously, competitors are able to provide the same electrical functions, however they do not provide them in a single box, with their LTWTAs, CTWTAs and LCTWTAs. Such integrated solutions compete fully with Tesat’s MPMs. [...]”*).

⁵¹ See [...]’s response to question 13 of the request for information of 22 December 2006.

⁵² See, for example, [...]’s response to question 13 of the request for information of 22 December 2006; [...]’s response to question 14 of the request for information of 22 December 2006.

⁵³ See [...]’s response to question 64 of the request for information of 22 December 2006: “[...]” maintains the capability to integrate TWTAs by sourcing TWTs from a TWT manufacturer, typically TED, and integrating the TWT with an EPC manufactured by Lockheed Martin. [...]”, to question 66: “[...]” has developed a strategy which calls for the procurement of its TWT related equipment from the industry experts

- (92) There is nevertheless a trend towards more integration and prime contractors increasingly source the integrated products (the market investigation confirmed the trend towards LCTWTAs/MPMs due to the increase in video applications, and the desire to increase payload flexibility in the light of the long satellite life⁵⁴) (see further Section VI, E, 1, a). According to a major TWTA manufacturer, a significant part of its output is currently sold with additional capabilities. Whereas in 2000 less than 10% of TWT output was sold with linearization capabilities, this share increased to 55% in 2006 and is forecast to increase to 75% in 2009. Over 70% of the TWTs currently produced are sold as further integrated TWTAs or MPMs rather than as the result of separate quotations for TWTs and EPCs.
- (93) Secondly, on the supply side, all TWTA integrators can supply LTWTAs, CTWTAs, or LCTWTAs⁵⁵, as it is relatively easy for TWTA integrators to manufacture or procure LCAMPs and to carry out the integration and testing of a further-integrated TWTA subsystem.
- (94) In conclusion, there is a single product market for the supply of TWTAs, CTWTAs, LTWTAs, LCTWTAs or MPMs. For the purposes of this Decision, TWTAs and the further-integrated TWT-based subsystems CTWTA, LTWTA, LCTWTA or MPMs are referred to together as "TWTAs" for ease of reference. Where it is necessary to distinguish TWTAs from the further integrated TWTAs (LTWTAs, CTWTAs, LCTWTAs or MPMs), the term "TWTA+ subsystems" is used.

in an integrated configuration for use on their satellite programs", [...]; L3's response to question 7 of the request for information of 16 October 2006 ("The level of TWTA assembly required by the spacecraft payload contractor or prime contractor varies significantly by prime contractor, often as a reflection of that prime contractor's internal manufacturing capability. Spacecraft prime contractors (including relevant subsidiaries or other divisions within the parent company) that do not have the internal capacity for the manufacturing of LCAMPs frequently by turn-key LCTWTAs or MPMs. Approximately [...]* of L-3 ETI's TWTA deliveries this year will be in the LCTWTA configuration, so we believe this level of integration is now a distinct market. Spacecraft payload or prime contractors with "in-house" linearizer, CAMP or LCAMP design and manufacturing capability are generally buying TWTAs only and integrating the next level assembly themselves. Predicting the specific market split between turn-key LCTWTAs vs. TWTAs is difficult as it is highly dependent on the prime contractor selected for the program") and to question 17 of the request for information of 16 October 2006 ("As noted in response to earlier question, the decision to buy a TWTA or an LCTWTA is very dependent on the customer's in-house manufacturing capability for LCAMPs. Some customers are willing to provide customer furnished TWTs for TWTA integration and some customers prefer a turn-key procurement. Each program tends to have a different relationship in the trade-off between price, delivery schedule, heritage and technical performance. Procurement practices and tendencies are highly dependent on the satellite prime contractor.")*

⁵⁴ See, for example, L3's response to question 16 of the request for information of 16 October 2006: "There is also a general trend towards an increasing percentage of TWTAs being linearized, and it appears that virtually all TWTAs will be linearized in the near future to provide maximum flexibility for transponder use over extended mission lives."

⁵⁵ See [...]*'s response to question 13 of the request for information of 22 December 2006: "On the supply side, each supplier who manufactures a TWTA can in most cases supply LTWTAs, CTWTAs, LCTWTAs or MPMs".

B. Relevant geographic markets

1. Ground Segment

(95) As decided by the Commission in previous decisions concerning the space industry, the geographic scope of the market for satellite ground products and services depends on the type of customer. Commercial products and services are generally sourced on a global basis by commercial operators, while the geographic scope is more limited for military and European institutional programmes. As such, for the purposes of this Decision, the markets for satellite ground products and services will be considered as worldwide in scope for commercial satellites, as national in scope for military satellites (when a national supplier exists) and as European in scope for European institutional satellites due to the procurement policy of ESA⁵⁶. Specifically for navigation and infomobility services, Thales and Telespazio are both active in fleet management in different countries. Features of demand (national regulations, knowledge of customer habits, language) indicate, however, that this product market has a national geographic scope.

2. Space Segment

(a) Satellite prime contracting

(96) In line with the Commission's approach in previous decisions, the market for commercial telecommunications satellites is considered to have a worldwide geographic dimension as sourcing takes place on a worldwide basis. It should however be noted that the U.S. Export Administration Regulations ("EAR") and U.S. International Traffic in Arms Regulations ("ITAR") exclude U.S. prime contractors from prime competitions to supply satellite to operators in black-listed countries (also referred to as "ITAR-restricted countries" in this Decision)⁵⁷. The EAR are intended to regulate dual-use technologies and make the export of certain U.S. subsystems and equipment subject to a licence. The ITAR make the export of certain U.S. subsystems and equipment subject to

⁵⁶ See Commission decision of 28 April 2005 in Case COMP/M.3680 – Alcatel/Finmeccanica/Alcatel Alenia Space & Telespazio, at paragraph 195. ESA's Member States are Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden, Switzerland, and United Kingdom. Canada and Hungary participate in some projects on the cooperation agreements.

⁵⁷ In 1998, the U.S. Congress passed a law reclassifying commercial communications satellites and their technology and components as military equipment subject to ITAR, thus requiring export licenses from the State Department in most cases. For the most part, export licenses under the ITAR or the EAR can be obtained to authorize exports of satellite-related items for commercial or military use by companies established in the Member States, but the process is complex and protracted. In addition, the ITAR prevents U.S. manufacturers from providing complete design and manufacturing processes of the subsystems and equipment subject to the ITAR. The U.S. Department of State is in charge of the enforcement of ITAR.

The list of black-listed countries is subject to changes, but currently black-listed countries notably include China, Iran, Syria, North Korea and Cuba (See <http://ecfr.gpoaccess.gov> (U.S. Electronic Code of Federal Regulations (e-CFR)): "**§ 126.1 Prohibited exports and sales to certain countries.** (a) *General.* It is the policy of the United States to deny licenses and other approvals for exports and imports of defense articles and defense services, destined for or originating in certain countries. This policy applies to Belarus, Cuba, Iran, Libya, North Korea, Syria and Vietnam. This policy also applies to countries with respect to which the United States maintains an arms embargo (for example, Burma, China, Liberia, Somalia, and Sudan) or whenever an export would not otherwise be in furtherance of world peace and the security and foreign policy of the United States"). Some of these black-listed countries, such as China, are active in the space sector.

a licence or forbid the export of certain subsystems and equipment depending on the end-use country.

- (97) All respondents in the Commission's market investigation have confirmed that the market for commercial telecommunications satellites is global:

L3: "*Commercial satellites is a world-wide market, although L3-ETI as a U.S. company is restricted in some world wide markets due to requirements in the ITAR.*"⁵⁸

Lockheed Martin: "*Lockheed Martin agrees that the market for commercial satellites and satellite subsystems and components is global.*"⁵⁹

- (98) The impact of the ITAR/EAR (hereinafter referred to as "ITAR") on competition on the market for commercial satellites is discussed in detail and taken into account in the competitive assessment. The impact of the ITAR export restrictions should not be overestimated, as it appears possible to obtain an export license⁶⁰, exceptions to and exemptions from the ITAR are possible, and the list of black-listed countries evolves over time. For example, although Vietnam appears in the list of black-listed countries, the U.S. prime contractor Lockheed Martin won the prime contracting bid for the Vietnamese satellite programme Vinasat⁶¹.

- (99) The market for military satellites must be considered as either national or worldwide in scope depending on both the procurement policies of each national military authority involved and the existence of national satellite prime contracting capabilities. In that

⁵⁸ See L3's response to question 8 of the request for information of 16 October 2006.

⁵⁹ See Lockheed Martin's response to question 8 of the request for information of 16 October 2006; see also the responses of Boeing, OHB.

⁶⁰ See <http://ecfr.gpoaccess.gov> (U.S. Electronic Code of Federal Regulations (e-CFR)): "**§ 126.1 Prohibited exports and sales to certain countries.** (e) *Proposed sales.* No sale or transfer and no proposal to sell or transfer any defense articles, defense services or technical data subject to this subchapter may be made to any country referred to in this section (including the embassies or consulates of such a country), or to any person acting on its behalf, whether in the United States or abroad, without first obtaining a license or written approval of the Directorate of Defense Trade Controls. However, in accordance with paragraph (a) of this section, it is the policy of the Department of State to deny licenses and approvals in such cases."

⁶¹ [...]*; see also Lockheed Martin's press release: "NEWTOWN, Pa., May 12, 2006 -- Lockheed Martin [NYSE: LMT]* has been awarded a contract by Vietnam Posts and Telecommunications Group (VNPT) of Vietnam to provide a turnkey telecommunications satellite system with operations slated to begin in the second quarter of 2008. (...) Designated VINASAT-1, the satellite system will be based on Lockheed Martin's award-winning A2100A spacecraft platform and represents the first satellite system ever procured by the nation of Vietnam. VINASAT-1, a C-/Ku-band hybrid satellite designed for a minimum service life of 15 years, will be located at orbital slot 132 degrees east. Under the terms of the delivery-in-orbit contract signed May 12, 2006 in Hanoi, Lockheed Martin Commercial Space Systems (LMCSS) will manage the project in its entirety, from satellite design and manufacturing to launch procurement arrangements, followed by final extensive in-orbit testing before customer acceptance. The satellite system is expected to improve telecommunications in Vietnam by transmitting radio, television and telephone communications to all corners of the country. VINASAT-1 also will improve the nation's communication networks infrastructure by removing dependence on ground networks and allowing 100% of Vietnam's rural communities and hamlets to be equipped with telephones and televisions." (<http://www.lockheedmartin.com/wms/findPage.do?dsp=fec&ci=17641&rsbci=0&fti=111&ti=0&sc=400>)

respect, the French and Italian Ministries of Defence source exclusively from, respectively, French and Italian military satellite prime contractors.

(100) The institutional satellite market has been defined by the Commission as European in scope due to the specific procurement policy of ESA. The agency's procurement is subject to a geographical repartition rule (known as "*juste retour*"), according to which the industrial share of business awarded to manufacturers in each Member State of ESA should be equal to the financial contribution of each Member State. As a consequence, ESA procures institutional satellites exclusively from European satellite prime contractors. National space agencies such as CNES and ASI procure satellites exclusively from domestic suppliers. For the purpose of this Decision, the institutional satellite market will be considered as either European in scope or national.

(b) Satellite subsystems and equipment

(101) Satellite subsystems and equipment for commercial satellites are sourced globally and as a result, the geographic scope of these markets is to be considered as worldwide. The ITAR limit the choice of satellite prime contractors in selecting their suppliers. On the basis of these restrictions, European prime contractors cannot source satellite subsystems and equipment from U.S. suppliers when the final customer (the satellite operator) is located in one of the black-listed countries. For the same reason, satellite operators in countries that could potentially become black-listed tend to buy European-only payload components. However, as indicated above in recital (98), the impact of the ITAR export restrictions should not be overestimated.

(102) For the purposes of this Decision, the markets for subsystems and equipment for commercial satellites will be considered as worldwide in scope, but with different segments due to the ITAR restrictions, which may limit the availability of U.S. satellite subsystems and equipment supplies in certain circumstances. This will be taken into account in the competitive assessment. In particular, the U.S. company L3, which is a major TWT and EPC supplier and TWTA integrator, is excluded from competitions for prime contractors or satellite operators located in ITAR-restricted countries.

(103) With regard to the markets for subsystems and equipment for military satellites and institutional satellites, the geographic market definition follows that of satellite prime contracting. As such, and for the purpose of this Decision, the geographic scope of the markets for subsystems and equipment for military satellites will be considered as national in scope when national suppliers exist and as worldwide in scope when national suppliers do not exist. The markets of subsystems and equipment for institutional satellites will be considered, for the purpose of this Decision, as European or national in scope when European or national suppliers exist and as worldwide in scope when European or national suppliers do not exist.

(c) Conclusion

(104) It is to be concluded that the relevant geographic market for commercial telecommunications satellites and satellite subsystems such as TWTs and TWTA is worldwide in scope, but with different segments due to the impact of the ITAR. As in the case of the relevant product market, the competitive assessment will take into account the existence of various segments where the respective subsystem suppliers and prime contractors face different constraints due to the existence of ITAR restrictions.

(105) The geographic market for military satellites and satellite subsystems is national when national suppliers exist and otherwise worldwide. The geographic market for institutional satellites and satellite subsystems is European or national in scope where European or national suppliers exist, and otherwise worldwide.

VI. COMPETITIVE ASSESSMENT

(106) In the ground segment, although there are some horizontal overlaps and vertical relationships between the activities of Thales and AAS, the Commission did not identify any competition concerns in its first phase investigation.

(107) As regards the space segment, the Commission's in-depth investigation of the vertical relationship between TWTs and downstream satellite subsystems and telecommunications satellites concluded that there would not be any significant impediment to effective competition post-merger.

A. Ground segment

(108) In the ground segment, Thales is not active on the markets for ground systems (products and services) for launchers, space transportation and space infrastructure. Thales is, however, active on the markets for products and services for satellites, and the proposed operation gives rise to a number of horizontal overlaps and vertical relationships, which are considered in recitals (109) to (115) below.

1. *Satellite ground products*

(a) Command and control software

(109) With regard to command and control products, Thales, and to a very limited extent also Finmeccanica, are software developers for command and control products produced by AAS, specifically for the institutional market. Thales has developed two specific software applications for AAS within the context of a CNES programme. Thales estimates that it has a share of between 20% and 30% of the market for space software developed for the French institutional market. Competitors of Thales are the major information technology companies such as CS, Cap Gemini, ATOS Origin which all have specific expertise in the space sector.

(110) Finmeccanica's activities for satellite command and control software are conducted through its subsidiaries Space Software Italia (SSI) and Dataspazio (a joint venture with Datamat). These Finmeccanica subsidiaries work for programmes of AAS Italia, Telespazio, the Italian space agency and the Italian Ministry of Defence, both at Italian and European level. Finmeccanica estimates that it has a share of [10-20%]* at most of the market for space software developed for the Italian institutional market.

(111) Given that Thales and Finmeccanica operate in different geographic markets, the proposed operation does not give rise to any horizontal overlaps in the field of command and control software. In addition, the Commission's market investigation in the first phase confirmed that the operation would not affect competition in this segment.

(b) Mission exploitation

(112) In the field of earth observation, Thales develops specific image processing software within the framework of the Pleiades programme launched by the CNES. Given that Telespazio offers image processing services, there is a potential vertical relationship between Thales software and Telespazio services in the area of image processing.

However, as confirmed by the Commission's market investigation in the first phase, Telespazio does not provide such image processing services in France whilst Thales is not active in image processing software development outside the Pleiades programme. The market investigation has not revealed any competition concerns in this market. There are several actual and potential competitors for image processing software including CS, Cap Gemini and ATOS Origin.

(113) For navigation, Thales produces specific components and supplies specific services for the EGNOS⁶² and Galileo navigation projects, for which AAS France was appointed as the prime contractor. Since the contracts for the EGNOS and Galileo navigation programmes have already been concluded (any follow-on of these programmes will be allocated to Thales/AAS France), the operation will have no impact on the competitive situation.

(114) In the field of telecommunications, Thales and AAS have overlapping activities for military telecommunications satellites in France. Thales was appointed by the French Ministry of Defence as the prime contractor for the ground system of the satellite system Syracuse 3 and AAS was appointed as Thales' main sub-contractor. Since Syracuse 3 is a military programme, the output of which cannot be sold on the open market and for which the competition has already taken place (any follow-on of Syracuse 3 will be allocated to Thales/AAS), competition issues are not expected to arise. In addition, the French Ministry of Defence has significant buyer power and, in any event, could turn to EADS/Astrium for competition for future programmes in this market.

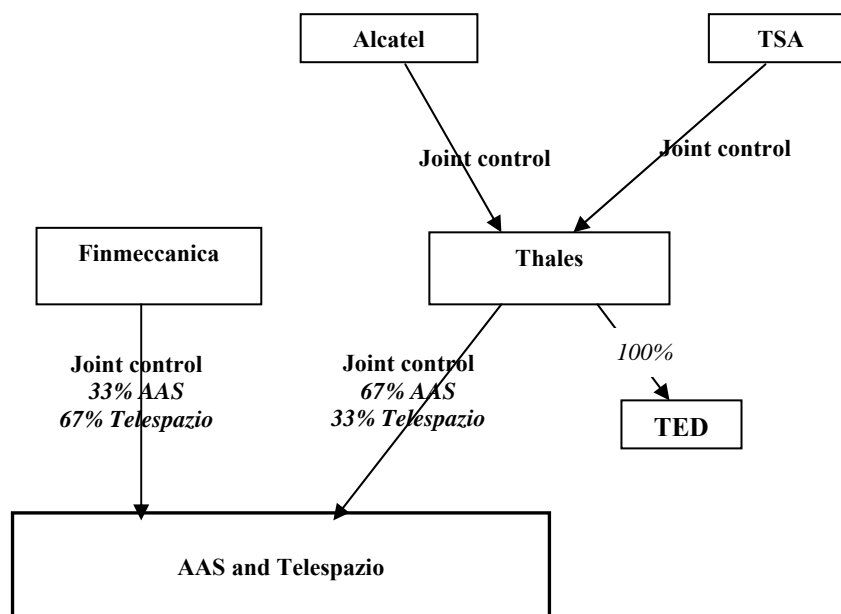
2. Satellite ground services

(115) In the navigation and infomobility services segment, Telespazio and Thales (through its Telematics subsidiary) provide navigation and infomobility services, and in particular fleet management services. Thales provides these services in the United Kingdom, South Africa, France and China and has a market share of around 10% in each of these markets. Telespazio is predominantly active in Italy where it serves customers in insurance, telecom, advertising and transport. AAS is currently only marginally active in these markets, as it has just started to develop navigation and infomobility activities. Given that fleet management services are national in scope, the operation does not give rise to any horizontal overlaps in the field of navigations and infomobility services.

⁶² European Geostationary Navigation Overlay Service (EGNOS) is Europe's first foray into satellite navigation. It is being developed by ESA under a tripartite agreement between the European Commission (EC), the European Organisation for the Safety of Air Navigation (Eurocontrol) and European Space Agency (ESA).

B. Space segment - Introduction

- (116) The proposed concentration does not give rise to any horizontal issues in the space segment, as there are no – or only minor as regards TWTAs (see recital (47)) – overlaps between the activities of Thales and those of AAS and Telespazio.
- (117) The proposed concentration does however create vertical issues between the TWTs produced by TED, and two markets downstream of TWTs: TWTAs, and satellite prime contracting for commercial telecommunications satellites⁶³.
- (118) Post-merger, Thales will replace Alcatel as a parent company of the two space joint ventures with Finmeccanica, AAS and Telespazio. AAS will become jointly-controlled by Thales, with a 67% shareholding, and Finmeccanica, with a 33% shareholding. As a result, TED, a TWT supplier and wholly-owned subsidiary of Thales, will become a sister company of AAS. AAS is a satellite prime contractor and a manufacturer of satellite equipment including EPCs, LCAMPs, and TWTAs. The concentration will therefore lead to a *partial and indirect* vertical integration of TED's activities as TWT producer and AAS' activities as satellite prime contractor and satellite equipment manufacturer. The vertical integration is partial to the extent of the 67% shareholding of Thales in AAS and indirect as TED will be a sister and not the parent company of AAS.



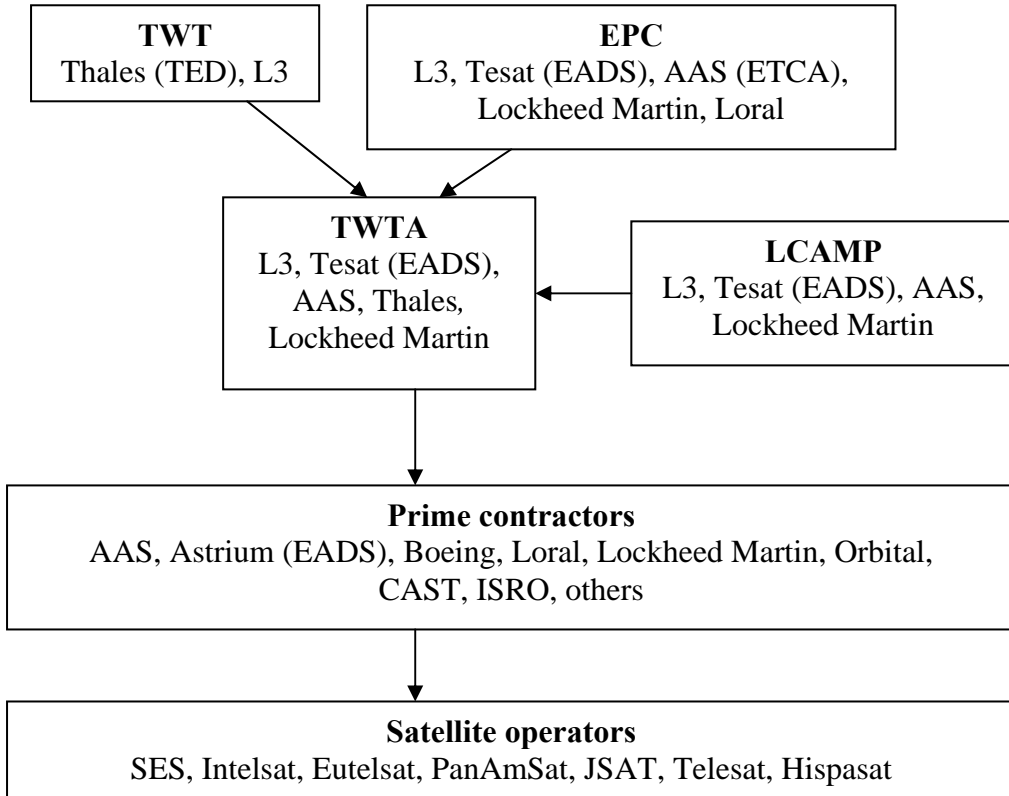
⁶³ TWTs are essentially used on commercial telecommunications satellites and military telecommunications satellites. Given the significant buyer power of national ministries of defense, the proposed transaction is not likely to significantly impede competition on the market for military satellites, and this market is not further discussed in this decision.

- (119) Should TED in the future become a part of AAS, this would constitute a new concentration due to the change from the sole control of Thales to the sole control of AAS, itself subject to the joint control of Thales and Finmeccanica. This concentration would be subject to merger clearance filing⁶⁴.
- (120) The issue raised by the notified operation is whether Thales, as the new parent company of AAS, will have the ability and incentive to engage in input foreclosure against AAS' downstream rivals on the market for TWTAs, and/or on the market for prime contracting of commercial telecommunications satellites, through discriminatory practices to be implemented by its fully-owned subsidiaries – TED – in their supply of TWTs to AAS' rivals, thereby increasing its downstream rivals' costs so as to significantly impede effective competition.
- (121) The fact that TED and AAS will remain separate legal entities with different and independent decision-making bodies has an impact on the ability and incentive of the new entity to engage in a strategy of input foreclosure. The fact that the integration is only partial also has an impact on the new entity's ability and incentive to engage in a strategy of input foreclosure so as to favour AAS' activities as integrator of TWTAs and satellite prime contractor, as any additional profits at the downstream level would have to be shared with Finmeccanica, and Finmeccanica's agreement would be required for strategic decisions relating to AAS' activities including any significant investments that would be required.
- (122) In its assessment of the likelihood of such a foreclosure strategy, the Commission examined the various chains of cause and effect with a view to ascertaining which of them is the most likely. The more immediate and direct the overall anti-competitive effect of the merger, the more likely the Commission is to raise competition concerns.
- (123) In assessing the likelihood of an anticompetitive foreclosure scenario, the Commission examined, first, whether the merged entity would have the ability and incentive to substantially foreclose access to TWTs, and, second, if an input foreclosure strategy was likely, whether it would have a significant detrimental effect on competition on these downstream markets.
- (124) The competitive assessment first explains the functioning and recent trends on the market for commercial telecommunications satellites, TWTs, EPCs, and TWTAs (Section B, 1 to 7), before describing the input foreclosure strategies that were considered during the in-depth investigation (Section C), and assessing the likelihood of input foreclosure post-merger, both at the level of the TWTA integrators (Section D) and at the level of the satellite prime contractors (Section E).

⁶⁴ See briefing memorandum for the European Commission of 8 February 2007 submitted by Thales.

1. *The commercial telecommunications satellite supply chain*

(125) The following graph presents in summary form the vertical supply chain from the TWT market to the market for telecommunications satellites, and the various players present at the different levels:



2. *The commercial telecommunications satellite market*

(126) The relevant satellite prime contractor market is that for commercial telecommunications satellites. Six main competitors are present on the market: Alcatel Alenia Space ("AAS") and EADS Astrium ("Astrium") in Europe compete with Boeing Space Systems ("Boeing"), Space Systems Loral ("Loral"), Orbital Sciences Corporation ("Orbital") and Lockheed Martin Commercial Space Systems ("Lockheed Martin") in the U.S. Japanese prime manufacturers (Melco and Mitsubishi) are significantly smaller. New players are emerging in India (ISRO), China (CAST), Russia (NPO PM and Russian Satellite Communications Company ("RSCC")), and Israel (IAI).

(127) The satellite markets are dominated by the U.S. suppliers which have exclusive access to the massive institutional and military satellite funding in the U.S. and therefore benefit from significant economies of scale and scope in terms of research and development. In Europe, institutional and military programmes also account for the majority of AAS' and Astrium's order books, although these European manufacturers are much more dependent on the commercial market than their U.S. counterparts.

(128) Given the massive investments needed in research and development, the industry is characterised by a certain degree of specialisation and concentration. This aspect is particularly accentuated in Europe, where space companies have developed particular expertises as equipment manufacturers, payload suppliers and solution providers.

Leading positions were developed by EADS for propulsion systems, solar arrays and generators, primary structures and EPCs, by Thales for radars and TWTs, and by AAS for antennas, TTC transponders and RF payload equipment. U.S. satellite manufacturers have streamlined their operations in response to the commercial satellite market downturn, and have outsourced a significant part of their internal activities to external suppliers and sometimes (European) competitors.

(129) While satellite manufacturers strive to maintain dual (or triple) sourcing of equipment supplies, situations where a satellite prime manufacturer is dependent on one source of supply are not uncommon in the space industry, given the need for rationalisation of costs which in turn calls for strong specialisation. The presence of monopsonist European institutional (ESA) and military (national Ministries of Defence) buyers and the impact of geographic return rules (“juste retour”)⁶⁵ further accentuates relations of cooperation and interdependence between European suppliers on the market.

(130) Table 2 provides an overview of the market shares of the satellite prime contractors for the period 2001–2005⁶⁶. The market shares represented by ITAR-restricted prime contracts are indicated separately.

Table 2

Satellite Prime Contracts	2001-2003	2004	2005	2001-2005 average	
AAS	[15-20%]*	[15-20%]*	[15-20%]*	[15-20%]*	[15-20%]*
AAS ITAR-restricted				[0-5%]*	
ASTRIUM	[10-15%]*	[5-10%]*	[5-10%]*	[5-10%]*	[10-15%]*
ASTRIUM ITAR-restricted				[0-5%]*	
Boeing	[20-25%]*	[20-25%]*	[15-20%]*	[20-25%]*	
Lockheed Martin	[15-20%]*	[20-25%]*	[20-25%]*	[20-25%]*	
Loral	[15-20%]*	[10-15%]*	[10-15%]*	[10-15%]*	
Orbital	[0-5%]*	[0-5%]*	[5-10%]*	[0-5%]*	
Mitsubishi	[0-5%]*	[5-10%]*	[5-10%]*	[5-10%]*	
Others including Northrop, CAST, ISRO, NPO PM, RSCC, IAI	[5-10%]*	[5-10%]*	[10-15%]*	[5-10%]*	[5-10%]*
Other ITAR restricted				[0-5%]*	
Total market	100%	100%	100%	100%	

(131) The market share evolution demonstrates the intense competition between the leading U.S. manufacturers (Boeing, Lockheed Martin and Loral), AAS and EADS/Astrium (number 3 and number 5 European players with [15-20%]* and [10-15%]* respectively), and a dynamic pure commercial satellite manufacturer such as Orbital.

⁶⁵ The geographic return balances the financial contributions of the Member States with contracts for their local industry. This implies that contracts over time are awarded to different players according to the contribution of their home countries. (See above recital (100)).

⁶⁶ Figures based on value as provided by the Parties. Additional information was compiled by the Commission on the satellite manufacturing bids that are restricted by ITAR regulation over the period 2001-2005. The importance of these markets is only represented in the column 2001-2005 average.

The table also indicates the growing importance of emerging satellite manufacturers in India, China and Russia.

- (132) Telecommunication remains by far the major application of the commercial space market today. For the last ten years, commercial orders have averaged around 20 to 25 satellites per year (apart from a low point of as little as three orders in 2002 when the dot.com bubble burst and the telecoms market collapsed). Forecasts up to 2010-2012 indicate that this level of activity will continue⁶⁷. At present, there are around 280 satellites with an average lifetime of 12 to 15 years each, making the replacement market worth around 18 satellites per year. This reduces the cyclical nature of the commercial telecommunications satellites market. The forecast for new orders (for both standard applications and new applications) is 2 to 7 orders per year. New applications are mainly high definition television (HDTV) using Ka-band TWTs, digital radio (S-band) and broadband via satellite (Ku-band). A recent example is ASTRA's 1 KR/1L Direct-To-Home (DTH) satellite system which provides television, radio, multimedia and Internet services to over 92 million European households.
- (133) The order-to-delivery cycle in the satellite industry is about two years. The major satellite manufacturers therefore need to maintain a minimum order book of about 2 satellites per year in order to justify research and development expenditure and the significant amount of sunk costs that characterise the space industry. In a highly cyclical and uncertain industry such as the satellite industry, satellite manufacturers and equipment manufacturers always take the risk that future market conditions will not make it possible to recoup short-term expenditure into capacity increases or new product developments, because future demand for that product or technology may fail to materialise. Maintaining a 'minimum scale of operation' is also instrumental for the satellite manufacturer to be perceived in the institutional and military satellites market as a reliable source of supply that is capable of providing technical solutions that can be adapted to institutional and military needs. The progressive decline of a satellite manufacturer in the commercial market therefore has a spill-over effect on the abilities of the satellite manufacturer in the military and institutional markets.
- (134) In addition, the satellite industry is, by definition, risk-averse, so that reliability, "Mission Success" and space heritage are of paramount importance. Satellite operators tend to forge a long-term relationship with satellite prime contractors. The choice of equipment suppliers is also driven by the suppliers' recognized experience in the field and the high reliability of their products. While the market is performance and relationship driven, price remains a dominant factor in the competition between satellite prime contractors. Satellite manufacturing is characterised by overcapacity, which further intensifies competition. These factors explain that the margins obtained on the production of a commercial satellite – average value EUR 100-150 million – are very low (2%-5%).
- (135) Satellite operators are the final customers for satellites. Based on revenue (2004 figures) Luxembourg-based SES GLOBAL is the largest, operating through its subsidiaries SES ASTRA in Europe, SES AMERICOM in North America and SES NEW SKIES in Africa, South America, the Middle East and parts of Asia. SES GLOBAL also holds

⁶⁷ There were 12 firm orders for 2004, 18 in 2005 and 21 in 2006, although there is a trend toward smaller satellites with declining margins.

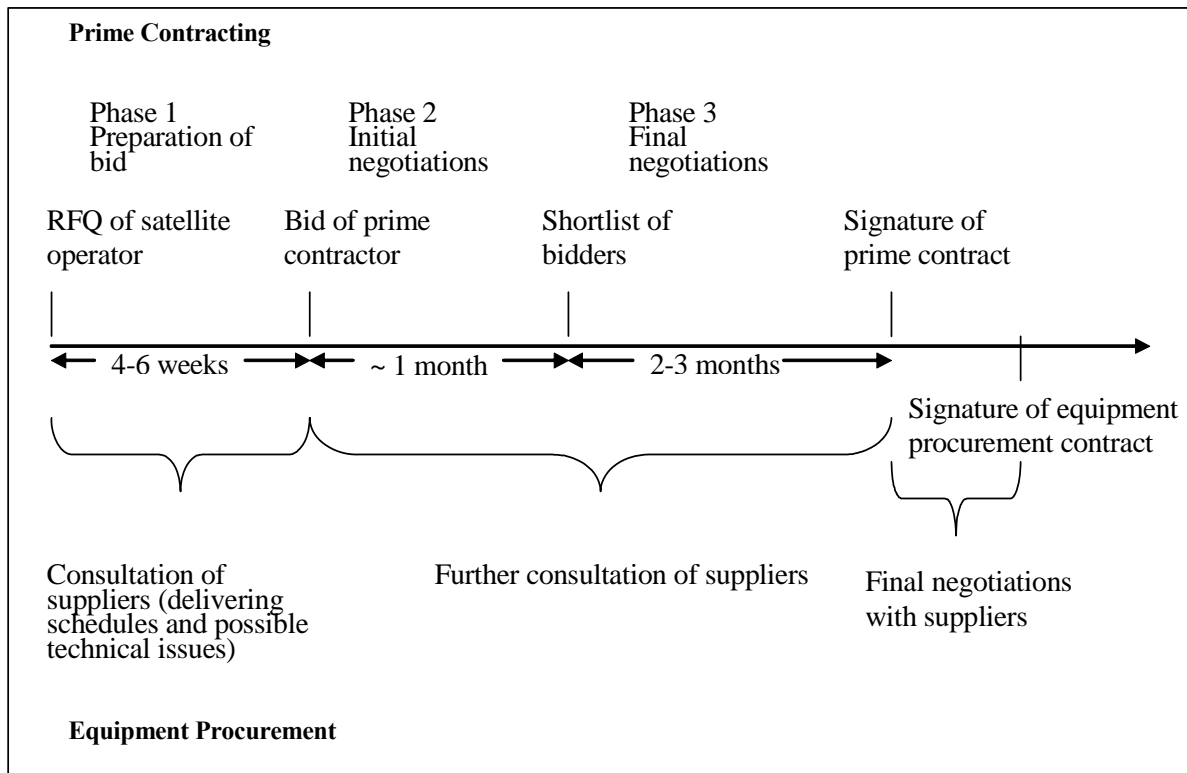
strategic participations in satellite operators AsiaSat, SES Sirius, QuetzSat, Ciel and Star One. Intelsat (U.S.), Eutelsat (France), PanAmSat (U.S.), JSAT (Japan), Telesat (Canada) and Hispasat follow in declining order of importance.

3. The commercial telecommunications satellite and satellite equipment markets are bidding markets

- (136) The markets for satellites and for satellite subsystems are bidding markets. When ordering a new telecommunications satellite, a satellite operator will generally request bids from several satellite prime contractors. Before submitting their bid for the prime contracting of the satellite to the satellite operator and in order to be able to do so, satellite prime contractors request bids for the most important equipment. As a general rule, the choice of equipment suppliers – including TWT(A)s – is the sole responsibility of the satellite prime contractor. Only on rare occasions would a satellite operator express a determining preference for a space equipment supplier.
- (137) Generally, the overall procurement process - from the date on which a satellite operator issues a request for a proposal to a prime contractor to the date on which the prime contracting agreement is signed – spans a period of 4 to 6 months. In the first phase, the prime contractor will respond to the operator's request for a proposal within 4 to 6 weeks of such request. The satellite operator and the bidding prime contractors will then discuss the replies within the next month (Phase 2). On the basis of these discussions, the satellite operator will short-list two bidders with whom all terms and conditions (including the price and technical specifications) are thoroughly negotiated, before the award of the contract to one prime contractor (Phase 3).
- (138) During Phase 1, the prime contractor will assess the TWT manufacturers' delivery capacities and the utilization load of their facilities (in order to ensure a timely delivery of the TWTs). In cases where the request for a proposal includes technical specifications that require non-standard TWTs, the consultation with the TWT manufacturers will also encompass technological questions. Further technical discussions between the bidding prime contractors and the component suppliers (including TWT manufacturers) may occur in Phase 2 and Phase 3, in particular to take into account changes requested by the satellite operator. The final prices for the procurement of the components are subsequently negotiated with the suppliers, but these supply agreements are entered into only after the award of the prime contracting agreement. There is no possibility for the supplier or the prime manufacturer to change the agreed conditions afterwards.

(139) Chart 1⁶⁸ illustrates the process described above in recitals (136) to (138).

Chart 1



(140) Specifically with regard to TWT(A)s⁶⁹, satellite manufacturers request bids either separately for TWTs, EPCs and other components, or for a TWTA. TWTs cannot be loaded onto a payload without integration. In all cases, TWTs must be integrated downstream with EPCs so as to constitute the TWTA which will be installed on the payload. The distinction between purchasing an integrated TWTA or purchasing the TWT and the EPC (including services for the assembly, integration and testing of the TWT with the EPC) ("AIT") separately is therefore limited to a procurement decision.

(141) If the satellite manufacturer opts for an integrated TWTA, the TWTA integrator that is invited to bid will, in turn, request an offer for a TWT from the TWT supplier (either TED or L3). In the course of the procurement, the TWTA integrator often has to revert to the TWT supplier to request additional successive quotations to take into account the changes in the programme-related requirements added by the satellite operator (for example, hot vibration, additional burn-out time, measurement of additional parameters). This illustrates that the quotation process requires frequent and technically detailed communication with the TWT supplier and that the quality of the TWTA integrator's bid is dependent on the accurate and swift reply of the TWT manufacturer.

⁶⁸ See Thales' response to question 9 of the request for information of 6 December 2006.

⁶⁹ Comparable procurement processes apply in the case of the selection of the EPC, the linearizer and channel amplifier functions.

- (142) The TWTA integrator that has won the bid will then assemble and integrate the TWT with the EPC, and test the obtained TWTA (AIT) and provide it to the satellite prime contractor within the schedule for integration on the satellite itself. Orbital, but also ISRO, CAST, NPO PM, RSCC and IAI, always buy integrated TWTAs.
- (143) If the satellite manufacturer opts to procure the TWT, EPC+AIT separately, he will issue separate requests for TWTs and the other components. The satellite manufacturer will request a quotation directly from a TWT supplier. The integration of the TWT with the EPC into a TWTA may be carried out by the satellite manufacturer itself – if that manufacturer has internal EPC production⁷⁰ – or by a third party TWTA integrator such as Tesat or L3. In the latter case, the satellite prime contractor will procure the TWT and will have it delivered to the TWTA integrator's facility for AIT with the TWTA integrator's own EPC. In such case, the TWTA manufacturer will sell an EPC+AIT, and invoice its margin on these components/services. This procedure is called Customer-Furnished Equipment (“CFE”). The TWTA is then provided to the satellite prime contractor within the schedule for integration on the satellite itself. It is important to stress that in the case of CFE procedure, the purchase decision is not made by the TWTA integrator itself but by the satellite manufacturer on the basis of its reliance on the ultimate product (TWTA, LCTWTA or MPM)⁷¹.
- (144) Although an exception rather than the general rule, the two types of procurement procedures may be combined for the same satellite programme. A satellite manufacturer may, for instance, procure an S-band TWTA from L3 and have C-band TWTs from TED integrated by L3 on CFE basis. Satellite programmes with TWTs from several suppliers include the JCAST 9, JC-SAT 10 and JC-SAT 11 programmes of Lockheed Martin, the Express AM 2/3 of NPO PM, the Hot Bird 7A programme and the Galaxy 17 programme of PanAmSat.
- (145) It is important to stress that market demand has evolved to integrated products. For more than 70% of recent satellite orders, prime contractors now request and purchase TWTAs or more integrated products rather than issuing separate quotations for TWTs and EPCs. Whereas in the past some major satellite manufacturers had – up to a certain degree – internal capacity for EPCs+AIT and LCAMPs, this capacity has either been outsourced (for example, Boeing sold these activities to L3) or is no longer used. For instance, Lockheed Martin, which used to produce EPCs for internal needs, purchased TWTs from either TED or L3 and itself carried out the integration of TWTAs. It appears from the market investigation that Lockheed Martin now favours procuring integrated TWTAs from Tesat or L3, as shown by the latest satellite programmes in which it was involved (Vinasat, Echo 14, PAN, etc.).
- (146) The market investigation has shown that the procurement of integrated TWTAs brings significant benefits to prime contractors. First, procuring TWTA+ subsystems allows certain cost savings and simplifies the procurement process (reduction of the number of contracts and subcontractors, reduction of procurement interfaces, of documents, reviews, travel, etc.). Secondly, in terms of risk management, the overall TWTA+

⁷⁰ Some satellite prime contractors, such as Lockheed Martin, have in-house production capabilities for EPCs and LCAMPs and in-house integration capabilities.

⁷¹ This procedure was used by Boeing for the Direct TV satellites, whereby customer-furnished Ka-band TWTs produced by TED were shipped to the U.S. to be integrated by L3.

subsystem performances cannot be easily guaranteed from two different specifications (one for the TWTA and one for the LCAMP). The LCTWTA linearity performances, for instance, mainly depend upon the matching of the TWTA and LCAMP electrical non-linearity characteristics which cannot be directly specified when separated units are procured. In such conditions, prime contractors may prefer to specify the TWTA assembly so that all the risks are taken by the TWTA subcontractor. In addition, some performances of TWTA+ subsystems can only be tested at the TWTA+ assembly level.

(147)[...]* also underlines the key advantages for prime contractors to source integrated products:

"The clear trend towards the procurement of TWTA or further integrated products stems from the risk that is incurred by the prime contractor when it decides to choose the TWT and supply this as CFE to the TWTA/MPM integrator. Indeed, in such a case, should a technical problem arise with the TWT-EPC or TWT-LCAMP interface, the prime contractor would be held responsible vis-à-vis the satellite operator and would not be able to pass on this liability to the TWTA/MPM integrator. (...)

In addition, [...]'s experience is that in general, in cases of failures, in particular when these occur once the satellite is in orbit, the responsible component (EPC or TWT or LCAMP or AIT) cannot be identified – in such situations, it is very difficult for a prime contractor having chosen the TWT and supplied it CFE to exclude its liability.*

(...)

Finally, the financial risk for repair and retest of the EPC in case of TWT failure would be borne by the prime contractor.

For these reasons, prime contractors increasingly procure integrated TWTAs and MPMs rather than TWTs (subsequently supplied CFE to a second integrator)."⁷²

(148)[...]*.^{73 74}

CHART 2

(149)According to [a market player]*, in 2000, customers generally purchased TWTs separately from EPCs and LCAMPs either because they had their own EPC or LCAMP capabilities or because they preferred to issue two distinct requests for a proposal for the TWT, on the one hand, and the EPC and LCAMPs, on the other hand. As shown in Chart 2, TWTs were purchased separately in more than 80% of the cases in 2000. However, in recent years, the market situation has changed drastically, and prime contractors increasingly request fully-integrated products rather than TWTs and EPCs and LCAMPs separately. In 2005, customers requested integrated products in about [50-60%]* of orders and it is estimated that in 2006, integrated products accounted for more than [65-75%]* of the market. Within integrated products, orders for TWTA+

⁷² See [...]* response to question 64 of the request for information of 22 December 2006.

⁷³ [...]*.

⁷⁴ [...]*.

subsystems have particularly increased, moving from [5-15%]* in 2000 to [35-45%]* of total orders in 2005 ([50-60%]* estimated in 2006). [This market player]* concludes that:

"It follows that the downstream markets (i.e., TWTA and MPM) have become the relevant level of business and the focus of customers and manufacturers."

(150) With a view to better understand the scope for TWT input foreclosure at the prime contracting level in a market characterized by a trend toward more integrated products, the Commission has assessed the TWT/TWTA sourcing policy of the main satellite prime contractors.

(151) [A prime contractor]* summarizes the prime contractors' purchasing policies as follows:

"• Boeing procured previously EPCs, LCAMPs and AITs with CFE TWTs; they have changed their policy to purchasing MPMs;

• Astrium procures MPMs;

• Lockheed Martin previously procured EPCs&LCAMPs&AITs, with CFE TWTs; they have now changed their policy towards purchasing MPMs;

• CAST procures MPMs;

• ISRO (Indian satellite prime contractor) procures MPM;

• Orbital procures MPMs;

• SS/Loral previously procured EPC&LCAMP&AIT with CFE TWT; they have now changed: for approximately half of their contracts, they procure EPCs, LCAMPs, AITs and provide CFE TWTs (sometime using internally produced LCAMPs) – for the other half, they procure integrated MPMs;

• Alcatel procures internally EPCs&AITs and supplies CFE TWTs, LCAMPs being also internally sourced and integrated. Alcatel Alenia Italy procures MPMs."⁷⁵

(152) [A prime contractor]*'s consistent procurement policy has therefore been to purchase TWTA+s.

(153) [...]*⁷⁶

(154) [Another prime contractor]* has [...]* the procurement of integrated products:

"[This prime contractor] has developed a strategy which calls for the procurement of its TWT related equipment from the industry experts in an integrated configuration for use on their satellite programs"*

⁷⁵ See [...]*'s response to question 64 of the request for information of 22 December 2006.

⁷⁶ See [...]*'s response to questions 66 and 67 of the request for information of 22 December 2006.

[...]*⁷⁷

- (155) [Another prime contractor]* combines different procurement strategies depending on the satellite programmes and [...]*:

"[This prime contractor]'s experience has been that the suppliers will work with their customer (i.e. satellite manufacturers) to achieve the best overall arrangement for a program, based on several factors. [...]*"*⁷⁸

- (156) Finally, the Commission notes that there is no indication that this trend toward more integrated TWTA solutions could be reversed. In particular, it is unlikely that a prime contractor will resume producing EPCs or assembling TWTAs once it has stopped such activities since it is difficult to maintain this competence. This is also confirmed by [a market player]*:

"It should finally be stressed that a prime contractor needs, in order to be able to specify the TWT-EPC interfaces, to have personnel able (i) to manage technically the interface and integration between the TWT and the EPC (this being one of the most critical and sensitive steps of the vertical chain) and (ii) to manage the timeline of the TWTA/MPM integration process.

*Without such personnel, the prime contractor is not able to adopt a CFE TWT procurement policy. Both Lockheed Martin and Boeing have decided not to keep the personnel dedicated to these processes. Astrium, Orbital and CAST never had such personnel. This implies that apart from SS/Loral (and Alcatel), prime contractors clearly chose not to resort to a CFE procurement strategy, based on the major risk factors identified above. They would simply not be able to shift to such a strategy should they wish to, since the relevant qualified personnel would be very difficult to hire."*⁷⁹

- (157) In view of the above, it is concluded that the trend of satellite prime contractors to procure more integrated products (TWTA and TWTA+s) instead of TWTs is long-lasting and that TWTAs and TWTA+s (and no longer TWTs) are the most relevant level of the supply chain for the assessment of the impact of the proposed operation on satellite prime contractors.

- (158) It appears that currently only AAS – and to a much lesser extent Loral – continue to procure TWTs and EPCs+AIT separately. AAS' policy is to procure TWTs from TED or L3 and have them integrated with EPCs from ETCA⁸⁰, L3 or Tesat. It can therefore be

⁷⁷ See [...]*'s response to questions 66 and 67 of the request for information of 22 December 2006.

⁷⁸ See [...]*'s response to questions 66 and 67 of the request for information of 22 December 2006.

⁷⁹ See [...]*'s response to question 64 of the request for information of 22 December 2006.

⁸⁰ When considering its EPC supplier, AAS will take a 'make or buy' decision. In doing so, AAS will first verify whether ETCA has the appropriate product offering. Secondly, and if the first condition is met, AAS will consider the cost of ETCA's EPCs and compare them to those of Tesat and L3. Thirdly, AAS will verify whether ETCA's production capacity is capable of handling the required demand in terms of quantity and delivery schedule. Even if ETCA is less expensive than an L3 or Tesat offering, AAS may turn to an external supplier in order to minimise the risk of delivery delays (and conversely).

concluded that direct sales of TWTs to satellite manufacturers are becoming more and more an exception and are in any case mostly limited to AAS.

4. *The TWT market*

(a) TWT suppliers

- (159) There are only two suppliers of TWTs worldwide: TED and the U.S. company L3.
- (160) In 2002, L3 acquired the space TWT activities of the Boeing group (Boeing Satellite Systems). These space TWT activities were part of the Hughes group (Hughes Electron Dynamic Devices Inc.) until 2000.
- (161) NTSpace, a Japanese space company resulting from the merger of the space activities of NEC and Toshiba, used to be a supplier of TWTs but exited the market at the end of the 1990's. NTSpace is now focusing on the Japanese institutional market and SSPAs. According to the market investigation⁸¹, NTSpace was in any event a small player for TWTs and it has now stopped developing and supplying TWTs. In addition, NTSpace has no plans to re-enter the TWT market and is unlikely to do so in the short to medium term due to the very high entry barriers.
- (162) The market investigation has confirmed that barriers to entry are very substantial, on a market which is quite small (5 year average of EUR 100–120 million in value). No new entry is expected in the medium term.

(b) Production capacities, actual production and merchant sales

- (163) TED manufactures TWTs at two sites, Vélizy in France and Ulm in Germany, and has a production capacity of approximately [...] * TWTs per year. TED manufactures TWTs of all frequency bands, both conduction-cooled and radiation-cooled.
- (164) L3 manufactures TWTs at the site in Torrance in California and has a production capacity of around [...] * TWTs per year. L3 manufactures TWTs in a broad range of frequency bands, both conduction-cooled and radiation-cooled.
- (165) In terms of TWT production capacity, TED has [...] * of the global production capacity of TWTs and L3 [...] *.
- (166) In terms of actual production, TED produced, on average over three years, approximately [70-80%] * of TWTs, the remaining [20-30%] * having been manufactured by L3. However, L3's share of production has increased to more than [30-40%] * in 2006. Table 3 below shows the number of TWTs manufactured by TED and L3 in 2004, 2005 and 2006⁸².

⁸¹ [...] *'s response to the request for information of 22 December 2006.

⁸² TWT manufactured and delivered by TED and L3 (either as a TWT or as TWTA).

Table 3

	TED production	TED share of production	L3 production	L3 share of production	TOTAL
2004	[...]*	[80-90%]*	[...]*	[10-20%]*	[...]*
2005	[...]*	[80-90%]*	[...]*	[10-20%]*	[...]*
2006	[...]*	[60-70%]*	[...]*	[30-40%]*	[...]*
TOTAL	[...]*	[70-80%]*	[...]*	[20-30%]*	[...]*

(167) In terms of merchant sales, TED has a higher market share for the sale of TWTs than its overall share of TWT production. L3 has a lower market share since it generally uses TWTs internally for integration into TWTAs. Table 4 below shows the number of TWTs sold to third parties by TED and L3 in 2004, 2005 and 2006⁸³.

Table 4

	TED sales	TED market share	L3 sales	L3 market share	TOTAL
2004	[...]*	[90-100%]*	[...]*	[0-10%]*	[...]*
2005	[...]*	[90-100%]*	[...]*	[0-10%]*	[...]*
2006	[...]*	[90-100%]*	[...]*	[0-10%]*	[...]*
TOTAL	[...]*	[90-100%]*	[...]*	[0-10%]*	[...]*

(168) Market shares (as compared to shares of production) do not provide a meaningful estimate of the market position of TED and L3 but simply reflect the fact that TED is not vertically-integrated in the manufacture of TWTAs while L3 privileges the sale of TWTAs. The size of the market for the supply of TWTs is also difficult to interpret since it includes sales of TWTs to both integrators (such as Tesat) and prime contractors.

(169) Commercial telecommunications satellites include TWTs of different frequency bands. Based on the information provided by the parties and other prime contractors, the Commission has established a list of all telecommunications satellites delivered between 2001 and 2006 including the number of TWTs, their frequency band, output power and their supplier for each satellite. Based on these data, the Commission has calculated the share of each frequency band in the overall TWTs installed on satellites over the past five years (see Table 5 and Chart 3 below in recital (170)), and the share of TED's and L3's installed base for each frequency band (see below in recital (171)).

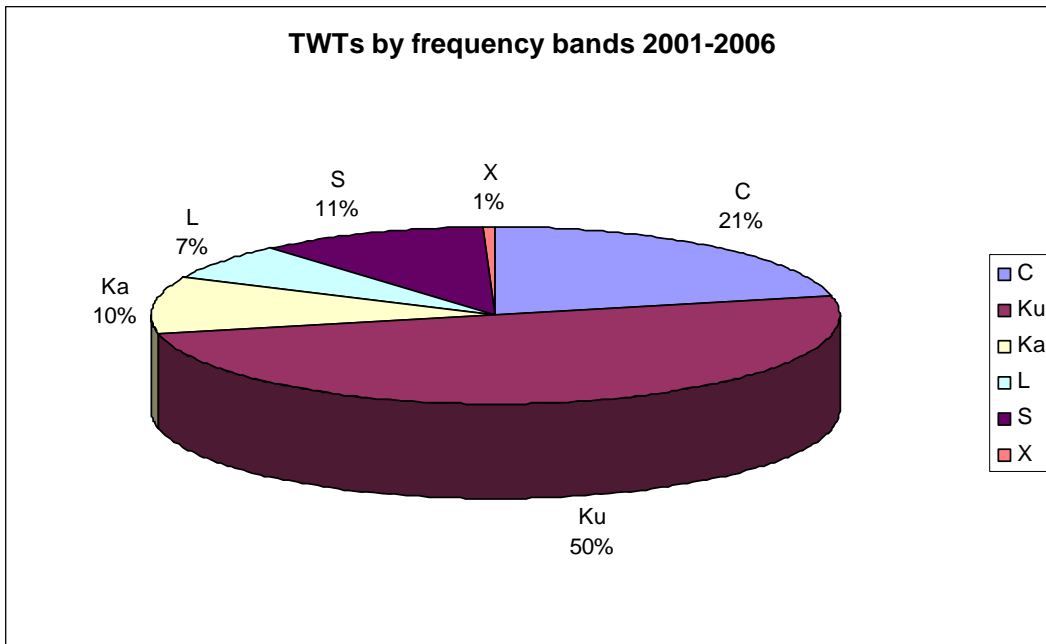
(170) Table 5 and the chart below show the importance of each frequency band by number of TWTs:

⁸³ TWT manufactured and delivered by TED and L3 as a TWT (not as TWTA). Source: data from TED and L3 provided to the Commission in response to the requests for information of 5 December 2006 and 22 December 2006.

Table 5

	S-Band	L-Band	C-Band	X-Band	Ku-Band	Ka-Band	TOTAL
Number of TWTs	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
%	11%	7%	21%	1%	50%	10%	100%

Chart 3



(171) The share of TED and L3 by frequency band is provided in Table 6 below⁸⁴. These figures show that L3 essentially focuses on S-band, as well as on C-band and Ku-band TWTs, which are the two most common frequency bands.

Table 6

	S-Band	L-Band	C-Band	X-Band	Ku-Band	Ka-Band	TOTAL
TED	[40-50%]*	[90-100%]*	[60-70%]*	[90-100%]*	[70-80%]*	[90-100%]*	[70-80%]*
L3	[50-60%]*	[0-10%]*	[30-40%]*	[0-10%]* ⁸⁵	[20-30%]*	[0-10%]*	[20-30%]*

(172) Overall demand in volume is expected to remain stable in the years to come. Demand for C-band (slightly decreasing) and Ku-band (stable to growing) is forecast to continue to represent the bulk of the market. Demand for Ka-band, L-band and S-band is expected to grow moderately due to increased demand for high definition television

⁸⁴ Table based on production figures of TED and L3 as provided by these companies in response to requests for information. Given that demand for TWTs is met by different procurement procedures which may lead to double-counting, a certain margin of error is to be taken into account.

⁸⁵ X-band is predominantly used for military applications and dual-use applications on commercial satellites. Information on L3's sales of X-band was not accessible to the Commission.

services, Internet services and high data rate applications. Demand for X-band is expected to decrease further.

(c) TWT capabilities of L3

(173) One of the key issues examined by the Commission in its in-depth investigation in this case is the competitive constraint exercised by L3 on TED and its likely evolution. This competitive constraint can be assessed both in terms of production capacity and in terms of product range.

(174) As mentioned in recital (64), L3 manufactures TWTs for a broad range of frequency bands although it has no qualified TWT products with flight heritage for certain frequency bands (L-band, high-power Ku-band and Ka-band). The Commission has therefore assessed (i) whether L3 has the required competence and expertise to develop TWTs for the frequency bands and output power in which it does not yet have a qualified product with sufficient flight heritage, and in particular whether L3 is already in the process of developing such product and at which stage of development these products are; and (ii) whether L3 represents a strong competitive constraint for the TWT frequency bands for which it currently has a product offering.

(175) The Commission has assessed L3's product offering on the basis of the responses of L3 and of satellite prime contractors (which are the end customers of TWTs and TWTAs) to the Commission's market investigation.

(1) Frequency bands for which L3 does not currently have a qualified TWT with sufficient flight heritage

(176) The market investigation has shown that L3 has the required competence and expertise to develop and market TWTs for all frequency bands and output power, including those for which it does not yet have a qualified product.

L3: *"Both L3 and TED have the expertise to produce the full range of products"*⁸⁶

[A market player]*: *"Both Thales and L3 have the expertise to produce the full range of TWTs with no exception. L3 has missed the development of the high-power Ku-Band TWTs in the end of the 90ies but it has now commercialized its high power Ku-band product. (...) For Ka-Band TWTs, L3 has the expertise but has not yet developed the necessary capabilities and Thales enjoys a monopoly position."*⁸⁷

(177) L3's capability to develop TWTs for all frequency bands is also demonstrated by the advanced stage of development for certain TWTs for which it does not yet have a qualified product offering with flight heritage. L3's statements below summarize the company's product offering and its development activities in the field of TWTs:

"L-3's long term in orbit experience exceeds that of all of our competitors combined. In the near term (last 6 years or so) both L-3 and TED have extensive on orbit experience in S, C and Ku-bands. TED has relevant near term heritage in L-band and K-band (20

⁸⁶ See L3's response to question 31 of the request for information of 22 December 2006.

⁸⁷ See [...]*'s response to question 31 of the request for information of 22 December 2006.

*GHz) that L-3 does not. L-3 has a near term experience advantage for X-band TWTs. L-3 ETI currently produces space TWTs in S-band, C-band, X-band, Ku-band, K-band (in small quantities for specialized government applications only), Ka-band and V-band. We are developing higher power S-band TWTs, higher power Ku-band TWTs and 20 GHz TWTs that we hope will be a viable option for commercial and unclassified government applications."*⁸⁸

(178) As regards L-band, L3 [...]*. L3 explains that it has the capability to produce L-band TWTs, in particular [...]*, but that this would require [...]*. L3's L-band TWT would also need to acquire sufficient flight heritage before being accepted by commercial customers. L-band TWTs account for around [...]* of overall TWT demand.

(179) As regards Ku-band, the market investigation has shown that L3 has a competitive TWT product offering up to the 150 W output power level. L3 states that it is currently developing a higher power Ku-band TWT that could produce in excess of 300 W. Such high power Ku-band TWT is expected to be qualified [...]*, and would thereafter need to acquire sufficient flight heritage before being accepted by commercial customers. According to the parties, [...]*, has informed TED that it will not purchase its 200 W Ku-band TWTs as it is waiting for the 300 W TWT in development at L3⁸⁹.

(180) As regards high power TWTs, the market investigation has shown that, contrary to what the parties claimed in their comments on the Article 6(1)(c) decision⁹⁰, it is not economically-viable to substitute two low power TWTs for one high power TWT for reasons of mass, performance (power consumption), and cost⁹¹. For L3, not having an offering for higher power Ku-band (and, to a lesser extent, S-band) is therefore a competitive disadvantage.

(181) As regards Ka-band, L3 has developed and qualified a 30 GHz TWT for deep space exploration (NASA programmes), which has, [...]*. The commercial demand for Ka-band TWT is, however, for 20 GHz products. According to L3, the design of a 20 GHz and a 30 GHz TWT are significantly different⁹².

⁸⁸ See L3's response to question 32 of the request for information of 22 December 2006.

⁸⁹ See parties' comments on the Article 6(1)(c) decision of 13 December 2006, paragraph 42, p. 19.

⁹⁰ See parties' comments on the Article 6(1)(c) decision of 13 December 2006, paragraph 37, p. 18.

⁹¹ See [...]*'s response to question 6 of the request for information of 22 December 2006: "[w]hile it is possible to power combine two 50 watt Ka-Band TWTs to achieve similar performance to a 100 watt ka band TWT, there are several disadvantages. The most obvious is that an additional TWT would be required. Further an additional HV-EPC or a dual HV-EPC would be required, and the overall power efficiency is reduced. The cost increase for the dual solution is between [1.5 and 2.0]* times the cost of a single solution. The dual solution has a minimum of four boxes whereas the single solution has a minimum of two boxes, therefore the space is roughly doubled. The dual solution uses between [10% and 20%]* more DC power to compensate for the overhead of operating two TWTs instead of one and the intrinsic loss associated with RF power combining."

⁹² See L3's response to question 33 of the request for information of 22 December 2006.

(182) According to the parties, L3's Ka-band TWT was developed in 2002, can achieve a frequency up to 32 GHz and offers a high efficiency level⁹³. The parties also point out that the technology to manufacture a 20 GHz Ka-band TWT is easier to master than the technology for a 32 GHz TWT, due to simpler scaling constraints⁹⁴. However, contrary to the parties' statement, it is not correct that [...]*, this does not provide L3 with space heritage for the 20 GHz TWTs used on commercial satellites.

(183) In view of the above, although L3 has the required expertise and has development programmes for these frequencies, it can be concluded that L3 does not currently have a qualified TWT with sufficient flight heritage for the following frequency bands and output power: L-band, Ku-band with a power over 150 W and Ka-band. Table 7 shows the frequency bands and output power for which L3 has a qualified TWT product with sufficient flight heritage (cells in grey).

Table 7

L3 product range	S-band	L-band	C-band	X-band	Ku-band	Ka-band
Low to Medium Power						
High Power						

(2) Frequency bands for which L3 currently has a qualified TWT with sufficient flight heritage

(184) Although TED recognizes it has a leading position on the market for TWTs, internal documents from its space sales and marketing department show that TED considers L3 as a credible competitor for TWTs. A number of strategic documents and marketing presentations compare TED's and L3's TWT product offering in terms of size, mass, design, efficiency, and flight heritage:

"L3-ETI shows today competitive advantage – or at least reaches TED level – on every identified differentiator – excepted heritage.

[...]*"⁹⁵

(185) In these internal documents, the acquisition by L3 of Boeing's TWT activities in 2004 appears to have increased the competitive constraint felt by TED:

*"We must take this new market configuration very seriously (on the top of other external parameters as the current Euro/US Dollar exchange rate for example) since we can assume that L3 will probably invest a lot more than BSS did in the past."*⁹⁶

⁹³ See parties' comments on the Article 6(1)(c) decision of 13 December 2006.

⁹⁴ See parties' comments on the Article 6(1)(c) decision of 13 December 2006, paragraph 35; see also recital 50 which indicates that the higher the frequency, the smaller the size of the TWT.

⁹⁵ PowerPoint presentation [...]*

⁹⁶ PowerPoint Presentation [...]*

"BEFORE

Not considered as a strategic asset for BSS

→ No significant investment → No competitive product line

Now

Is considered at least as a "Standard" asset for L3

→ Targeted investment in order to become a competitive player in the growing markets (High Power Ku, Ka band ,...).

They master internal complete LTWTA chain plus other component.

*They have to solve technical issues on the Radiation Cooled design on OPTUS D1."*⁹⁷

"L3: more dangerous than Boeing used to be:

- Has a better offer than TED in 100/150 W Ku TWTs (more efficiency, more power) which is the biggest market and the biggest threat for TED*
- Has an excellent and complete in-house offer with linearizers, channel amplifiers and EPCs*
- Has no access to China*
- Needs to improve profitability. (...)*

*ITAR rules: difficulties with some US materials. An advantage for TED in China, no more in India."*⁹⁸

(186) A regards S-band, C-band, and X-band TWTs, TED considers that L3 is a credible competitor:

- a) S-band: *"Strong competition from L3-ETI on the medium Power range (around 150W) with Radiation Cooled design validated in-orbit on the previous SIRIUS satellites"*
- b) C-band: *"Strong competition from L3-ETI (C-Band was the main market of L3-ETI in the recent past). Similar performances as L3-ETI but L3-ETI has in-orbit heritage on Radiation Cooled version (intelsat program at 80 W)"*
- c) X-band: *"L3-ETI is very active on this market. He is leading the business on this band (Skynet, WGS, ...)." ⁹⁹*

(187) This view is shared by satellite prime contractors such as [...] ^{*}:

"a) S-band: significant heritage compared to TED for radiation cooled TWTs; power limited to around 150W, while TED can achieve 250 W.

b) C-band: most comparable to TED; L3's heritage includes radiation cooled

*c) X-band: slightly more heritage than TED, L3's heritage includes radiation cooled"*¹⁰⁰

⁹⁷ PowerPoint presentation [...] ^{*}

⁹⁸ PowerPoint Presentation [...] ^{*}

⁹⁹ PowerPoint presentation [...] ^{*}

¹⁰⁰ [...] ^{*}'s response to question 32 of the request for information of 22 December 2006.

(188) An overview of L3's TWT installed base confirms the assessment in recitals (186) and (187). L3 is an established source of supply for C-band and is the preferred supplier for S-band TWTs up to 150 W (which form the bulk of the market) [...]*

(189) Finally, as regards Ku-band, which is currently the most important market segment, L3 started to commercialise an updated Ku-band TWT product range in 2004. The Commission's market investigation has confirmed that L3's Ku-band TWTs currently have a better performance than TED's equivalent TWTs in terms of efficiency and this product range has been marketed successfully by L3 (such as on the Intelsat IA9 and the Intelsat 14 manufactured by Loral, the PAS-11 manufactured by Orbital and the AMC21 manufactured by AAS). Ku-band TWTs account for a significant part of overall TWT demand (around 50%).

(190) The threat that L3's Ku-band TWTs represent for TED's market position is reflected in TED's internal documents:

"[...]*" ¹⁰¹

(191) Prime contractors [...] confirm that L3's Ku-band TWTs offer better performance than TED's Ku-band TWTs:

*"L3's Ku-band TWT is qualified and on-orbit at 150 watts. This product may be superior to the current TED offering, namely due to a decade difference in designs."*¹⁰²

(192) In view of the above, L3 is clearly a credible competitor of TED for TWTs in the frequency bands and power output ranges where it has a qualified product with sufficient flight heritage. Despite L3's more limited flight heritage, TED considers L3 a strong competitive constraint in particular for medium power Ku-band TWTs, the largest market segment, where L3's TWT is more competitive than TED's TWT. TED also considers that L3's capabilities in terms of EPCs, TWTAs and LCAMPs provide it with a strong competitive advantage (while TED only manufactures TWTs and has limited TWTA activities). Moreover, TED estimates that this competitive constraint has increased since L3 acquired Boeing's TWT activities.

(3) How prime contractors view L3's TWT capabilities

(193) The Commission also requested the view of prime contractors on the reliability and the flight heritage of L3's TWTs and any other factors which determine their choice of TWT supplier. It appears that although L3's TWTs have in general less flight heritage than TED's TWTs and have been integrated on fewer satellites, prime contractors generally consider that L3 has a competitive product offering.

(194) According to [a prime contractor]*, both TED and L3 have the expertise to develop and manufacture TWTs. Their ability to compete in the full range of TWTs is based on heritage but may be affected by export restrictions, which may prevent L3 to compete in certain foreign markets.

¹⁰¹ PowerPoint presentation [...]*

¹⁰² [...]*

(195)[This prime contractor]* generally considers that L3 is a credible competitor for the frequency band where it has a product offering. [This prime contractor]* has historically purchased TED TWTs for commercial telecommunications satellites more frequently than L3 TWTs due to TED's more extensive flight heritage:

"For programs where TWTs were procured from Thales, the selection of Thales was primarily due to flight heritage (an example being high power Ka-band)"

"[This prime contractor] definitely considers L3 as a credible supplier for all market segments where it has a product offering. [...]*"*

"[This prime contractor] has and will source from those companies that offer the best overall value".* ¹⁰³

"Apart from the frequency bands and products mentioned where L3 ETI is lagging in product offering or product development, [This prime contractor] already considers L3 ETI a ready alternative."* ¹⁰⁴

(196)For [another prime contractor]*, L3 is a credible TWT supplier, which lacks product offering for certain market segments but on the other hand has a competitive advantage for mainstream Ku-Band TWTs. According to [this prime contractor]*, L3's TWT delivery schedules and prices have improved since L3 acquired Boeing's TWT business.

(197)For [another prime contractor]*, both L3 and TED have the required expertise to produce a full range of TWTs in terms of both frequency and power. However, L3's product range is currently not complete and it would face significant barriers to develop TWTs for which TED is currently the only supplier. TED also has more flight heritage for the frequency bands where both L3 and TED have a product offering.

(198)[...]*. ¹⁰⁵

(199)It should however be noted that [this prime contractor]* procured L3 TWTs in [...]*. All these satellite programmes were with [...]*. The fact that [this prime contractor]* and [...]* turned to L3 for [...]* bids in a row shows that the quality/compliance issues were finally overcome.

(200)[A prime contractor]* considers that L3's competitive constraint is seriously hampered by the preferences of both satellite prime contractors and satellite operators for TED TWTs. [This prime contractor]* claims that the main satellite prime contractors clearly prefer TED's TWTs and that European satellite operators have selected only TED's TWTs. Furthermore, [this prime contractor]* claims that L3 TWTs were only selected for less complex TWT contracts, notably for satellites of Orbital and Loral.

(201)The market investigation has not confirmed this. First, as explained in recital (136), satellite operators do not select the TWT supplier. This is the exclusive responsibility of

¹⁰³ [...]*.

¹⁰⁴ [...]*.

¹⁰⁵ [...]*.

the satellite prime contractor. Secondly, it appears that [this prime contractor]*'s analysis was made on the basis of a selective data collection that does not fully take into account L3's installed base. L3 has provided TWTs for satellites ordered by the major satellite operators, including European satellite operators such as SES ASTRA (AMC 9, AMC 21, AMC 23) and Eutelsat (Hot Bird 7 A and Eutelsat W7 programmes). Major non-European satellite operators that have purchased satellites on which L3 TWTs are installed include JSAT (JCAST 9, JC-SAT 10 and JC-SAT 11 programmes), Intelsat (IA9 programme), PanAmSat (Galaxy 12, 15 and 17 programmes, PAS 11) and smaller operators such as Telenor, Singtel, Terrestar, Asiasat, Bsat Japan and ICO. Furthermore, none of the satellite operators that replied to the Commission's market investigation indicated that they have a preference for a given TWT supplier or that such preference would have a decisive influence in evaluating the bids of satellite prime contractors.

(202) As to satellite manufacturers having a preference for TED's TWTs, it is a fact that TED has been the reference supplier in the past and that L3's TWT business has become significantly more dynamic since L3 acquired it from Boeing some years ago. In any case, all satellite manufacturers (including [this prime contractor]*) have procured TWTs from L3. Secondly, while Orbital and Loral are indeed L3's main customers, [this prime contractor]* does not submit that the needs and requirements of these satellite manufacturers are significantly different from those of [this prime contractor]*. On the contrary, [this prime contractor]* indicates that Orbital and Loral are dynamic competitors that concentrate specifically on the commercial telecommunication market.

(203) Finally, [this prime contractor]* claims that for ITAR contracts and countries such as India and Russia (which may be sensitive to potential future ITAR restrictions) L3 is not available as an alternative TWT supplier to prime contractors. First, the size of the market directly affected by ITAR restrictions is significantly smaller ([5-10%]*) than [this prime contractor's]* estimate (15%). Secondly, the market investigation does not show reluctance of "ITAR sensitive" prime manufacturers in selecting L3 as a TWT supplier. For instance, L3 was selected as the TWT supplier on the Express AM 11, Express AM 2/3 and Kazsat1 programmes of the Russian manufacturer RSCC.

(d) Conclusion

(204) In view of the above, it can be concluded that L3 is a credible competitor of TED for the most common commercial frequency bands, in particular C-band (21% of the market) and Ku-band, where L3's TWTs are currently more competitive than TED's TWTs (34% of the market). L3 also has the competence and expertise to develop and manufacture TWTs in all frequency bands and has already qualified a 32 GHz Ka-band TWT for institutional applications. However, L3 does not currently have qualified TWTs with sufficient flight heritage for the commercial market for L-band (7% of the market), high power Ku-band (12%) and Ka-band (10%). Most satellite prime contractors consider L3 as a credible alternative for TWT frequencies where it has a product offering despite the fact that it has less flight heritage than TED. L3 has increased its share of global TWT production since 2004, and was ever more successful in 2006.

5. The EPC market

(a) EPC Suppliers

- (205) There are two main suppliers of EPCs worldwide, Tesat, and L3. A number of other space companies have the capability to manufacture EPCs for in-house applications but have never produced for the merchant market, such as Lockheed Martin, or have limited commercial activities, such as ETCA, a subsidiary of AAS, and Galileo Avionica, a subsidiary of Finmeccanica.
- (206) Tesat is a wholly-owned subsidiary of Astrium, which is itself part of the EADS group. Tesat is based in Backnang in Germany and develops and manufactures payload equipment for telecommunications satellites. Tesat is a leading producer of EPCs and leading integrator and supplier of TWTAs to satellite prime contractors.
- (207) TED does not manufacture EPCs.
- (208) ETCA is a wholly-owned subsidiary of AAS based in Charleroi, in Belgium. The company specializes in power electronics for satellites and launchers. ETCA essentially integrates TWTs from TED with its EPCs to supply TWTAs to its parent company, AAS.
- (209) Galileo Avionica has very limited activities in the field of EPCs, limited to the Italian institutional market. It has only produced [10-20]* EPCs in the last ten years. Except in 1999, Galileo Avionica had no production of EPCs between 1997 and 2003. Galileo Avionica anticipates producing [...] EPCs in 2006-2007 and estimates that it could manufacture [...] EPCs per year. Galileo Avionica's EPCs were essentially intended for institutional satellites. Galileo Avionica states that it has no plans to increase output or expand its product range. In view of its very limited activities in the field of EPCs¹⁰⁶, Galileo Avionica is not further considered in the competitive assessment in this Decision.
- (210) [...] ¹⁰⁷.
- "[...] does not manufacture EPCs anymore, and has never marketed EPCs on a commercial basis. (...) [...] has decided to interrupt the manufacturing line of its single HV-EPC but currently reserves the production capability. (...) It has determined that the sale of space based components is not consistent with [...] 's business goals"*
- (211) A third party has claimed that competition at the EPC level is more intense than at the TWT level as more suppliers compete. The market investigation has not confirmed this. Although Lockheed Martin produces EPCs, it has indicated that it is not its policy to sell EPCs or LCAMPs to third parties. If it were to reuse its residual production capacity, it would do so only for its internal needs. NTSpace has never supplied EPCs for commercial satellites and is no longer even present on the commercial market for TWTs.

¹⁰⁶ See Finmeccanica's response to the request for information of 6 December 2006.

¹⁰⁷ See the responses of [...] to the request for information of 22 December 2006.

(212) The market investigation has shown that barriers to entry to the EPC market are very high, although they can be considered slightly lower than those to entry to the TWT market to the extent that EPC development is based on power conditioning technology which is more mainstream technology than the space microwave technology applied in TWTs.

(b) Production and merchant sales

(213) Tables 8 and 9 below indicate the number of EPCs produced by each EPC supplier in 2004, 2005 and 2006, and their respective market share¹⁰⁸. These tables clearly show that Tesat and L3 are the two leading producers of EPCs. Lockheed Martin has stated that it no longer produces EPCs, as of 2007.

Table 8

	Tesat	L3	Lockheed Martin	ETCA	Galileo Avionica	TOTAL¹⁰⁹
2004	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
2005	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
2006	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
TOTAL	[...]*	[...]*	[...]**	[...]*	[...]*	[...]*

Table 9

	Tesat	L3	Lockheed Martin	ETCA	Galileo Avionica	TOTAL
2004	[50-60%]*	[20-30%]*	[10-20%]*	[10-20%]*	[0-10%]*	100%
2005	[40-50%]*	[20-30%]*	[10-20%]*	[10-20%]*	[0-10%]*	100%
2006	[40-50%]*	[40-50%]*	[0-10%]*	[10-20%]*	[0-10%]*	100%
TOTAL	[40-50%]*	[30-40%]*	[10-20%]*	[10-20%]*	[0-10%]*	100%

(214) It should be noted that it is difficult to calculate market shares for EPCs since EPC manufacturers generally assemble, integrate and test the EPC with a TWT and thus supply third parties with TWTAs (or EPCs + AIT), and not EPCs.

(c) Dual EPCs

(215) Only L3 and Tesat currently manufacture dual EPCs.

(216) Dual EPCs supply power and control for two TWTs and offer significant benefits in terms of cost, size and mass. According to the parties¹¹⁰, one dual EPC costs

¹⁰⁸ Source: data provided by Tesat, L3, Lockheed Martin, AAS and Finmeccanica to the Commission in response to the requests for information of 5 December 2006 and 22 December 2006.

¹⁰⁹ The total number of EPCs produced does not match the number of TWT produced. This can be explained by the production of dual EPCs, which are integrated with two TWTs. It may also be due to inaccuracies in the data provided by market players to the Commission.

approximately 25% more than a single EPC; the cost advantage of a dual EPC solution is thus 38% for a satellite prime contractor. Benefits in terms of mass and size can be considerable as up to 60 TWTs need to be powered on a satellite. Even a mass reduction of 1,000 grams per TWT (an average EPC weighs around 1,200 grams) can therefore contribute significant savings for the satellite manufacturer.

- (217) Some prime contractors initially expressed concerns about the reliability of dual EPCs. The consequences of the failure of a dual EPC are indeed more severe than the failure of a single EPC since it affects two TWTs of the satellite instead of one. Prime contractor requirements in terms of qualification and flight heritage are therefore more stringent for dual EPCs. In addition, there are currently no dual EPCs available for TWTs with a power higher than 150 W.
- (218) Because of their cost and technical advantages and despite considerations of reliability, dual EPCs have been widely adopted by prime contractors and demand for dual EPCs is rapidly increasing.
- (219) The importance of dual EPCs can be estimated by the share of TWTAs and the share of satellite programmes using dual EPCs. [...]*. This shows the importance of dual EPCs.
- (220) As regards AAS, dual EPCs accounted for around [20-30%]* of channels on AAS satellites over the 2002-2005 period. The share of dual EPCs increased to [50-60%]* in 2006 and is expected to reach [60-70%]* in 2007.

(d) EPC capabilities of ETCA

- (221) Only L3 and Tesat have the full range of EPC products, while ETCA's product range only covers single EPCs. ETCA's current EPC product range and its development plans are assessed in detail in Section VI, D, 1.
- (222) L3 summarizes the capabilities of EPC manufacturers as follows:

*"Tesat is the largest merchant supplier with the greatest volume over the past decade and a full range of products. L-3 is the second largest merchant supplier and also has a full range of products. Alcatel ETCA has a limited product catalog and limited heritage, but the design they offer is competitive technically. We have no knowledge of the capabilities of Galileo Avionica. Lockheed-Martin only manufactures EPCs for internal consumption and does not market to others. L-M has only a single EPC design (no dual). This design is not competitive technically with offerings from L-3 or Tesat, but it is an integral part of L-M's well established heritage (...). In addition to manufacturing EPCs, L-M also buys integrated TWTAs from both L-3 and Tesat."*¹¹¹

- (223) The numerous competitive advantages of Tesat, the leading market player are also described in ETCA internal documents:

¹¹⁰ AAS' submission on the "Absence of foreclosure issues in relation with ETCA's single EPCs".

¹¹¹ See L3's response to the request for information of 22 December 2006.

"[...]”¹¹²

(224) As regards production capacities, Tesat indicates that it can produce around [...] EPCs per year, the main constraint being the availability of qualified personnel. L3 estimates its own EPC production capacity to be around [...] units per year, with the main constraint also being the availability of qualified personnel.

(e) How prime contractors view ETCA's EPC capabilities

(225) In its market investigation, the Commission requested the views of satellite prime contractors on the respective EPC capabilities of L3, Tesat and ETCA. Replies from prime contractors generally confirm that Tesat and L3 have a strong competitive advantage over ETCA due to the availability of dual EPCs in their product range, a significant presence on the merchant market (the most competitive one) and significantly greater flight heritage.

(226) [A prime contractor] only deals with L3 and Tesat and considers these two suppliers as full-fledged EPC manufacturers for the full product range. [This prime contractor] is not aware of ETCA's EPC production capabilities.

(227) [Another prime contractor] indicates that ETCA has a credible single EPC product range but stresses the lack of flight heritage:

*"L3 and Tesat have comparable products for dual and single EPCs and significant in orbit heritage; ETCA has a single product offering and limited in orbit heritage. (...) The ETCA single EPC offering is most comparable to the Tesat and L3 offerings but is lacking in orbit heritage (...) Lack of heritage is a significant factor. The products are especially difficult to design and manufacture."*¹¹³

(228) [Another prime contractor] only deals with L3 and Tesat and considers that the EPCs of both suppliers have excellent reliability and extensive in-orbit heritage. It does not comment on ETCA's EPC capabilities.

(229) [...].

(f) Conclusion

(230) L3 and Tesat are the two leading suppliers of EPCs globally. The two companies have large production facilities, a broad product range, including dual EPCs, an established position on the merchant market and extensive flight heritage. By contrast, ETCA has a much more limited production capacity, only produces single EPCs and integrates most of its EPCs to supply its parent company AAS [...] and to supply [...] satellite manufacturer [...]. The major satellite prime contractors (other than ETCA's parent company, AAS) only deal with Tesat and L3 for EPCs and are not familiar with ETCA's products.

¹¹² Presentation [...].

¹¹³ See [...]'s response to the request for information of 22 December 2006.

6. *The TWTA market*

(a) TWTA suppliers

- (231) There are two main suppliers of TWTAs worldwide, Tesat and L3. A number of other space companies have the capability to integrate TWTAs but have no or limited commercial activities: Lockheed Martin, Loral, ETCA, TED and Galileo Avionica.
- (232) Tesat concluded a [...] agreement with TED in [...] for the supply of TWTs by TED to Tesat for integration into TWTAs.
- (233) Loral and Lockheed Martin have the capability to integrate TWTAs but have never supplied TWTAs to third parties.
- (234) Lockheed Martin used to integrate TWTAs for internal needs and estimates its TWTA integration capacity at around [...] TWTAs per year. However, [...].

*"Lockheed Martin maintains the capability to integrate TWTAs by sourcing TWTs from a TWT manufacturer, typically TED, and integrating the TWT with an EPC manufactured by Lockheed Martin. [...] (...) The current model is for Lockheed Martin to procure integrated TWTAs from TESAT or L3."*¹¹⁴

- (235) TED has some TWTA integration capabilities in its Velizy and Ulm TWT plants. According to the parties, TED has capacity to integrate around [...] TWTAs per year and has no plans to increase output or extend its product range¹¹⁵. TED concluded a [...] with Tesat in [...] whereby TED can purchase EPCs from Tesat for integration into TWTAs.
- (236) Galileo Avionica has very limited activities in the field of TWTAs and has only produced [10-20%] TWTAs in the last ten years. Except in 1999, Galileo Avionica had no production of TWTAs between 1997 and 2005. Galileo Avionica anticipates producing [...] TWTAs in 2006-2007 and estimates that it could integrate up to [...] TWTAs per year. However, it has no plans to increase output or expand its product range. In view of its very limited activities in the field of TWTAs¹¹⁶, Galileo Avionica will not be considered further in the competitive assessment in this Decision.

(b) Production and merchant sales

- (237) Tables 10 and 11 indicate the number of TWTAs integrated by each TWTA integrator in 2004, 2005 and 2006¹¹⁷. This table clearly shows that Tesat and L3 are the two leading integrators of TWTAs. [...].

¹¹⁴ See Lockheed Martin's response to the request for information of 22 December 2006.

¹¹⁵ See Thales' response to the request for information on "Production and sales data – Thales", 15 December 2006.

¹¹⁶ See response of Finmeccanica to the Commission request for information of 6 December 2006.

¹¹⁷ Source: data provided by EADS-Tesat, L3, Lockheed Martin, Alcatel, Thales and Finmeccanica to the Commission in response to the requests for information of 5 December 2006 and 22 December 2006.

Table 10

	Tesat	L3	Lockheed Martin	ETCA	TED	Galileo Avionica	TOTAL ¹¹⁸
2004	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
2005	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
2006	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
TOTAL	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*

Table 11

	Tesat	L3	Lockheed Martin	ETCA	TED	Galileo Avionica	TOTAL
2004	[50-60%]*	[20-30%]*	[10-20%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%
2005	[40-50%]*	[20-30%]*	[10-20%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%
2006	[40-50%]*	[30-40%]*	[0-10%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%
TOTAL	[40-50%]*	[30-40%]*	[10-20%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%

(238) The TWTA integration figures of Tesat, ETCA, TED and Galileo Avionica may include some military and institutional satellite programmes. More precisely, based on the figures provided by the companies, from 2004 to 2006, ETCA produced [...]* TWTA's for military and institutional programmes [10-20%]*, TED 17 (14%) and Galileo Avionica [...]*. By contrast, L3 and Lockheed Martin figures only relate to commercial satellite programmes.

(239) The leadership of Tesat and L3 is even more obvious in terms of merchant sales since Lockheed Martin and ETCA did not supply TWTA's to third parties over the three-year period from 2004 to 2006.

¹¹⁸ The total number of TWTA's integrated by all TWTA integrators does not match the number of TWTA's produced in 2004 and 2005. This may be due to the time required to integrate a TWTA or to inaccuracies in the data provided by market players to the Commission.

Table 12

	Tesat ¹¹⁹	L3	Lockheed Martin	ETCA	TED	Galileo Avionica	TOTAL
2004	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
2005	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
2006	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*
TOTAL	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*	[...]*

Table 13

	Tesat	L3	Lockheed Martin	ETCA	TED	Galileo Avionica	TOTAL
2004	[60-70%]*	[30-40%]*	[0-10%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%
2005	[50-60%]*	[40-50%]*	[0-10%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%
2006	[30-40%]*	[50-60%]*	[0-10%]*	[0-10%]*	[10-20%]*	[0-10%]*	100%
TOTAL	[50-60%]*	[30-40%]*	[0-10%]*	[0-10%]*	[0-10%]*	[0-10%]*	100%

(240) The market position of the various TWTA integrators is summarized as follows by L3:

*"L-3 and Tesat are the only merchant suppliers with significant market share for integrated TWTAs and LCTWTAs etc. AAS and Lockheed Martin have extensive capability for manufacturing and integration but their efforts have been focused on vertical integration. TED is occasionally the TWTA prime contractor, but most customers prefer a different arrangement."*¹²⁰

(c) TWTA integration capabilities of ETCA and TED

(241) The Commission has assessed the capabilities of ETCA and TED to integrate TWTAs in order to determine whether the new entity may have the ability and incentive to foreclose downstream TWTAs integrators, in particular Tesat.

(242) ETCA has a limited TWTA activity, essentially for AAS [...]*. ETCA essentially performs the assembly of EPCs it produces with CFE TWTs from Thales procured by AAS and then returns the integrated TWTA to AAS. ECTA refers to this activity as EPC + AIT (Assembly, Integration and Testing)¹²¹. Besides AAS satellites, ETCA only

¹¹⁹ [...]*

¹²⁰ See L3's response to the request for information of 22 December 2006.

¹²¹ The only TWTA (excluding EPC+AIT) produced by ETCA from 2004 to 2006 were for two institutional satellite programmes.

integrated [...] TWTAs (EPC + AIT) [...]*. Part of the TWTs used on these satellites were supplied by L3 through a CFE procurement by AAS.

(243) ETCA has a current theoretical capacity of around [...] TWTAs per year, which will be increased to around [...] TWTAs per year by the end of [...]*.

(244) TED focuses on the development and manufacture of TWTs and has therefore limited activities in TWTA integration. Over the three year period from 2004 to 2006, TED integrated [...] TWTAs, essentially for [...] satellites programmes ([...] TWTAs).

[...]*

(d) How prime contractors view ETCA's and TED's TWTA integration capabilities

(245) The Commission requested the views of prime contractors on ETCA's and TED's TWTA integration capabilities, as compared to the two leading suppliers, Tesat and L3.

(246) **Boeing** has no TWTA integration capabilities and purchase TWTAs from L3 or Tesat:

"Boeing only deals with L3 and Tesat and considers these two companies full-fledged TWTA and further subsystems manufacturers for the full product range."¹²²

(247) **Loral** has the capability to integrate TWTAs and considers that L3, Tesat and ETCA can integrate and test TWTAs.

(248) **Lockheed Martin** principally integrates TWTAs internally or sources TWTAs from Tesat. It has no knowledge of AAS' TWTA integration capabilities and is not aware that TED also integrates TWTAs.

(249) Although it did not purchase TWTAs from AAS or TED in the past three years, **Astrium** takes the view that L3, Tesat, Lockheed Martin, AAS and TED have comparable TWTA offers and have a strong in-orbit heritage. While Lockheed Martin has a strong installed base of internally-integrated TWTAs, the Commission's market investigation has not confirmed that AAS' and TED' TWTA integration capabilities and experience are at a level comparable to those of L3 and Tesat. Lockheed Martin only integrates TWTAs for internal use and is exiting this activity. ETCA has a much more limited flight heritage compared to L3 and Tesat and has no sales on the merchant market. TED also has a much more limited flight heritage although it has already supplied TWTAs to Indian and Chinese prime contractors (ISRO and CAST).

(e) Conclusion

(250) Due to their strong position at the level of EPCs, L3 and Tesat are the two leading integrators of TWTAs globally. They are the only two integrators with significant assembly and testing facilities, an installed base with extensive flight heritage and a significant presence on the merchant market. ETCA and TED have limited TWTA

¹²² See response of Boeing to Commission Phase II market investigation, 16 January 2007.

integration activities, with the former essentially having supplied for its parent company AAS on the institutional market [...]*

7. *Historic market segments based on the types of TWTs and EPCs loaded on the telecommunications satellites ordered during the years 2001 to 2006.*

(251) Table 14 gives an overview of the different market segments based on TWTs loaded on the satellites supplied by the different prime contractors in the period 2001-2006:

Table 14

	Number of satellites with TWTs								
	S-band	L-band	C-band		Ku-band		Ka-band		X-band
			MP <100W	HP >100W	MP <140W	HP >140W	MP <100W	HP >100W	
AAS	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
AAS ITAR	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Astrium	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Astrium ITAR	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Boeing	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Lockheed Martin	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Loral	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Orbital	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
CAST	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Other primes	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Total ITAR segment	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %
Total market	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %	[...]* %

(252) Table 15 provides an overview of the different market segments based on TWTs and single EPCs ("S") versus dual EPCs ("D") loaded on the satellites supplied by the different prime contractors in the period 2001-2006:

Table 15

		AAS	Astrium	Boeing	Lockheed Martin	Loral	Orbital	Other primes	ITAR segment	Total market
S-band	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
L-band	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
C-band MP	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
C-band HP	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
Ku-band MP	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
Ku-band HP	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
Ka-band MP	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
Ka-band HP	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
X-band	Single	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
	Dual	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%
Market share		[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%	[...]*%

C. Space segment - Description of the input foreclosure strategies considered during the in-depth examination

(253) The issue raised by the proposed operation is whether or not the notified operation will give the new entity the ability and incentive to engage in input foreclosure and significantly impede effective competition downstream, that is to say whether Thales, as the new parent company of AAS, would be likely in the foreseeable future to foreclose AAS' downstream rivals on the market for TWTAs, and/or on the market for prime contracting of commercial telecommunications satellites, through discriminatory practices to be implemented by its fully-owned TED subsidiaries in their supplies of TWTs, and whether, as a result of such practices, effective competition would be significantly impeded in a substantial part of the common market.

- (254) It should first be stressed that the investigation has not focused on foreclosure strategies whereby the new entity Thales/AAS would refuse to supply TED TWTs to a rival integrator such as Tesat¹²³ or to rival satellite manufacturers, as third-party complainants broadly admit that an outright refusal to supply would be unlikely¹²⁴. Rather, what has been investigated is whether the new entity would discriminate against Tesat, so as to favour its integrated activities downstream on the market for TWTAs, and/or against satellite manufacturers so as to favour its activities on the market for telecommunications satellite prime contracting.
- (255) Secondly, it should be noted that the likelihood of input foreclosure was assessed with a focus on the pre-award stage of bidding competitions for satellite and satellite subsystems. Post-award input foreclosure strategies (essentially delays in the implementation of TWT supply agreements) appear less likely, as they would be more easily detectable (in particular, customers can require a contractual right to send resident experts to follow the production process at their supplier) and would trigger pre-defined penalty payments.
- (256) During its investigation, the Commission examined whether the new entity would be in a position to adopt various subtle cost-raising strategies within the complex procurement context described in recitals (136) to (143), as this procurement process requires back-and-forth interaction between the supplier and the customer. Such strategies could consist in not reacting in time to the integrator's or the satellite manufacturer's requests for price quotations and technical information, offering an unfavourable price, offering a less favourable delivery schedule for the TWTs, or offering a less favourable compliance list for the technical performance of the TWTs. This type of foreclosure behaviour was alleged by third parties to be particularly difficult to detect.
- (257) As regards replies to requests for quotation, it was alleged that TED would delay its replies to requests for technical information from Tesat or rival satellite manufacturers. By so doing, it would impair the ability of the new entity's rivals to participate in the back-and-forth negotiations and therefore reduce their potential to win the bid.
- (258) As regards delivery schedule, TWTs are critical path components, meaning that when their specification and delivery is delayed, the manufacturing of the satellite itself is delayed. As such, even a difference of one or two weeks in the proposed delivery of the TWTs can be an important element in winning or losing the TWTA bid. It was alleged that TED would be inclined to provide more favourable conditions to AAS for the delivery schedule of the TWTs.

¹²³ As indicated above, L3 is not dependent upon TED for the supply of TWTs. As L3 does not purchase TWTs from TED, there is no supplier/customer relationship between the two companies. Other integrators, such as Lockheed Martin and to a lesser extent Loral, have never supplied the TWTA merchant market and are in any case moving away from internal integration.

¹²⁴ This is also consistent with the case-law of Court of Justice of the European Communities in *Tetra* and *General Electric* which requires the Commission to take into account the possible deterrent effect of Article 82 of the Treaty. Indeed, the fact that the practice at stake would be clearly, or highly probably, unlawful under Article 82 of the Treaty would have an impact on the incentives of the merged entity to implement such practice. In view of the conditions prevailing in this market, an *outright* refusal to supply TWTs would be easily detectable (as opposed to a "constructive" refusal to supply TWTs by offering rivals discriminatory conditions such that the rivals would not win the bid and TED would not supply them any TWTs) and caught under Article 82.

- (259) As regards technical performance and compliance, the performance of the satellite is to a large extent conditional upon the performance of the TWTAs. TWTA suppliers try to meet the needs of satellite operators for equipment with increased performance. TWTs and EPCs are both important components of the payload, with comparable qualification processes, and the schedule for production and delivery is critical for both. However, EPC technology has already reached very high efficiency levels (currently around 94%) whereas the efficiency of TWTs (around 70%) still shows considerable potential for improvement. In that sense, the technological evolution that can be achieved in respect of TWTs is a more important differentiator than that in respect of EPCs. Third parties have alleged that TED could stipulate better technical performance for TWTs (in terms of efficiency, gain, signal linearity, etc.) in replies to requests for quotations from AAS.
- (260) Finally, with regard to pricing, TWTs are complex products which are customised and project-specific. As such, it has been alleged that TED could offer the same contractual conditions to the new entity and third parties, but provide for more favourable unwritten conditions for the new entity. According to third parties it is difficult to compare the prices of TWTs due to the large degree of customization of TWTs, which means that it would be difficult to detect such price discrimination.
- (261) The following sections will analyse the ability and incentive of the new entity to engage in input foreclosure against the background of the input foreclosure strategies described above in recitals (253) to (260). In that context, the market investigation has shown that – due to the importance of the TWTA – TWT customers already impose significant requirements with regard to the procurement process, including production capacity and technology surveys, customer identification of the TWT with elaborate test reports and the possibility for a customer to have a resident expert auditing these issues at the production plant. In addition, it appears from the market investigation that customers are highly sophisticated and can benchmark prices and supply conditions with price lists, long-term supply agreements and competing offers from L3.

D. Space segment - Impact of the merger on the TWTA market

(262) The Commission has investigated whether the new entity Thales/AAS would have the ability and incentive to discriminate against other integrators so as to favour its downstream activities on the market for TWTAs (section 1 below), and, if so, whether this would have a significant detrimental effect on effective competition on the TWTA market (section 2 below). Such foreclosure strategy would in practice be targeted at Tesat, as this is the only merchant market TWTA integrator that is not vertically-integrated into TWTs.

1. Ability and incentive of the new entity to foreclose rival TWTA integrators

(263) Successful foreclosure strategies would allow Thales/AAS to develop its activities as TWTA integrator and allow it to gain market share at the expense of Tesat. The merger would thus give Thales/AAS the incentive to further integrate downstream on the market for TWTAs so as to capture the additional margins on the EPC, LCAMP, and AIT.

(264) The Commission's in-depth investigation has however revealed that the new entity's ability and incentive to foreclose rival integrators would be seriously constrained for several reasons.

(265) First, in order to foreclose Tesat on the TWTA market, the new entity needs to have access to EPCs to integrate with its TWTs. To that effect, the market investigation has demonstrated that AAS' subsidiary ETCA only has a limited range of EPCs, [...] and is, in any case, constrained by a limited EPC and AIT production capacity.

(266) Secondly, prime contractors and satellite operators purchase conservatively and have strong preferences for the EPCs and TWTAs of Tesat and L3.

(267) Thirdly, the market investigation has revealed that margins are considerably lower at the TWTA level which is characterised by more competitive pressure than at the TWT level.

(268) Fourthly, the fact remains that – due to its 67% shareholding in AAS – Thales would only have 67% of the additional margins it would make on TWTAs (which would be integrated by AAS' subsidiary ETCA) whereas it benefits from the full margins for TWTs.

(a) ETCA's EPC product range

(269) ETCA's EPC production capabilities are essential for the assessment of the ability and incentive of the new entity to foreclose rival TWTA integrators. The Commission has therefore carried out an in-depth assessment of the current and probable future capabilities of ETCA. In particular, the Commission's case team visited ETCA's plant in Charleroi and reviewed a large number of internal documents on the company's strategy and marketing of EPCs¹²⁵. The Commission has also obtained detailed information from

¹²⁵ The majority of these internal documents of ETCA were prepared before the announcement of the proposed transaction.

the ESA, which is funding technological developments related to EPCs at ETCA and the views of other market players.

(270) ETCA's current product range and its development activities in the field of EPCs are first discussed below in recitals (272) to (286). Its production capacity and its possible expansion are then analyzed in recitals (287) to (295).

(271) ETCA evaluates its own strengths and weaknesses in the following terms:

"[...]*" ¹²⁶

(1) Current product range

(272) ETCA's current EPC product range covers only single EPCs. ETCA does not yet have a qualified dual EPC. As explained above in recital (220), dual EPCs accounted for around [50-60%]* of EPC demand in 2006 and are expected to grow to around [60-70%]* of demand. ETCA's product range thus only covers [50-60%]* of the EPC market and the share of EPC demand addressed by ETCA is declining.

(273) ETCA currently has three EPCs in its product portfolio¹²⁷: the EPC 2.1 MP (Medium Power), currently reaching the end of life stage, the EPC 3.0 MP, which was qualified at the end of 2006 and the EPC 2.1 HP (High Power). The EPC 2.1 MP and 2.1 HP are ETCA's second generation products and are considered by ETCA to be not competitive compared with Tesat's product offering in terms of [...] performance, whereas the EPC 3.0 MP is a third generation product with improved performance [...]*

(274) ETCA's EPC 2.1 MP was qualified in 1998. The product was developed by AAS with a view to maintaining a competitive alternative EPC source to L3 and Tesat. ETCA has already produced 477 EPC 2.1 MP and the EPC has a good reliability, as evidenced by limited failure in orbits. [...]*. In addition, ETCA's EPC 2.1 MP does not match Tesat's equivalent EPC product in terms of size and mass¹²⁸.

(275) At the end of 2006, ETCA qualified its third generation medium power EPC, the EPC 3.0 MP, which is optimized in terms of cost, mass, size and lead time. The EPC 3.0 MP also offers additional advantages over the EPC 2.0 MP in terms of flexibility and compatibility with TWTs. The product was qualified in 2006 for a 100 V bus and is expected to be qualified with other voltage busses in 2007.

(276) The objectives set by ETCA for the EPC 3.0 MP are for the EPC 3.0 MP to be at least equal to the competition in terms of [...] and to exceed competition in terms of [...]*

¹²⁶ Presentation [...]*

¹²⁷ Presentation [...]*

¹²⁸ [...]*

(277) ETCA's EPC 3.0 MP does not have yet sufficient flight heritage [...] and it is expected to take [...] to acquire sufficient flight heritage (end [2009-2012] at the earliest). ETCA indicates that the first flight of the EPC 3.0 MP will not occur before[...] ¹²⁹.

(278) ETCA's EPC 2.1 HP was qualified in 2000 and has a maximum output power of 220 W. Being a second generation product, the performance of ECTA's EPC 2.1 HP does not match the performance of Tesat's EPC, as evidenced in the Table 16:

Table 16

	Maximum output power in Ku band (Ka Band) in W	Maximum voltage (V)	Mass (gr)	Dimensions
ETCA EPC 2.1 HP	[...]*	[...]*	[...]*	[...]*
Tesat ATC	[...]*	[...]*	[...]*	[...]*

(279) In view of the above, it can be concluded that ETCA has a modern and competitive medium power single EPC product offering which however still lacks sufficient flight heritage, that ETCA has an older generation high power single EPC [...] (see also Section VI, B, 5, d), but which is maintained in anticipation of a third generation development, and that ETCA does not have yet a qualified dual EPC.

(2) Development plans

(280) ETCA currently has several technological and product development programmes related to EPCs¹³⁰.

(281) ETCA is developing an EPC 3.0 Dual based on the architecture of the EPC 3.0 MP which is expected to be available in [...]*. This dual EPC will supply two TWTs with an output power up to [...]*. ETCA is also developing an EPC 3.0 HP which is expected to be available in [...]* and will have an output power up to [...]*.

(282) ETCA's EPC 3.0 Dual and EPC 3.0 HP would then still need to gain in-orbit heritage, which takes a minimum of three years. This means that ETCA's dual EPCs could be commercially available as of [2012-2015]* at the earliest.

(283) The development of EPCs at ETCA is supported by ESA programmes (ARTES programmes). [...] ¹³¹ Chart 4 shows the status of each EPC product of ETCA

¹²⁹ Submission of AAS, [...]*

¹³⁰ Presentation [...]*

¹³¹ See response of AAS to question 16(c) of the request for information of 6 December 2006.

(available means a qualified product available for the commercial market, without indicating the level of flight heritage).

Chart 4

[...]*

(284) This is confirmed by ESA:

[...]*

(285) According to the Commission, ETCA's development planning described in recitals (280) to (283) and confirmed by ESA provides the most relevant time schedule for the qualification of ETCA's new EPCs, although there have been delays in [...]* development programmes in the past as indicated in ESA's assessment.

(286) In view of the above, it can be concluded that ETCA benefits from the support of ESA to develop new EPC technologies and products, and that ETCA could qualify a competitive dual EPC in [2009-2012]*, which could have acquired flight-heritage by [2012-2015]* and a competitive high power EPC in [2009-2012]*, which could have acquired flight-heritage by [2012-2015]*. It should be noted that, in the meantime, Tesat and L3, the market leaders, may have developed even more competitive EPCs (in terms of cost and performance).

(b) ETCA's EPC and TWTA production capacity

(287) ETCA's EPC production capacity and TWTA production capacity (AIT) is currently limited to around [...]* EPCs and TWTAs¹³² per year. ETCA's current production level is, however, below this level and does not exceed [...]* EPCs per year due to [...]*. ETCA's development and manufacturing of EPCs involves [...]* employees in Charleroi.

(288) Due to its lack of competitiveness, ETCA did not supply any third-party prime contractor with EPCs over the period 2004-2006 and only provided a modest share of AAS' EPC needs. Over this three-year period, AAS sourced [...]* EPCs for its satellite programmes: [...]* from ETCA [20-30%]*, [...]* from Tesat [...]* and [...]* from L3 [...]*. The fact that even AAS, ECTA's parent company, only sources [...]* EPCs from ECTA shows the lack of competitiveness of ETCA's current EPC product line.

(289) ETCA, however, plans to reach an output of [...]* units per year following the introduction of its third generation EPC 3.0 MP and a capacity of [...]* EPCs per year¹³³ following the current investment in manufacturing and test equipments¹³⁴. The

¹³² See response of AAS to question 16(a) of the request for information of 6 December 2006.

¹³³ AAS/ETCA indicates that these figures cover the sum of the three product types: EPCs alone, EPCs + AIT and TWTAs, as from a pure capacity [...]*.

¹³⁴ See response of AAS to question 16(a) and (d) of the request for information of 6 December 2006. AAS/ETCA has already invested in an increase of the production capacity [...]*.

objective is to cover the majority of AAS' needs for single EPCs and to market and supply this new generation product to third parties on an opportunistic basis. ETCA's production capacity increase is explained in its internal documents:

[...]*¹³⁵

(290) Finally, ETCA also indicates that increasing capacity above [...]* EPCs would require heavy material and human investments¹³⁶. In particular, a major obstacle to increasing the production of EPCs is the availability of qualified personnel. Any further expansion of ETCA's production capacity is, in any case, conditional upon the commercial success of its EPC 3.0 MP as well as the qualification of its EPC 3.0 Dual.

(291) ETCA provides estimates for the investment cost and the time required to further increase its EPC production capacity in Table 17¹³⁷:

Table 17

[...]*

(292) Third parties have confirmed that significant EPC and TWTA production [...]* requires significant investments (approximately EUR 10 million each) and time. Apart from such sunk costs, it is to be noted that the successful expansion of ETCA's EPC product range and the increase in its production capacity are subject to a certain level of risk and depend on the successful introduction of its new generation EPCs. ETCA experienced significant industrial and technical difficulties in the past when it introduced its second generation of EPCs [...]*¹³⁸. [...]*.

(293) [...]*¹³⁹

(294) To conclude, ETCA has a limited production capacity for EPCs ([...]* per year) but produces only [...]* EPCs per year due to the lack of competitiveness (performance and cost) of its second generation EPCs. Even AAS, its parent company, only sources one fourth of its EPC needs from ETCA. In parallel with the qualification of its more competitive third generation of EPCs, ETCA is expanding its production capacity to [...]* EPCs per year and expects to reach this level of output with a higher share of AAS' single EPC needs and occasional sales to third parties.

(295) ETCA would, however, require significant efforts to further increase its production capacity, in particular since qualified manpower is a scarce resource in the industry. The successful qualification and commercial launch of ETCA's new EPC products (dual EPC and third generation high power EPC) and the ramp-up of its EPC production is not

¹³⁵ Presentation [...]*.

¹³⁶ See response of AAS to question 16(a) of the request for information of 6 December 2006.

¹³⁷ See response of AAS to question 16 (d) of the request for information of 6 December 2006.

¹³⁸ Thales' response to the request for information of 18 January 2007.

¹³⁹ "Weekly DMSH - Application Defence – Main comments by areas / customers", 23 February 2005.

expected to take place before [...] and is subject to considerable uncertainty. Past examples show that ETCA had difficulties in developing new EPCs and increasing its production, [...].

(c) Likelihood of input foreclosure by the new entity at the TWTA level

(296) As explained in recitals (280) to (286), the vertical integration that results from the notified operation will not, in the foreseeable future, provide the new entity Thales/AAS with an internal EPC product supply that is comparable – in terms of product range, production capacity, technology, perceived quality and heritage – to that of Tesat. Beyond the time horizon for the development of ETCA's EPC capabilities, that is to say beyond [...], it becomes even more difficult for the Commission to conclude, with a sufficient degree of certainty, that foreclosure would be likely given the possible evolution of demand, technology, and the products of the various players on the market.

(297) The market investigation has shown that the limitations inherent to ETCA's EPC offering will reduce the ability and incentive of the new entity to foreclose rival integrators, and in particular Tesat, as it will be dependent on Tesat's EPCs, thereby providing Tesat with a certain degree of countervailing power.

(298) In [...], Tesat entered into a [...] framework contract with TED relating to the supply of TWTs (while TED has entered into a reciprocal [...] framework contract with Tesat relating to the supply of EPCs). The assessment of Thales/AAS' ability and incentive to foreclose Tesat is focused on the period starting after the [...] Tesat – TED mutual supply agreement that expires in [...]. Indeed, up to that date, the vast majority of Tesat's TWT needs are covered by that agreement¹⁴⁰.

(299) As a result of ETCA's limited EPC product range, the new entity Thales/AAS will have an incentive to pursue its current relationships with Tesat and to continue supplying it with TWTs.

(300) This is reflected in Thales' internal documents demonstrating TED's dependence on Tesat when competing with L3, in a context where the demand of prime contractors is moving towards more integrated TWTA products:

[...] ¹⁴¹

[...] ¹⁴²

(301) Should Thales/AAS discontinue its relations with Tesat, it would no longer have access to Tesat's EPCs, which would significantly reduce the share of the TWTA demand it can address. Indeed, in a market where all satellite manufacturers other than AAS increasingly require TWTAs, the new entity Thales/AAS would be able to offer TWTAs only where ETCA could supply the EPC (effectively less than 50% of the TWTA

¹⁴⁰ [...].

¹⁴¹ See PowerPoint presentation [...].

¹⁴² See PowerPoint presentation [...].

product range). ETCA's production capacity would also be too limited to meet a significant demand for TWTAs.

(302) In addition, even where ETCA has an EPC offering, it is by no means certain that satellite manufacturers would select the new entity's TWTAs, given that Tesat's EPCs and TWTAs (in particular Tesat's MPM product) are perceived to be of higher quality and performance by satellite manufacturers. Based on their [...]*, weaker heritage [...]*, the new entity could see demand turning to Tesat's or L3's TWTAs. In that case, the new entity Thales/AAS would not only have its TWTA offer rejected but would possibly also lose the opportunity to sell a TWT. Hence, when the new entity Thales/AAS will have no chance to secure the TWTA sale, it has no reason to foreclose Tesat.

(303) This is reflected by Thales/AAS in its internal documents:

[...] *143, [...] *144

(304) Quite apart from the new entity not being able to address a major part of the TWTA demand, Tesat could use the new entity's dependency on Tesat to threaten retaliation, if the new entity were to distort the conditions of supply of TWTs to Tesat significantly. The mere possibility of such retaliation would limit TED's incentives to discriminate in the supply of TWTs to Tesat.

(305) [A market player]* has disputed the effectiveness of such retaliation by stating that there is only one, less capable, alternative source of supply for TWTs (L3), whereas alternative sources of EPC supply are available through L3, ETCA, Lockheed Martin and NTSpace or new entrants. The market investigation does not support this claim, as it indicated that competition on the EPC merchant market is essentially limited to Tesat and L3.

(306) [This market player]* has also put forward the argument that a retaliation mechanism by Tesat would not be plausible and effective since it would be impossible for third parties to detect and verify the alleged foreclosure strategy. As regards the ability to detect a possible foreclosure strategy by the new entity, it should be noted that Tesat is a large and sophisticated customer of TED. Tesat has been purchasing TWTs in large quantities for a number of years. Tesat was in fact TED's largest customer in 2006, accounting for 30% of TED's TWT sales, and TED's second largest customer in 2005. Tesat is also a sophisticated customer of TED's TWTs. The TED-Tesat framework contract sets the terms and conditions according to which Tesat purchases TWTs from TED. In addition to the prices for base line quantities of TWT units broken down by frequency range and power output, the contract sets out the costs of the various options such as pairing of TWTs and specific requirements regarding the bandwidth of the TWTs. Apart from Tesat's acquired knowledge on price evolutions, [...] *.

(307) In addition, if Thales/AAS were to offer less competitive TWTs (either on price, delivery schedule, performance or otherwise), the main beneficiary would be L3, whose TWTA offering would be unaffected by the operation as it is not a customer for TED's

¹⁴³ ASPE is a new entrant in the EPC market, established by former Tesat employees, which has recently started developing a limited range of EPCs.

¹⁴⁴ See e-mail [...] *

TWTs (or ETCA's EPCs for that matter). Confronted with a "foreclosed" Tesat, it is likely that satellite manufacturers would prefer the TWTA offer of L3 rather than the new entity's TWTA which has limited heritage and perceived poorer performance. While it is correct that L3 does not have an offering for all frequency/power combinations, the TWTA range covered with ETCA's EPC range is much smaller than that covered with L3's TWT range.

(308) In light of the constraints described above, the likelihood of the new entity engaging in input foreclosure, through subtle forms of discrimination or otherwise, requires a detailed analysis that takes account of the various input components of the TWTA, and the prime contractor's potential preference for the TWTA suppliers that are active on the market.

(1) Request for a TWTA integrating a dual EPC

(309) The majority of customers request dual EPCs to power TWTs. Dual EPCs are preferred because they provide benefits in terms of cost (a dual EPC costs only 25%-30% more than a single EPC) and in terms of mass reduction, which is important given that 30 to 60 TWTs need to be powered on a satellite. (See Section VI, B, 5, d).

(310) ETCA currently has no dual EPC product offering, and is not expected to have such a product with the required space heritage prior to [2012-2015]* at the earliest (See Section VI, D, 1, a). This implies that until [2012-2015]*, the new entity will not be able to compete with Tesat and L3 for at least 50% of the overall TWTA demand. Given that the new entity has no offering in this market segment, it will not have an incentive to foreclose its main customer from a competitive TWT offering.

(311) As noted in recital (220), dual EPCs are overall the main – and growing – segment of the market, accounting for 50% of the TWTA market and forecast to grow to 70% in the near future. The Commission's has also checked whether the demand for dual EPCs varies according to the TWT frequencies and power requirements. As shown in Table 18¹⁴⁵, dual EPC demand is significantly below the 50% market average for the S-band and X-band frequencies. However, L3 has a competitive TWT offering for S-band and X-band and X-band is not frequently used in the commercial market. By contrast, dual EPC demand is above the 50% market average for the L-band and Ka-band frequencies. While L3 is not yet a credible alternative to TED for these two frequency bands, the fact that ETCA does not currently have a dual EPC contributes to significantly reducing the likelihood of foreclosure in these market segments.

¹⁴⁵ Calculation of demand for single versus dual EPCs based on the configuration of commercial satellites ordered between 2001 and 2006. Information compiled by the Commission on the basis of data from EADS/Tesat, TED, AAS, Boeing, Lockheed Martin, Loral and L3.

Table 18

Ratio demand for Single / Dual EPCs	Single	Dual
overall	50%	50%
S-band	70%	30%
L-band	45%	55%
C-band medium power	49%	51%
C-band high power	37%	63%
Ku-band medium power	49%	51%
Ku-band high power	59%	41%
Ka-band medium power	34%	66%
Ka-band high power	39%	61%
X-band	75%	25%

(312)[A market player]* argues that the new entity would be able to procure EPCs from L3. However, this claim disregards the fact that the new entity would be a direct competitor of L3 at the integrator level when L3 has a TWT offer for the required frequency. The market investigation has indicated that L3 would have no incentive to supply the new entity directly with EPCs when they are in competition for the TWTA. [...]***¹⁴⁶. The only situation in which L3 would be inclined to supply the EPC and AIT, would be at the request of the satellite manufacturer, whereby the TWT is supplied CFE to L3. There would in any event not be any risk of foreclosure on the TWTA market in such case, as no TWTA would be sold, but L3 would sell an EPC and AIT.

(313)It can be concluded that – with regard to TWTAs using dual EPCs – the new entity Thales/AAS would not be able to start to engage in an input foreclosure strategy before [2012-2015]* at the earliest when it will have qualified a dual EPC and have obtained the requisite space heritage for its dual EPCs.

(2) Request for a TWTA integrating a single EPC

(314)Approximately 50% of TWTAs include single EPCs, and for this part of the market ETCA has an EPC on offer. As indicated in recital (136), as a general rule, the choice of the TWTA supplier is the sole responsibility of the satellite prime contractor. Accordingly, in order to assess the new entity's ability and incentive to foreclose Tesat, the preference of the satellite manufacturer with regard to the supplier of the EPC/TWTA must be taken into account.

(315)As indicated in recital (278), ETCA's high power EPC (EPC 2.1 HP) is a second generation product that does not match the performance of Tesat's and L3's EPCs [...]*. Although it could be concluded on this basis that ETCA's high power offer is not competitive, the Commission takes a conservative view and considers that, as regards competition at the integrator level, ETCA's high power offer is equal to that of its competitors. As preferences are considered from the point of view of the prime contractor, AAS' preference for internal sourcing could prevail over the intrinsic profitability of ETCA's high power EPC.

¹⁴⁶ [...]***.

- (i) Prime contractors with a preference for the TWTA supplier (Astrium, AAS and Orbital)

- (316) Analysis of the satellite platforms (period 2001 – 2006) for which Astrium was selected as the satellite prime contractor shows that Astrium has a preference for Tesat as the TWTA supplier in order to maximise EADS content on the payload.
- (317) The merger is not likely to bring any change to the ability of Tesat to continue to supply TWTAs to Astrium. Indeed, when Astrium steers the TWTA procurement, both L3 and Thales/AAS know that Astrium will have a substantial preference for Tesat to supply the TWTA. This is evidenced by L3's reply to the market investigation, stating that "*[f]or instance, we will sell TWTs to Tesat directly when those TWTs are used on an Astrium satellite as that is likely our own opportunity for content on an Astrium satellite. We will selectively sell TWTs to a prime contractor for them to furnish to another EPC supplier and TWTA integrator when that customer makes it clear that the TWT only is our only opportunity for participation. We generally do not bid TWTs only to a customer when we believe we still have an opportunity to sell the entire TWTA.*"¹⁴⁷
- (318) While the preferred option of the new entity and of L3 would be to sell integrated TWTA to Tesat, they are not likely to be able to make Astrium switch to their TWTA product offering. As a result, L3 will continue to supply TWTs to Tesat. In order not to lose Tesat as a customer to L3, the new entity will be forced to continue competing with L3 in order to supply Tesat with TWTs. On the basis of the Commission's calculations, Astrium's historic market share for the period 2001 – 2006 accounts for [9.6%]*.
- (319) For the same reasons, the merger will also not change the TWT market conditions for customers who have a preference for the TWTA products of L3. For these customers, in particular Orbital, the merger will not change TED's incentive to revert to Tesat to offer the best TWT/EPC combination, to compete with L3's integrated TWTAs and have the best chances to sell its TWTs. On the vast majority of its satellites¹⁴⁸, Orbital has selected L3 as the TWTA supplier. [...]*. It can therefore be concluded that Orbital selects L3 as its TWTA supplier whenever it can. On the basis of the Commission's calculations, Orbital's historic market share for the period 2001-2006 amounts to [0-5%]*.
- (320) As before the proposed operation, AAS will continue to select ETCA as its TWTA supplier whenever ETCA has competitive products. Based on an analysis of the satellite platforms (period 2001-2006) for which AAS was selected as the satellite prime contractor, it can be concluded that AAS has a policy of sourcing components separately and on the basis of a make-or-buy decision. AAS had pre-merger EPC/TWTA/LCAMP capabilities and based its TWTA sourcing decision on price, performance and its strategic policy of maintaining a viable production capability in-house. Post-merger, the new entity will be in a position to integrate its own TWTs and EPCs in cases where it has an EPC product offering at a price equal to that of Tesat. In order to gain increased

¹⁴⁷ L3's response to question 66(iii) of the request for information of 22 December 2006.

¹⁴⁸ BSAT 2C, MEASAT 1 R, PAS-11, Galaxy 12, Galaxy 15, Telkom 2, OPTUS D1, OPTUS D2, Thor II-R and NSS 9.

space heritage for its EPCs, Thales/AAS may be willing to source EPCs internally at a price in excess of that of Tesat on certain occasions.

- (321) The remainder of AAS' demand (for TWTAs integrating single EPCs that ETCA cannot supply because of capacity problems or difficulties in meeting delivery schedules) will continue to be addressed by either Tesat or L3. Tesat is likely to remain an important supplier of TWTAs to AAS, especially taking into account that Tesat's EPCs/TWTAs have superior flight heritage, Tesat is likely to offer better pricing to AAS as it benefits from economies of scale and technological improvements, Tesat is more likely to meet AAS' schedule requirements for delivering the EPCs/TWTAs in time in case of peak demand or a high number of channels on big satellites that need to be powered (as ETCA faces capacity constraints), and Tesat has unrivalled capabilities with regard to system integration as it is the only supplier of integrated MPMs. All these factors can be important for AAS to win the platform competition.
- (322) In short, it can be expected that AAS will continue to source its TWTAs competitively to obtain the optimal subsystem in terms of price, performance and delivery schedule. Pre-merger, AAS already had the incentive to source TWTAs or EPCs from ETCA whenever they were competitive, to support its subsidiary production and integration capabilities in this field. Pre-merger, AAS also had the incentive to source EPCs and TWTAs from Tesat and L3 whenever their subsystems were more competitive than ETCA's (due to ETCA's limited economies of scale and scarce production capacities) and could provide AAS with a competitive advantage at the prime contracting level. The proposed operation is unlikely to change AAS' TWTA procurement policy to a significant extent in this respect.
- (323) On the basis of the Commission's calculations, AAS' historic market share for the period 2001-2006 amounts to [15-20%]*.
- (324) It can therefore be concluded that in the vast majority of cases where AAS, Astrium or Orbital is the satellite manufacturer, that is to say a market segment representing [30-35%]* for the period 2001-2006 in terms of historic market shares of these prime contractors, the new entity will not have the ability and incentive to foreclose Tesat. This market segment is even larger in terms of collective TWT(A) demand of these prime contractors, namely [40-45%]* over the period 2001-2006.
- (ii) Prime contractors without any preference (Boeing, Lockheed Martin, Loral and smaller non-US competitors)
- (325) Boeing, Lockheed Martin and Loral currently buy TWTAs from either Tesat or L3 and base their procurement decision on availability of the required TWT (in terms of product range), price, flight heritage, production capacity and delivery schedule, possible preference for integrated (MPM) design, and possible commonality effects that result from previous satellite platforms on which the TWTA of a given supplier was already installed. Post-merger, the new entity Thales/AAS will be a vertically-integrated TWTA supplier that could compete with Tesat and L3 in as far as the satellite manufacturer's requirements are based on a single EPC design.
- (326) If the satellite manufacturer's TWTA demand is based on a TWT that both L3 and TED can supply, the likelihood of foreclosure is limited. The new entity would have no incentive to foreclose Tesat from access to a competitive TWT input since it is unlikely

to win against L3's superior TWTA offering in terms of perceived quality, cost, production capacity and flight heritage. Given that L3 produces its own TWTs, the new entity would in that case not only lose the TWTA competition but also the possibility to sell TWTs.

(327) As indicated in recitals (287) to (295), the new entity Thales/AAS currently has a production capacity of EPCs that is significantly inferior to that of Tesat and L3, and which is, to a certain extent, already reserved for AAS satellites. The rational strategy for the new entity would likely be to remain an independent supplier of TWTs to Tesat and to try to win carefully selected TWTA competitions in order to increase the space heritage of its EPCs/TWTAs. While the new entity could try to win the TWTA competition by lowering its price (in practice cross-subsidising the EPC/AIT with its margin on TWTs) it will be restrained by both Tesat and L3 in terms of production capacity, delivery schedule requirements and costs (as Tesat and L3 are likely to have a superior EPC/TWTA cost structure due to economies of scale).

(328) If the satellite manufacturer's TWTA demand is based on a TWT that only the TED can supply, the likelihood of foreclosure increases. Indeed, the absence of L3's competitive constraint increases the likelihood that TED would no longer supply Tesat with L-band, Ka-band or high power Ku-band TWTs in order to become the only supplier of such TWTAs. Such input foreclosure strategy would, in addition, increase ETCA's space heritage and provide a rationale for increasing production capacity. As a result, for these frequencies, the new entity Thales/AAS would replace Tesat as the sole supplier of TWTs.

(329) However, as indicated by the market investigation, even when satellite prime manufacturers have no clear preference for a given TWTA integrator, they are likely to avoid a single sourcing situation whereby the sole TWTA supplier is also the only TWT supplier. Indeed, satellite manufacturers would be inclined to support L3 in obtaining the space heritage that it is currently missing for some Ka-band, Ku-band and L-band frequencies.

(330) In any event, foreclosure of Tesat as a TWTA supplier is not possible prior to December 2008, and by that time, L3 would already be in a position to gain part of the required space heritage on the frequencies where it has no readily available TWT offering. Also, prime manufacturers could define the TWTA requirements in such a way that Thales/AAS would not be able to compete with Tesat for the supply of the TWTA. For the satellite manufacturer it would suffice to require a dual EPC to eliminate the new entity's ability and incentive to foreclose.

(331) On the basis of the Commission's calculations, the historic market share of prime contractors without any TWTA supplier preference for the period 2001-2006 amounts to [65-70%]*. In terms of TWT(A) demand, this market segment accounts for [55-60%]*.

(iii) Prime contracts subject to ITAR restrictions

(332) A specific segment of the market relates to satellite competitions which are affected by ITAR restrictions. Indeed, in such cases, L3 is not a competitive constraint to TED and Tesat for as long as ITAR restrictions prevent it from supplying TWT(A)s. On this market segment, foreclosure is most likely to occur. The new entity would have a strong incentive to foreclose Tesat from TWT input at competitive conditions in order to

become the only supplier of TWTAs on this market segment. In this market segment, the new entity is also not likely to face L3 or a new entrant¹⁴⁹.

(333) This market segment is in any case limited. On the basis of the Commission's calculations, satellite manufacturers (including Astrium and AAS) supplying satellites to operators in ITAR-restricted countries account for around [5-10%]* of the market in volume (based on the historic market shares for the period 2001-2006). In terms of TWT(A) demand, this market segment accounts for [5-10%]*. It should be noted that the customers on these market segments are satellite operators in ITAR countries, which are outside the EEA.

(d) Comparative margins on TWTs and TWTAs and partial integration of Thales and AAS

(334) As to the question whether the merger will provide the new entity with the incentive to foreclose Tesat from TWT input at competitive conditions in order to favor its integration downstream on the market for TWTAs, it should be noted that margins are currently significantly lower at the TWTA level (which is more competitive) than at the TWT level¹⁵⁰, and this in itself does not provide the new entity Thales/AAS with an incentive to integrate downstream. In order for the new entity to establish itself on the TWTA market, it would need to compete with the existing market players Tesat and L3 on price, which would further reduce the margins that the new entity would be able to extract downstream.

(335) In addition, Thales would only obtain 67% of any additional margin on TWTAs which are integrated by ETCA (to the extent of its 67% shareholding in AAS) as compared to 100% of the margins on TWTs.

(e) Conclusion on ability and incentive of the new entity to foreclose at the TWTA level

(336) The foregoing analysis of the new entity's ability and incentive to foreclose has been quantified on the basis of the relative weight of the different market segments. The outcome is indicated in Table 19, which indicates the weight of each market segment (percentage in the cell) and the likelihood of input foreclosure (shading of the cell):

¹⁴⁹ As explained above, foreclosure would however not be possible, also for prime contracts subject to ITAR restrictions, when the prime contractor requires dual EPCs. In that case, the new entity would not have a TWTA offering or would have to purchase an EPC from Tesat and would therefore not have the ability and incentive to foreclose Tesat from a competitive TWT offering.

¹⁵⁰ Average sales margins are [...] for TED's TWTs [...].*

Table 19

Impact on the TWTA market							
Market segments	Volume market	Medium power Ku-band. All C-band, X-band and S-band		High Power Ku-band (with HP EPC)		Ka-band, L-band	
		Single EPC	Dual EPC	Single EPC	Dual EPC	Single EPC	Dual EPC
Primes with L3/Tesat preference (Orbital/Astrium)	[10-15%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*
Primes with no preference	[65-70%]*	[20-25%]*	[15-20%]*	[0-5%]*	[0-5%]*	[5-10%]*	[10-15%]*
Prime with ETCA preference (AAS)	[15-20%]*	[5-10%]*	[5-10%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*
Prime contracts for ITAR countries (AAS/Astrium/Others)	[5-10%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*
Total market	100%	[30-35%]*	[25-30%]*	[5-10%]*	[0-5%]*	[5-10%]*	[10-15%]*
Possible	[10-15%]*						
Likely	[0-5%]*						

(337) An assessment market segment by market segment shows that foreclosure is more likely for some market segments that are ITAR-restricted [...]*, and notably for the ITAR-restricted segments where the new entity is active (single EPC) and where it currently does not face L3 as an alternative source of supply (high power Ku-band, L-band and Ka-band). Foreclosure is also more likely when ETCA can meet AAS' demand. All in all, foreclosure is likely for [0-5%]* of the TWTA market. The customers on some of these market segments are satellite operators in ITAR countries, which are outside of the EEA.

(338) Table 19 also shows that foreclosure is possible but not to such a degree as to consider that it would be likely for those market segments where the new entity is active (single EPC) and does not currently face competitive constraint from L3 (high power Ku-band, L-band and Ka-band) although L3 could become a competitive constraint in the future. These market segments altogether represent [10-15%]* of the TWTA market.

(339) Finally, Table 19 shows that there is no possibility for foreclosure on the market segments where dual EPCs are used, or on the market segment where single EPCs are used but where L3 is a competitive constraint or where satellite manufacturers have a strong preference for L3 or Tesat. This represents the vast majority of the TWTA market (more than [80-85%]*). The single EPC market segment with an AAS preference for ETCA is assumed by the Commission to represent current demand for ETCA's products.

(340) Finally, the Commission notes that the impact of the merger cannot be assessed entirely independently on these various market segments. The [...]* level of TED margins at the TWT level, the supplier/customer relationships, the high degree of interdependence between the main players at the TWTA level (principally between TED and Tesat) and the resulting possibility of retaliation across the different market segments by Tesat further reduce the ability and the economic incentive of the new entity to foreclose its TWTA rivals on all market segments.

2. *Significance of the impact on effective competition*

- (341) Based on the quantitative assessment in recitals (336) to (340), it is estimated that an input foreclosure strategy by the new entity Thales/AAS would allow it to capture [0-5%]* of the TWTA market immediately with relatively high probability (some of the ITAR-restricted markets segments). For [10-15%]* of the TWTA market such a scenario can also be considered as possible although not very likely. In order to capture this part of the TWTA market, Thales/AAS would need to improve its reputation as a [...] TWTA supplier capable of meeting satellite manufacturers' [...] requirements and [...]*, which would require significant investments. In addition, the new entity could face a possible alternative product offering in these segments by L3. L3 also enjoys a competitive advantage as a result of being fully vertically-integrated and being an established player at all levels (TWT, EPC and TWTA). Under such conditions, it does not appear that the new entity would have the ability and incentive to foreclose. Rather, it can be considered that the new entity will continue to prefer selling its TWTs with the associated [...] margins to integrators rather than run the risk that satellite manufacturers increasingly turn to L3.
- (342) In any event, the entry of Thales/AAS on (this part of) the TWTA market in the near future - which was, until now, divided between Tesat and L3 - would increase the number of credible competitors on the market from 2 to 3, thereby increasing competition.
- (343) In contrast, additional foreclosure on the remaining part of the TWTA market does not appear to be likely as it would only be possible to start such a strategy if and when the new entity Thales/AAS obtains an EPC product range that is comparable to Tesat's and L3's product range (that is to say, around [...]*) and it would then still need to be successful over time by leading to the marginalisation of Tesat¹⁵¹.

3. *Conclusion*

- (344) On the basis of the above, it can be concluded that the concentration would not significantly impede competition on the market for TWTAs.

E. Space segment - Impact of the merger on the market for commercial telecommunications satellites

- (345) The Commission has also investigated whether the new entity Thales/AAS would have the ability and incentive to discriminate against other satellite manufacturers so as to favour its downstream activities as a satellite prime contractor (Section 1), leading to a significant detrimental effect on effective competition on the market for commercial telecommunications satellites (Section 2).

¹⁵¹ Assuming that Thales/AAS' input foreclosure strategy would become successful over time and that, in the worst case scenario, it would eventually lead to Tesat's exit from the TWTA market (which is unlikely in the foreseeable future), there would still remain two players on this market as is the case pre-merger (one of the current two TWTA supplier is also already vertically-integrated with a satellite prime contractor, as Tesat belongs to the Astrium group). The merger would therefore not lead to any change for TWTA/MPM customers compared to the pre-merger situation.

(346) In addition, the Commission has examined the concerns expressed by a satellite prime contractor as regards the risk that, through TED, AAS would gain access to confidential information on its rivals' bids, which it could use to its advantage in prime competitions (Section 3).

1. Ability and incentive of the new entity to foreclose

(a) Introduction

(347) Post-merger, the prime contractor AAS will become jointly-controlled by Thales, whose subsidiaries TED are the leading supplier of TWTs. The Commission has investigated whether the new entity would have the ability and incentive to discriminate against other prime contractors for the supply of TWTs in order to gain an advantage against them in the bidding process in the competitive market for commercial satellite prime contracting.

(348) Such input foreclosure strategy would take place at the pre-award stage to distort the satellite bidding process in favour of AAS. Since TWTs are key satellite subsystems that have a decisive influence on the overall performance of telecommunications satellites, the objective of such strategy would be to increase the competitiveness of AAS' satellite bids compared to its rival prime contractors by providing them with a less attractive TWT proposal for example through delayed reaction to requests for quotations and technical proposals, less favourable pricing, less favourable delivery schedules, and/or inferior technical performance /compliance of the TWT.

(349) If successful, such foreclosure strategies could allow AAS to increase its market share (and gain additional margins) on the market for commercial telecommunications satellites, at the expense of rival satellite prime contractors since AAS' rivals would no longer be able to obtain competitive TWTs. This could thus impair their competitiveness at the prime contracting level.

(350) It is important to stress that any foreclosure strategy would need to combine several ways to decrease the competitiveness of TED's TWT offer (See Section VI, C) and that a simple increase in the price of TWTs would most likely not be sufficient to distort competition at the prime contracting level. Since the TWT accounts for 40% of the TWTA cost (the EPC accounts for 40% and the AIT accounts for 20% of the total TWTA cost), Tesat could already absorb TWT price increases from its own margin. In other words, a price increase of, for example, 10% for TWTs would have no impact on Astrium's ability to compete at the prime level. Even if Tesat were not able to absorb price increases, owing to the input cost that these products represent in the overall price of the satellite (3% to 5%), price increases would need to be very substantial - and thus detectable - before they could materially affect the ability of Astrium to compete in the downstream markets.

(351) The ability and incentive of the new entity to carry out such a foreclosure strategy at the prime contracting level is necessarily linked to the market situation at the intermediate level of TWTAs.

(352) Most prime contractors increasingly purchase TWTAs (in particular TWTA+s) instead of sourcing TWTs directly for integration with their own EPCs or for integration by a third party integrator. The procurement of TWTA+ subsystems (instead of LCAMPs

and TWTAs or EPCs and TWTs as separate equipment), is perceived by prime contractors as bringing advantages in terms of simplification and risk mitigation¹⁵² (See Section VI, B, 2).

- (353) Therefore, a foreclosure strategy at the prime contracting level would be highly dependent on the new entity's ability and incentive to engage in an input foreclosure to successfully foreclose its rivals at the TWTA level. However, for the reasons stated in Section D, the effectiveness of a similar foreclosure strategy at the upstream TWTA level is very unlikely and, if it were to occur, would most likely result in an increase in the degree of competition at the TWTA level in the short to medium term with the development of the new entity as a more credible supplier of TWTAs in competition with Tesat and L3. As long as the TWTA market is likely to remain as competitive as it is prior to the merger, with two leading players (Tesat and L3) and smaller players (ECTA), prime contractors will have access to alternative TWTA suppliers and will be in a position to compete on a level-playing field at the prime contracting level. This, in itself, strongly suggests that an input foreclosure strategy relating to the direct supplies of TWTs to prime contractors is not likely and could not be effective.
- (354) Finally, it is worth noting that the proposed operation will in fact place Thales/AAS in the same position as regards competition on the prime satellite market as Astrium/Tesat was in prior to the operation.
- (355) Tesat is a leading TWTA supplier and it has been solely-controlled since the end of 2001 by Astrium, a satellite prime contractor. As explained in recitals (145) to (158), most prime contractors purchase TWTAs (and there has been an increasing trend to procure integrated TWT products in recent years). Prime contractors do not therefore deal with the TWT supplier at all, but request an offer from a TWTA integrator before making a bid for the prime contract. The TWTA performance and delivery schedule is then crucial for the competitiveness of the prime contractor's bid.
- (356) The fact that there has been no allegation that Astrium has engaged in an input foreclosure strategy for TWTAs (through its control of Tesat) so as to gain advantages in prime contracting bids in the past shows that this strategy is unlikely post-merger and there is no incentive for such a strategy, especially in a space industry characterized by complex interdependences.
- (357) In addition, the new entity's position on the prime market is more indirect than that of Astrium/Tesat because TED is only a sister company of AAS (while Tesat is owned by Astrium) and because TWTA is the direct input for the prime contractor (while TED only supplies the TWT which is further upstream and needs to be further integrated with an EPC before its integration on the satellite payload) and is partial (as Thales will own 67% of AAS while Tesat is wholly-owned by Astrium).

(b) Segmentation of the market

- (358) In order to ensure a thorough and exhaustive investigation, the Commission has nonetheless assessed the ability and incentive of the new entity to foreclose rival prime contractors post-merger, assuming that such foreclosure would be independent of the

¹⁵² See Thales/Finmeccanica response to question 20 to the request for information of 5 December 2006 (drivers behind increasing demand for integrated TWT-based products)

success of an input foreclosure strategy at the TWTA level. As for the integration level, the Commission has carried out this assessment at the prime contracting level on the basis of the various market segments, taking into account the different competitive conditions in order to envisage all the different foreclosure scenarios. Market segments need to be defined at the TWT level, at the EPC level and at the prime contracting level.

(359) There are certain categories of TWTs for which TED is the only supplier (L-band, HP Ku-band and Ka-band) and other categories where L3 represents an important competitive constraint (S-band, C-band, MP Ku-band and X-band). The new entity's ability and incentive to foreclose its rival prime contractors is obviously higher for the TWT categories where L3 is not present.

(360) With respect to EPCs, ETCA's product range only covers single EPCs and its high power EPC is an older generation model. The new entity's ability and incentive to foreclose rival prime contractors is higher for satellite programmes which include EPCs where ETCA has a competitive product since for the other satellite programmes ETCA has to source an EPC from Tesat or L3.

(361) The new entity's ability and incentive to engage in input foreclosure also depends on the market positioning of the different prime contractors, which may depend ultimately on the possible preferences of satellite operators. All things being equal, the new entity has a greater ability and incentive to foreclose its rival prime contractors when AAS is already the satellite operator's preferred option since the chances that this foreclosure strategy is successful (namely that AAS wins the bid) are higher. In contrast, when competition takes place among all prime contractors or whenever AAS is not the satellite operators' preferred choice, the chances of success of the input foreclosure strategy, and hence the incentive to carry out such strategy, are lower.

(362) Accordingly, several cases must be distinguished:

- (a) competition between all prime contractors (the satellite operator does not have a specific preference for any satellite prime contractor);
- (b) competition where the satellite operator has a preference for a European prime contractor (Eutelsat for instance); and
- (c) competition limited to the two European prime contractors (AAS and Astrium) because of U.S. ITAR restrictions (for operators in China and Arab countries).

(363) Each of these combinations will be assessed in turn in order to establish the market segment(s) on which the new entity may have the ability and the incentive to engage in an input foreclosure strategy.

(1) TWT segments

- (a) *Market segments where L3 has a qualified TWT with sufficient flight heritage ([70-80%]* of the market)*

(364) In market segments where L3 has a qualified TWT with sufficient flight heritage, in order to win the prime competition, AAS would need to have an overall bid that was more competitive than that of rival prime contractors' (strategy of raising rivals' costs).

The objective of the input foreclosure strategy would be to achieve this result by discriminating against rival prime contractors in the supply of the TWTs.

- (365) First, in this market segment, AAS' rival prime contractors are in a position to source TWTs and TWTAs from L3, which has a competitive product offering. If it were to discriminate against its rivals, the new entity would risk losing the TWT bids against L3 since rival prime contractors are likely to select L3's more competitive TWT bids.
- (366) Secondly, even if the new entity accepted the risk of losing the TWT bids, it would not be able to make AAS' prime contracting bid much more competitive than the rival bids. AAS' bid would include TWTs from TED and its rival prime contractors' prime contracting bids would include TWTs either from L3 (if TED's TWT bids were not sufficiently competitive) or from TED (if its TWT bids were still sufficiently competitive). Given that L3's TWTs are competitive in these market segments, the input foreclosure strategy is not likely to be successful.
- (367) Thirdly, TWTs are only a part of the satellite bid, and the best bid is not necessarily the one with the best TWTs. As other satellite manufacturer parameters (track record, failure rate), and components that drive the performance of the satellite (antenna, software, etc.) are also important factors in selecting a bid, the outcome of a foreclosure strategy is uncertain.
- (368) In view of the above, it can be concluded that the new entity's ability and incentive to carry out an input foreclosure strategy for TWTs are generally limited in all market segments where L3 has a qualified TWT with sufficient flight heritage. These market segments account for [70-80%]* of the overall TWT market. The type of EPCs and the preferences of satellite operators should however also be taken into account.

(b) Market segments where L3 does not have a qualified TWT with sufficient flight heritage ([20-30%] of the market)*

- (369) In market segments where L3 does not have a qualified TWT with sufficient flight heritage, TED is the only supplier of TWTs. The ability and incentive of the new entity to foreclose its rivals are therefore important since rival prime contractors have to purchase the TWTs from TED in any event.
- (370) The only element that could mitigate the new entity's incentive to implement such a foreclosure strategy is the risk that satellite prime contractors actively sponsor L3 in qualifying frequency bands for which it has currently no offering. L3 has the competence and expertise to develop such TWTs and is already at an advanced stage of development in respect of certain of these frequency bands. If the new entity systematically discriminates against its rival prime contractors in these market segments, L3 may, with the support of prime contractors, accelerate the development and qualification of its TWTs for these frequency bands. It should, however, be recognized that entry barriers are relatively high for the development and qualification of TWTs in new frequency bands.
- (371) In addition, AAS' rival prime contractors might threaten to increase their purchases of TWTs from L3 in other frequency bands (where L3 has a TWT offering) if the new entity were to carry out such foreclosure strategies in the market segments where L3

does not yet have a qualified TWT with sufficient heritage. The credibility of such a threat could, however, be limited by L3's production capacity. This countervailing power of prime contractors vis-à-vis the new entity therefore seriously restricts the new entity's ability and incentive to foreclose its rivals in all market segments, including those where L3 does not have a qualified TWT with sufficient flight heritage.

(372) Despite these countervailing factors, and with a view to carrying out a conservative assessment, the ability and incentive of the new entity to engage in a foreclosure strategy can be considered as relatively high in the TWT market segments where L3 is absent. The type of EPCs and the preferences of satellite operators should, however, also be taken into account.

(2) EPC segments

(a) Market segments where ETCA does not have a qualified EPC with sufficient flight heritage (50% of the market)

(373) ETCA does not currently have a dual/high power EPC available and ETCA is not expected to have a dual EPC or a competitive high power EPC with sufficient flight heritage before [2012-2015]* (assuming that it successfully completes the qualification of these EPCs). In these market segments, AAS would have two options for the EPCs in its satellite bid: either include its single EPCs or source dual EPCs or high-power EPCs from Tesat or from L3.

(374) The first option would not allow the new entity to present a more competitive prime contracting bid than that of its rival prime contractors. As explained above (see recital 215), dual EPCs offer significant benefits in terms of size, mass and cost as compared to single EPCs. By proposing single EPCs, AAS would put itself at a considerable competitive disadvantage compared to other prime contractors that propose dual EPCs from Tesat or L3.

(375) The second option would also significantly limit the new entity's ability and incentive to foreclose rival prime contractors. If it were to source the EPCs from Tesat, AAS would not have the ability and incentive to foreclose Astrium, which is Tesat's parent company, since it would rely on Tesat for a key subsystem of its satellite bid. In these circumstances, Astrium would have significant retaliation power vis-à-vis AAS and the two companies would be mutually dependent, AAS for EPCs and Astrium for TWTs. If Astrium considered that TED' TWT bids were no longer competitive, it would have the possibility to make its EPC bids to AAS similarly unattractive. Neither the new entity nor Astrium would benefit from such a situation. This mutual interdependency would create an equilibrium with no incentive for the new entity to carry out an input foreclosure strategy.

(376) As to the possibility of AAS sourcing its EPCs from L3, it should be noted that AAS has procured only a limited number of EPCs from L3 in the past 7 years. It has sourced [...] EPCs from L3 since 1999, which account for only [10-20%]* of the total number of EPCs procured by AAS over the period ([...] EPCs). In addition, this would require AAS to supply L3 with the TWT on a CFE basis, assuming responsibility for the TWTs. That would go against the market evolution towards integrated TWTA demand. In any event, it is unlikely that the new entity would implement a strategy to foreclose rival

prime contractors in the market segments where it is itself dependent upon its main TWT competitor.

(377) In view of the above, it can be concluded that the new entity's ability and incentive to foreclose rival prime contractors in all market segments where it does not have a qualified EPC with sufficient flight heritage are generally low. The type of TWTs and the preferences of satellite operators should however also be taken into account.

(b) Market segments where ETCA has a qualified and competitive EPC (50% of the market)

(378) In the segment of medium power EPCs, ECTA's second generation product has flight heritage but is uncompetitive in terms of mass, size and cost. ETCA has recently qualified a third generation medium power EPC, which is more competitive, although it has not yet acquired any flight heritage.

(379) In these market segments, the key parameter to assess whether the new entity would have the ability and incentive to foreclose rival integrators is the competitiveness and the reputation of ECTA's EPCs. Assuming that AAS' rivals could source TWTs from L3, the relevant question is whether an AAS prime contracting bid with ECTA EPCs and TED TWTs can be more competitive than bids of AAS' rivals with Tesat or L3 EPCs and L3 TWTs or TED TWTs (supplied at less competitive conditions). In the light of the prime contractors' views on ETCA, the AAS bid will be less competitive in terms of EPCs while it may be equally or more competitive in terms of TWTs compared to a bid integrating a TWT from L3. It is therefore not obvious that this foreclosure strategy will be successful, in particular since ETCA's 3.0 MP EPCs still lack flight heritage.

(380) In view of the above, it can be concluded that the new entity's ability and incentive to foreclose its rival prime contractors in all the market segments where ETCA has a qualified and competitive EPC are generally moderate and the assessment needs to be refined according to the type of TWTs and the preferences of satellite operators.

(3) Satellite operator segments

(a) Market segments where satellite operators do not have a preference for the prime contractor ([80-90%] of the market)*

(381) Whenever satellite operators do not have any preference for the satellite prime contractor, competition at the prime contracting level takes place among all satellite prime contractors, including Boeing, Lockheed Martin, Loral, Orbital, AAS, Astrium and potentially other prime contractors. In order to win the prime competition, AAS must make a proposal that is more competitive than the bids of all the other prime contractors. However, it is difficult for the new entity to evaluate whether a foreclosure strategy for TWTs will make its offer decisively more competitive. The competitiveness of a satellite prime contracting offer depends on a wide range of subsystems, including but not limited to TWT-related subsystems, and the optimization of their integration to achieve the best performance for the satellite (see for instance the other subsystems for which AAS and EADS hold leading positions in recital (128)). If the new entity cannot reasonably assume that its foreclosure strategy will be successful, it does not have the incentive to implement such a strategy since it will certainly result in lower TWT sales

only to achieve uncertain gains at the prime level. Once again, it should be stressed that margins are substantially higher at the TWT level (around [...] for TED) than at the much more competitive prime contracting level (between [0-10%]*).

- (382) Becoming more competitive than all other prime contractors through TWT input foreclosure will be even more difficult for satellite programmes which are a follow-up of previous satellite programmes awarded to other prime contractors. In such cases, satellite operators have a preference for a prime contractor other than AAS and the chances of success of the foreclosure strategy are therefore even lower.
- (383) In view of the above, it can be concluded that the new entity's ability and incentive to foreclose rival prime contractors in all the market segments where satellite operators do not have a preference for the prime contractor are generally low to moderate and depend to a large extent on the type of TWTs and the type of EPCs.

(b) Market segments where satellite operators have a European preference for the prime contractor ([10-20%] of the market)*

- (384) Certain satellite operators, such as Eutelsat, have historically had a preference for European satellite prime contractors and have with few exceptions purchased Astrium or AAS satellites in the past five years (2001-2006). Although these satellite operators issue competitive requests for bids and make use of competition at the prime contracting level, they are more familiar with AAS and Astrium and competition therefore takes place essentially between AAS and Astrium at the satellite prime contracting level. These satellite operators are, however, not subject to ITAR restrictions and the satellite may thus include U.S. content for TWTs and EPCs (such as for instance the Eutelsat W7 and Hot Bird 7A programmes).
- (385) In these market segments, the new entity has a relatively high incentive to foreclose Astrium, its main prime contracting rival, to win the prime competition. However, its ability and incentive to do so are limited to the extent that Astrium can revert to L3 and to the extent that AAS is dependent upon Tesat for EPCs.
- (386) In addition, if the satellite operator saw its competitive sourcing policy endangered by the foreclosure strategy of the new entity, it could abandon its preference for European content and start inviting U.S. satellite prime contractors to bid since nothing prevents it from doing so. In that context, it should be noted that the shareholders of Eutelsat are no longer Member States but venture capital firms and banks. These satellite prime contractors would thus switch to the category of satellite operators who do not have a preference as regards the prime contractor, for which the likelihood of foreclosure is in general lower (see Section VI, E, 1, b, 3, a).
- (387) For these reasons, it can be concluded that the new entity's ability and incentive to foreclose its rival prime contractors in all the market segments where satellite operators have a European preference are generally moderate and depend to a large extent on the type of TWTs and the type of EPCs.

(c) *Market segments where satellite operators are subject to ITAR restrictions ([0-10%]* of the market)*

(388) Satellite operators established in countries subject to ITAR restrictions cannot select a U.S. prime contractor for the satellite nor can they select U.S. suppliers for TWTs and EPCs. Competition therefore takes place between AAS, Astrium and local prime contractors at the prime contracting level, between Tesat and ECTA at the EPC level, and TED is the only option for TWTs.

(389) Since there is no alternative to TED TWTs, the new entity has the ability and incentive to foreclose rival prime contractors except when there is little effective competition at the prime contracting level and the contract is awarded to local prime contractors such as ISRO and CAST. In the latter circumstances, the new entity does not have any incentive to foreclose rival prime contractors since AAS would have little chance of winning the prime contracting bid in any event.

(390) In view of the above, it can be concluded that the new entity's ability and incentive to foreclose rival prime contractors in all the market segments where satellite operators are subject to ITAR restrictions are, in principle, generally high. The type of TWTs and the type of EPCs should, however, also be taken into account. The customers on these market segments are satellite operators in ITAR countries, which are outside the EEA.

(c) Competitive assessment by market segment

(391) Based on the assessment of the satellite and TWT bidding process in Section VI, E, 1, b above, the likelihood of foreclosure can be evaluated for each narrow market segment:

(1) *S-band, C-band, medium power Ku-band and X-band TWTs (L3 has a qualified TWT with sufficient flight heritage), medium power single EPC (ETCA has a qualified and competitive EPC), and satellite operators subject to ITAR restrictions (Market size: [0-10%]*)*

(392) Foreclosure is likely since AAS only competes with Astrium and can make an integrated TWTA offer including ETCA EPCs. Astrium cannot source TWTs from L3. The customers on this market segment are satellite operators in ITAR countries, which are outside the EEA.

(2) *S-band, C-band, medium power Ku-band and X-band TWTs (L3 has a qualified TWT with sufficient flight heritage), medium power single EPC (ETCA has a qualified and competitive EPC), and satellite operators with European preference for the prime contractor (Market size: [0-10%]*)*

(393) Foreclosure is possible since AAS competes mainly with Astrium and can make an integrated TWTA offer including ETCA EPCs. Astrium can, however, source TWTAAs from L3. It cannot therefore be demonstrated that foreclosure is not only possible but also likely.

- (3) *S-band, C-band, medium power Ku-band and X-band TWTs (L3 has a qualified TWT with sufficient flight heritage), medium power single EPC (ETCA has a qualified and competitive EPC), and satellite operators with no preference for the prime contractor (Market size: [30-40%]*)*
- (394) Foreclosure is unlikely. AAS competes with all prime contractors and can make an integrated TWTA offer including ETCA third generation EPCs which will not have acquired sufficient flight heritage before the end of 2009. Rival prime contractors can source L3 TWTs which are competitive compared to TED TWTs. By foreclosing its rival prime contractors, the new entity will risk losing TWT sales to L3 while not being able to gain a decisive competitive advantage at the prime contracting level.
- (4) *S-band, C-band, medium power Ku-band and X-band TWTs (L3 has a qualified TWT with sufficient flight heritage), high power single EPC or dual EPCs (ETCA does not have a qualified and competitive EPC), and satellite operators subject to ITAR restrictions (Market size: [0-10%]*)*
- (395) Foreclosure is unlikely since AAS must source the EPCs from Tesat (L3 is not an option), whose parent company Astrium is AAS' only competitor at prime contracting level. Astrium has to procure the TWTs from TED. The two groups are interdependent. The customers on this market segment are satellite operators in ITAR countries, which are outside the EEA.
- (5) *S-band, C-band, medium power Ku-band, X-band TWTs (L3 has a qualified TWT with sufficient flight heritage), high power single EPC or dual EPCs (ETCA does not have a qualified and competitive EPC), and satellite operators with a European preference for the prime contractor (Market size: [0-10%]*)*
- (396) Foreclosure is unlikely since AAS has to source the EPCs either from L3, its only TWT competitor or from Tesat, whose parent company Astrium is AAS' only competitor at prime contracting level. Astrium can purchase the TWTs from L3.
- (6) *S-band, C-band, medium power Ku-band and X-band TWTs (L3 has a qualified TWT with sufficient flight heritage), high power single EPC or dual EPCs (ETCA does not have a qualified and competitive EPC), and satellite operators with no preference for the prime contractor (Market size: [20-30%]*)*
- (397) Foreclosure is unlikely (even less likely than in (3)). AAS competes with all prime contractors and is dependent upon Tesat or L3 for the EPCs. Rival prime contractors can source L3 TWTs which are competitive with TED TWTs. By foreclosing its rival prime contractors, the new entity would risk losing TWT sales to L3 while not being able to gain a decisive competitive advantage at the prime contracting level.
- (7) *L-band, high power Ku-band, Ka-band TWTs (L3 does not have a qualified TWT), medium power single EPC (ETCA has a qualified and competitive EPC), and satellite operators subject to ITAR restrictions (Market size: [0-10%]*)*
- (398) Foreclosure is likely (as in (1)) since AAS only competes with Astrium and can make an integrated TWTA offer including ETCA EPC. Astrium cannot source the TWTs from

- L3. The customers on this market segment are satellite operators in ITAR countries, which are outside the EEA.
- (8) L-band, high power Ku-band, Ka-band TWTs (L3 does not have a qualified TWT), medium power single EPC (ETCA has a qualified and competitive EPC), and satellite operators with a preference for a European prime contractor (Market size: [0-10%]*)
- (399) Foreclosure is likely (as in (7)) since AAS competes essentially with Astrium and can make an integrated TWTA offer including ETCA EPC. Astrium cannot source the TWTs from L3.
- (9) L-band, high power Ku-band, Ka-band TWTs (L3 does not have a qualified TWT), medium power single EPC (ETCA has a qualified and competitive EPC), and satellite operators with no preference for the prime contractor (Market size: [0-10%]*)
- (400) Foreclosure is likely since AAS can make an integrated TWTA offer including ETCA EPC and other prime contractors cannot procure the TWTs from L3. Chances of success of foreclosure are, however, lower than in (8) due to the presence of other rival prime contractors than Astrium in the bidding process.
- (10) L-band, high power Ku-band, Ka-band TWTs (L3 does not have a qualified TWT), high power single EPC and dual EPC (ETCA does not have qualified and competitive EPC), and satellite operators subject to ITAR restrictions (Market size: [0-10%]*)
- (401) Foreclosure is unlikely (as in (4)) since AAS has to source the EPCs from Tesat (L3 is not an option), whose parent company Astrium is AAS' only competitor at prime contracting level. Astrium has to procure the TWT from TED. The two groups are interdependent. The customers on this market segment are satellite operators in ITAR countries, which are outside the EEA.
- (11) L-band, high power Ku-band, Ka-band TWTs (L3 does not have a qualified TWT), high power single EPC and dual EPC (ETCA does not have qualified and competitive EPC), and satellite operators with a preference for a European prime contractor (Market size: [0-10%]*)
- (402) Foreclosure is possible. AAS has to source the EPCs either from Tesat, whose parent company Astrium is AAS' only competitor at prime contracting level, or from L3. However, L3 does not have a TWT product in this market segment and may have the incentive to sell the EPCs to AAS. Astrium cannot purchase the TWTs from L3. It is however difficult to demonstrate that foreclosure is not only possible but also likely since AAS is dependent upon the cooperation of one of its competitors to implement it.
- (12) L-band, high power Ku-band, Ka-band TWTs (L3 does not have a qualified TWT), high power single EPC and dual EPC (ETCA does not have qualified and competitive EPC), and satellite operators with no preference for the prime contractor (Market size: [10-20%]*)
- (403) Foreclosure is possible (as in (11)). AAS competes with all prime contractors and is dependent upon Tesat or L3 for the EPCs. AAS has to source the EPCs from L3 or from Tesat, whose parent company Astrium is AAS' only competitor. However, L3 does not have a TWT product in this market segment and may have the incentive to sell the EPCs to AAS. Astrium cannot purchase the TWTs from L3. In the short term, the likelihood

of such foreclosure depends upon the future strategy of L3 (that is to say, L3's willingness to sell the EPC to AAS) and would require AAS to assume the responsibility over the TWT in a CFE procurement rather than buying an integrated TWTA. In the longer term, the likelihood of such foreclosure depends upon the future ability of L3 to expand its product range, in particular for those frequency bands where it has no TWTs in orbit. Satellite manufacturers that compete with AAS would, in any case, have the incentive to support L3 in gaining the requisite space heritage as an alternative source of TWTs would effectively neutralize a possible foreclosure strategy of AAS on this market segment.

(d) Conclusion of the assessment

(404) On the basis of an assessment market segment by market segment, it can be concluded that it is likely that the new entity will have both the ability and the incentive to foreclose its rivals at the prime contracting level in a market segment accounting for only around [10-15%]* of the total market size. On segments representing altogether [20-25%]* of the total market size, foreclosure would be possible but not to a sufficient degree so as to consider that it would be likely. The customers on some of these market segments are satellite operators in ITAR countries, which are outside the EEA. For the remaining market segments (around two thirds or [65-70%]*), it is very unlikely that the new entity would have both the ability and the incentive to foreclose. These results are reflected in Table 20, which indicates the weight of each market segment (percentage in the cell) and the likelihood of input foreclosure (shading of the cell: likely (grey), possible but not likely (diagonal), very unlikely (no shading)).

Table 20

Likelihood of foreclosure					
Market segments	Market segment size	S-band, C-band, medium power Ku-band, X-band		L-band, High Power Ku-band, Ka-band	
		Medium Power single EPC	High Power Single EPC and Dual EPC	Medium Power single EPC	High Power Single EPC and Dual EPC
Satellite operators in ITAR countries	[5-10%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*
Satellite operators with European preference	[5-10%]*	[0-5%]*	[0-5%]*	[0-5%]*	[0-5%]*
Satellite operators with no preference	[80-85%]*	[30-35%]*	[25-30%]*	[5-10%]*	[15-20%]*
Market segment size		[70-75%]*		[25-30%]*	

(405) The limited likelihood of foreclosure as explained in Table 20 stems from the constraints that would be faced by the new entity if it were to implement such a foreclosure strategy¹⁵³:

¹⁵³ Beyond the time horizon considered above for the development of ETCA's EPC capabilities, i.e. beyond [2012-2015]*, it becomes even more difficult for the Commission to conclude, with a sufficient degree of certainty, that foreclosure would be likely given the possible evolution of demand, technology, and the products of the various players on the market.

- (a) ECTA does not have dual EPCs, which account for around half of the market and it is not expected to have qualified such EPCs with sufficient flight heritage before [2012-2015]*;
 - (b) dual EPCs offer significant competitive advantages over single EPCs and their share is expected to continue growing;
 - (c) ETCA does not have a competitive (performance and costs) high power single EPC and is not expected to have qualified such EPCs before [2012-2015]*;
 - (d) ETCA's third generation medium power single EPC does not yet have any flight heritage;
 - (e) ECTA is not yet considered by prime contractors as a [...] and competitive supplier of EPCs since it was essentially focused on supplying AAS [...] (TED terminated its supply relationship with AAS ECTA in 2005);
 - (f) L3 does not have an incentive to sell EPCs to AAS if it can sell integrated TWTAs;
 - (g) AAS cannot purchase EPCs from L3 for satellite programmes subject to ITAR restrictions;
 - (h) L3 is a reliable and competitive supplier for the frequency ranges where it has a qualified product;
 - (i) AAS risks losing significant sales of TWTs if prime contractors favor L3 in reaction to a possible foreclosure strategy;
 - (j) TED's sales of TWTs are [...] profitable due to the current strong position of TED;
 - (k) it is far from certain that a TWT foreclosure strategy would allow the new entity to be decisively more competitive than all its rival prime contractors;
 - (l) even a substantial increase of the price of TWTs would not materially affect the ability of rival satellite manufacturers to compete with AAS given the relatively limited share of the total development and production cost of a telecommunications satellite TWTs account for [0-5%]*.
- (406) Finally, the impact of the merger cannot be assessed entirely independently on these various market segments. The [...] level of TED margins at the TWT level and the possibility of retaliation across these different market segments from Tesat and prime contractors further reduce the ability and the economic incentive of the new entity to foreclose its prime contractor rivals on all market segments. The results of a balance between the commercial risks which would be incurred by the new entity if it were to carry out a TWT foreclosure strategy against the benefits to be gained from such a foreclosure strategy are clearly dissuasive. This is because these commercial risks extend to all the TWT market segments (customers are the same and could retaliate) while the benefits would be limited to the narrow market segments where such foreclosure strategy could be successful. Any foreclosure strategy would not, in any

event, be profitable for the new entity in the long term as it would jeopardise its leading position in the TWT market to the benefit to its competitor, L3.

- (407) During the procedure, [a market player]* submitted that Tesat's strong EPC market share in itself would not provide it with sufficient countervailing power to resist any exclusionary tactic that Thales might carry out based on its dominant TWT position. [This market player]* alleges that such power to retaliate would be limited because it is the TWT – rather than the EPC – that drives the performance of the satellite. In addition, compared to the TWT, the EPC is already operating at a very high level of efficiency which reduces the scope for the EPC supplier to discipline the TWT supplier. Moreover, [this market player]* would not be able to retaliate because it would not be able to detect the discrimination.
- (408) Quite apart from the relevance of these arguments, what is at stake is the ability and incentive of the new entity to engage in an input foreclosure strategy, knowing that it depends on EADS/Tesat and L3 for its supply of critical components such as EPCs. The lack of competitive EPCs limits the ability of the new entity to offer TWTAs. Although EPC are not as schedule-critical as TWTs, they are still an important component, roughly of the same value and complexity and customers clearly require reliable EPCs with sufficient in-orbit heritage. In addition, some customers have a preference for the more integrated MPM solution that only Tesat offers.
- (409) Also, TWTs should not be considered in isolation from the other components that are procured by the prime manufacturer AAS and in respect of which EADS enjoys a certain degree of countervailing power when it is the leading supplier. Other than Tesat's EPCs and TWTAs, this is the case for propulsion systems, solar arrays and generators and primary structures.
- (410) Finally, it should once again be stressed that this assessment is based on the assumption that the potential foreclosure strategy at the TWTA and prime contracting levels are independent. However, this assumption is unrealistic as it has been demonstrated that the vast majority of prime manufacturers now prefer to purchase integrated systems and there is no indication that this trend will not continue, the new entity is not likely to have the ability and the incentive to foreclose rival TWTA integrators, Tesat and L3 will remain the main TWTA integrators and the preferred choice of prime contractors, and in the short to medium term, the proposed operation is likely to increase competition at the TWTA level with the entry of the new entity.

(e) Economic study submitted by a third party

- (411) On 28 January 2007, [a third party]* submitted an economic study on the potential foreclosure of satellite prime contractors resulting from the proposed operation¹⁵⁴. The economic study assesses the new entity's economic incentive to foreclose its rival prime contractors for TWTs with a view to increasing AAS' chances of winning satellite contracts. The study is based on two economic models: a relatively simple vertical arithmetic analysis and a more sophisticated bidding model.

¹⁵⁴ "The potential for vertical foreclosure resulting from the combination of Thales and Alcatel: A preliminary economic analysis", prepared by [...]*, 28 January 2007.

- (412) The conclusions of the study are that the new entity will have a strong economic incentive to foreclose its rival prime contractors for TWTs and that, under certain assumptions, these foreclosure practices will result in very significant price increases for TWTs and for commercial satellite telecommunications. The Commission has reviewed the economic study and has reached the conclusion that the proposed models fail to reflect appropriately the competitive dynamics and the various segments of the industry and that the models' assumptions and conclusions are not supported by the market investigation.
- (413) Firstly, the two models only address the incentive of the new entity to foreclose its rivals and presuppose that the new entity has the ability to implement such foreclosure strategies (the study explicitly indicates that the ability issue is not dealt with). However, the Commission's market investigation has shown that the ability of the new entity to foreclose its rivals is a very complex question, and that the various constraints in terms of product range, production capacity, flight heritage, reputation, etc. need to be analyzed in-depth and substantially reduce the scope for foreclosure.
- (414) Secondly, the two models assume that the competitive conditions are uniform in the TWT and satellite prime contracting markets whereas the Commission's market investigation has established that several market segments should be distinguished and that the competitive situation of the new entity and its rivals, and thus the scope for foreclosure, is significantly different from one market segment to another. As such, the two models fail to reflect the customized / non-homogeneous nature of these satellite subsystems markets and do not correctly model their competitive dynamics.
- (415) Thirdly, the two models only relate to very substantial price increases or to TED's refusal to supply TWTs to its rival prime contractors. The market investigation has however shown that such strategies are very unlikely as they would be very simple to detect and would constitute abuses of TED's dominant position. Increases in the prices charged to rival prime contractors for TWTs would need to be very significant (at least 200%) for the new entity to raise its rival costs to any meaningful extent (TWTs account for around 5% of the total cost of satellites).
- (416) Fourthly, the study does not take into account the fact that there is an intermediate market between TWTs and commercial telecommunications satellites, the market for TWTAs, which has become the level of integration at which competition takes place. The new entity has an extremely limited presence on this intermediate market and Tesat and L3 are the leading suppliers of TWTAs to prime contractors. This situation clearly restricts the scope of any direct foreclosure strategies as TED is to a large extent dependent on Tesat to sell its TWTs to prime contractors. This is not reflected in the study.
- (417) The objective of the first model (vertical arithmetic analysis) is to compare the margins that TED could lose on reduced TWT sales with the higher margins AAS would gain on increased telecommunications satellites sales as a result of the foreclosure strategy. On the basis of Tesat's estimates of margins and prices at the TWT and prime contracting levels, the model in fact evaluates the critical diversion ratio (ratio of the number of satellite bids AAS would need to gain to the number of satellite bids where TED would foreclose access to TWTs) necessary to make the foreclosure profitable and obtains a result of about 6.5%, which is quite low. The Commission made its own calculation using the margins and price data obtained during its market investigation and obtained

results of between 27% and 40% depending on the data. In particular, margins on TWTs are [...] (the market is not very competitive), margins on satellites are much lower (the market is much more competitive), and Thales will recoup only 67% of AAS gains (proportionate to its 67% shareholding in AAS). On top of these differences in their mere magnitude, it seems difficult to draw any clear conclusion from critical diversion ratios since the likelihood of the strategy being successful greatly depends on the market segments.

(418) The second model is much more sophisticated and seeks to model the bidding process for TWTs explained in Section VI, B, 2. While the model is relatively complex to reflect the bidding process and market players' strategies, it is used only with extreme assumptions in order to simplify the calculation. The starting point of the exercise is that TED will not supply TWTs to any third party rival prime contractors and will only supply AAS. The model assumes that the competitive constraint exercised by TED on L3 would disappear as TED would withdraw from the merchant market. Under these very unlikely conditions, the model shows that the new equilibrium would be significantly different from the current market conditions and that TWT prices would increase tenfold and telecommunications satellite prices would increase by 30%. AAS would acquire a 53% market share of the commercial satellite market (compared to [10-20%] currently). This strategy would be profitable for the new entity and this result is robust to variations in the TWT and satellite margins.

(419) While the model is interesting in terms of merger simulation in bidding markets, its result are not relevant in this case since it does not take into account the specificity of the market (namely, the capabilities of the various players). First, the model focuses only on the incentive to foreclose, taking the ability to foreclose as granted, and it does not distinguish between the various market segments. Secondly, the model does not take into account the new entity's limited EPC production capacity, which would prevent it from gaining half of the prime contracting market. Thirdly, the model does not take into account the large fixed costs associated with the production of TWTs and the fact that, following the described foreclosure strategy and the substantial reduction of its production, the new entity's TWT unit production cost would increase. Fourthly, the model assumes that all other elements necessary for the satellite, including EPCs, are commodities that can be bought by the prime contractors at market prices. By doing so, the model ignores the complex strategic interactions between the new entity and Tesat, and their implications on competition at the prime contracting level, as the new entity's limited EPC portfolio exposes it to possible retaliation from Tesat.

2. Significance of the impact on effective competition

(420) Although the conclusions of the above assessment show that the market segments on which the new entity is likely to implement a strategy to foreclose its rival prime contractors do not represent more than [10-15%] of the market, the Commission has also assessed the potential impact of the proposed operation on competition on the market for commercial telecommunications satellites.

(421) Firstly, it should be noted that AAS had a market share of [15-20%] during the period 2001-2006 and that a potential TWT foreclosure strategy is likely in market segments accounting for only [10-15%] of satellite programmes. The market power of AAS at the prime contracting level is thus not expected to increase significantly and,

competition is expected to remain unaffected by the proposed operation for the vast majority of satellite prime contracting bids

(422) Secondly, in order to refine the impact of such a foreclosure strategy, the Commission has also assessed the impact of a potential TWT foreclosure strategy on a 'satellite prime contractor by satellite prime contractor' basis, depending on the market segments where each prime contractor is most active. The objective of such an assessment is to determine whether the ability of certain prime contractors to compete on the market for telecommunications satellites in general may be negatively affected by a potential foreclosure strategy limited to certain narrow market segments. The Commission's assessment however shows that such a potential foreclosure strategy would not significantly affect the competitiveness of any prime contractor.

(423) Table 21 below shows the proportion accounted for by each frequency band for each prime contractor's satellites. An empty cell indicates that the prime contractor achieves less than 15% of its satellite programmes in that given TWT frequency, a grey cell between 15% and 40% and a dashed cell more than 40%. This figure excludes ITAR satellite programmes for which the competitive dynamics are different due to the exclusion of U.S. subsystems manufacturers and prime contractors.

Table 21

	S-band	L-band	C-band		Ku-band		Ka-band		X-band
			MP	HP	MP	HP	MP	HP	
AAS									
Astrium									
Boeing									
Lockheed Martin									
Loral									
Orbital									
Others (IAI, MELCO, ISRO, RKK, RSCC)									

(424) Table 22 below shows the distribution of single EPCs and dual EPCs by frequency band (based on the same set of satellite programmes).

Table 22

Ratio Single / Dual	Single	Dual
Overall	50%	50%
S-band	70%	30%
L-band	45%	55%
C-band medium power	49%	51%
C-band high power	37%	63%
Ku-band medium power	49%	51%
Ku-band high power	59%	41%
Ka-band medium power	34%	66%
Ka-band high power	39%	61%
X-band	75%	25%

(425) What these tables show is that most of the satellite prime contractors achieve a very significant share of their sales in the medium power Ku-band segment, where L3 currently has a TWT that is more efficient than that of TED. In addition, in the Ku-band frequency range, half of the EPCs are dual EPCs, which are not available to the new entity. It should also be noted that precisely for Ka-band TWTs, where TED is the only supplier and the likelihood of foreclosure is generally higher, almost two thirds of TWTs

use dual EPCs. This considerably reduces the risks to competition in these market segments.

- (426) Assessing the potential impact of the TWT foreclosure strategy on each prime contractor considered in isolation, shows that only Boeing could potentially be affected by the foreclosure strategy to a meaningful extent. Astrium and Lockheed Martin achieve half of their business with medium power Ku-band satellites. Loral is strong in S-band and Ku-band. Orbital – and the smaller prime contractors – are essentially active in C-band and medium power Ku-band. Except for Astrium and Boeing, the L-band, high power Ku-band and Ka-band segments, where a foreclosure strategy would be possible (if only to a certain degree) account for less than 25% of all satellite prime contractors business. In addition, only around 50% of TWTs in these frequency bands use single EPCs and foreclosure is unlikely for the other half (which corresponds to dual EPCs which the new entity does not have).
- (427) Moreover, Lockheed Martin and Boeing both have a significant presence in U.S. institutional and military satellite programmes which account for up to two thirds of their satellite activities. There is thus no risk of a spill-over effect whereby Lockheed Martin's or Boeing's ability to compete on the commercial satellite markets would be negatively affected by the potential loss of some prime contracting bids to AAS. In any event, the risk that the new entity would be able to marginalize Lockheed Martin or Boeing is inexistent because of the strategic importance for the U.S. government and Department of Defense to maintain a competitive U.S. space industry.
- (428) As regards ITAR market segments, it should first be noted that only Astrium is concerned since U.S. prime contractors have no activity and other local prime contractors are generally selected for strategic reasons, meaning that AAS only competes with Astrium when the contract is not awarded to the national satellite manufacturer (CAST in China and ISRO in India). As regards Astrium, ITAR satellites did not account for [...] of its business over the period 2001-2006. The potential impact of the proposed operation on Astrium is further discussed below.
- (429) [...].
- (430) The Commission takes the view that it is very unlikely that AAS could marginalize Astrium through a very limited TWT foreclosure strategy.
- (431) First, as reflected in the Table 21, Astrium realises [...], where L3 TWT is a more competitive supplier than TED. Such satellite programmes are unlikely to be affected by a foreclosure strategy (if ITAR programmes were to be included, medium power Ku-band would still account for [...] of Astrium's activity). Secondly, for [...] of its satellite programmes, Astrium used dual EPCs, which further limits the likelihood of foreclosure by the new entity for these satellite programmes, and that same proportion also applies to Astrium's ITAR satellite programmes. In the light of all these elements, the market segment where a foreclosure strategy can be considered likely accounts for approximately [...] of Astrium's business. The market segments where such foreclosure would be theoretically possible - although not likely - accounts for [...] of Astrium's business.

(432)[...]¹⁵⁵. [...] a list of 16 bids where both AAS and Astrium were short-listed and thus competed against each other. It appears that in [...] out of 16 of these satellite programmes dual EPCs were used. In addition, [...] of these programmes had L3 content (either the TWT or the EPC). This implies that the scope for foreclosure of Astrium by AAS is restricted and that the competitiveness of a prime contractor does not depend on its ability to offer TED TWTs.

(433)[...].

(434)Even if AAS were to implement a foreclosure strategy, it is not likely that Astrium's competitiveness would be seriously affected as a result of losing a limited number of prime competitions. Stakeholders such as ESA, CNES and other institutional and military satellite operators may have a strategic interest in balancing their budgets in favor of Astrium when ordering institutional or military satellites or selecting development projects. Astrium's institutional and military activities may support its commercial activities in case of downturn. The commercial satellite industry is also very cyclical in nature and prime contractors such as Astrium have already shown that they could adapt their capacity to a lower level of activity.

(435)Finally, even in the unlikely event that Astrium would exit the commercial satellite market, it is not obvious that this would significantly impede effective competition. If Astrium were to exit the market, and (in a worst case scenario) AAS subsequently won the majority of the satellite programmes where Astrium would have been short-listed, AAS would increase its market share from around [15-20%] to [25-30%] whilst a large number of alternative prime contractors - including Boeing, Lockheed Martin, Loral, Orbital and Chinese and Russian prime contractors - would remain on the market.

(436)In view of the above, even if foreclosure were to occur on certain market segments, the new entity's foreclosure strategy would not have a significant impact on competition for commercial satellites. In particular, that foreclosure strategy is not likely to affect the ability of rival prime contractors to compete with AAS for most satellite programmes.

3. Transmission of confidential information

(437)During the procedure, a satellite manufacturer submitted that, through the proposed operation, AAS could obtain proprietary information on its rival prime contractors' satellite designs through TED. During the bidding process, as a leading TWT supplier, TED will receive requests for proposals for TWTs, which contain information on the technical options and the design of the satellite selected by prime contractors. According to this satellite manufacturer, it would be detrimental to competition at the prime contracting level if AAS obtained access to third-party proprietary information concerning the proposals of its competitors.

(438)Firstly, as discussed in recitals (114) and (117), the proposed operation will only bring about an indirect integration of TED and AAS since TED will remain subsidiaries of Thales whereas AAS will become a joint venture jointly-controlled by Thales and Finmeccanica. As a result, TED and AAS will remain distinct legal entities, with different controlling shareholders and different management. This indirect and partial

¹⁵⁵ [...].

vertical integration and the presence of different shareholders significantly reduce the risk of transmission of confidential information between the two distinct legal entities.

- (439) Secondly, the majority of satellite prime contractors now purchase TWT subsystems at the TWTA level (See Section VI, B, 3) and no longer at the TWT level. This means that prime contractors procure TWTAs from Tesat and L3 and have no direct commercial relationship with TED when they purchase TWTAs. Thus, the direct exchange of proprietary information takes place between Tesat, a subsidiary of Astrium, or L3 (and potentially ETCA) and prime contractors and decreasingly so between TED and prime contractors. The importance of the intermediate TWTA level thus significantly reduces the likelihood of transfer of proprietary information at the prime contracting level.
- (440) The risk of transmission of proprietary information between subsystems suppliers and prime contractors, if any, appears to be higher between TWTA integrators such as Tesat and prime contractors than between TWT producers, such as TED, and prime contractors. The Commission is however not aware of any issue related to the transmission of proprietary information between Tesat and Astrium, which tends to show that such a risk would be minimal post-merger as regards the new entity.
- (441) Thirdly, the satellite industry is characterized by multiple commercial relationships between subsystems suppliers, payload contractors and prime contractors, which often compete at other levels of the supply chain. For example, AAS and Astrium are both major suppliers of satellite subsystems to satellite prime contractors, with whom they compete at the prime contracting level. As regards TWTs and EPCs, Tesat is at the same time a supplier of TED for EPCs and a customer of TED for TWTs. Because of this specific structure of the satellite industry, the setting up of distinct legal entities for the production of satellite subsystems and the implementation of firewalls between satellite subsystems and prime contracting activities is a common practice in the industry in order to protect the confidential information exchanged between suppliers/customers¹⁵⁶.
- (442) Subsidiaries of prime contractors supplying satellite subsystems to rival prime contractors have to demonstrate a very high level of protection of the proprietary information they receive as part of the commercial relationship with their customers. The protection of such information and the absence of discrimination are key to the business model of such subsystems subsidiaries. Any deviation from these strict confidentiality rules would have serious business and legal consequences.
- (443) Fourthly, the Commission's investigation has shown that, prior to the merger, TED already has very detailed rules in place for the protection of the confidential information it receives from its customers. TED's confidentiality obligations vis-à-vis its customers are generally defined prior to the start-up of pre-contractual contracts and adapted to the specific needs of each customer. In particular, access to requests for proposals received by TED from its customers is restricted to the relevant person within TED and access to other documents depends on their confidentiality level.
- (444) Moreover, after the merger, TED is likely to have an even stronger incentive to reinforce its confidentiality protection measures. Any perception from prime contractors and TED customers that the proprietary information they supply to TED could be transferred to AAS would put TED's TWT business at risk and would provide TED customers with an

¹⁵⁶ [...]*

incentive to go to L3, which is entirely independent from other prime contractors. This is reflected in some internal documents of Thales:

"L3 Com will appear as a more "independent" supplier than TED. TED has handled such situation in Broadcast and Defence but the customer will always point out a potential risk of internal preference. In order not to jeopardize our position, we will have to demonstrate "firewalls" to Thales Space competitors."¹⁵⁷

(445) In view of the above, it is unlikely that effective competition on the market for the commercial telecommunications satellites could be impeded as a result of AAS obtaining proprietary information, through TED, on the satellite designs of its rival prime contractors and using such proprietary information to distort competition.

4. Conclusion

(446) On the basis of the above, it can be concluded that the proposed operation does not lead to a significant impediment to competition on the market for commercial telecommunication satellites.

VII. CONCLUSION

(447) On the basis of the evidence available, it is not likely that the new entity would have the ability and incentive to foreclose its competitors at any level of the supply chain and that the proposed operation would, as a result, significantly impede effective competition.

(448) The proposed operation should therefore be declared compatible with the common market and the EEA Agreement.

¹⁵⁷ See PowerPoint presentation "060713 – SBP 1 RFMS" (July 2006) (Q.5 – Cabanel).

HAS ADOPTED THIS DECISION:

Article 1

The notified operation whereby Thales S.A. and Finmeccanica Società per Azioni acquire within the meaning of Article 3(1)(b) of Regulation (EC) No 139/2004 joint control of Alcatel Alenia Space SAS and Telespazio Holding srl is hereby declared compatible with the common market and the EEA Agreement.

Article 2

This decision is addressed to:

Thales S.A.
45, Rue de Villiers
92526 Neuilly-sur-Seine
France

Finmeccanica Società per Azioni
Piazza Monte Grappa, 4
00195 Roma
Italy

Done at Brussels,

For the Commission

Neelie KROES
Member of the Commission

EN 1

ONLY THE ENGLISH TEXT IS AUTHENTIC.	1
REGULATION (EC) NO 139/2004	1
MERGER PROCEDURE	1
ARTICLE 8 (1)	1
DATE: 04/04/2007	1
I. THE PARTIES	3
II. THE OPERATION AND THE CONCENTRATION	3
III. COMMUNITY DIMENSION	4
IV. PROCEDURE	4
V. RELEVANT MARKETS	7
A. Relevant product markets	7
1. Ground Segment	7
(a) Launchers, space transportation and space infrastructure	7
(b) Satellites	7
2. Space Segment	8
(a) Launchers, space transportation and space infrastructure	8
(b) Satellites	8
B. Relevant geographic markets	21
1. Ground Segment	21
2. Space Segment	21
(a) Satellite prime contracting	21
(b) Satellite subsystems and equipment	23
(c) Conclusion	23
VI. COMPETITIVE ASSESSMENT	25
A. Ground segment	25
1. Satellite ground products	25
(a) Command and control software	25
(b) Mission exploitation	25
2. Satellite ground services	26
B. Space segment - Introduction	27
1. The commercial telecommunications satellite supply chain	29
2. The commercial telecommunications satellite market	29

3. The commercial telecommunications satellite and satellite equipment markets are bidding markets	32
4. The TWT market	38
(a)TWT suppliers	38
(b)Production capacities, actual production and merchant sales	38
(c)TWT capabilities of L3	41
(d)Conclusion	47
5. The EPC market	48
(a)EPC Suppliers	48
(b)Production and merchant sales	49
(c)Dual EPCs	49
(d)EPC capabilities of ETCA	50
(e)How prime contractors view ETCA's EPC capabilities	51
(f) Conclusion	51
6. The TWTA market	52
(a)TWTA suppliers	52
(b)Production and merchant sales	52
(c)TWTA integration capabilities of ETCA and TED	54
(d)How prime contractors view ETCA's and TED's TWTA integration capabilities	55
(e)Conclusion	55
7. Historic market segments based on the types of TWTs and EPCs loaded on the telecommunications satellites ordered during the years 2001 to 2006.	56
C. Space segment - Description of the input foreclosure strategies considered during the in-depth examination	57
D. Space segment - Impact of the merger on the TWTA market	60
1. Ability and incentive of the new entity to foreclose rival TWTA integrators	60
(a)ETCA's EPC product range	60
(b)ETCA's EPC and TWTA production capacity	63
(c)Likelihood of input foreclosure by the new entity at the TWTA level	65
(d)Comparative margins on TWTs and TWTA's and partial integration of Thales and AAS	72
(e)Conclusion on ability and incentive of the new entity to foreclose at the TWTA level	72
2. Significance of the impact on effective competition	74
3. Conclusion	74
E. Space segment - Impact of the merger on the market for commercial telecommunications satellites	74
1. Ability and incentive of the new entity to foreclose	75
(a)Introduction	75
(b)Segmentation of the market	76
(c)Competitive assessment by market segment	82
(d)Conclusion of the assessment	85
(e)Economic study submitted by a third party	87
2. Significance of the impact on effective competition	89
3. Transmission of confidential information	92
4. Conclusion	94
VII. CONCLUSION	94
OPINION	98
BRUSSELS, 26 MARCH 2007	101



OPINION

of the ADVISORY COMMITTEE on CONCENTRATIONS

given at its 148th meeting on 23 March 2007

concerning a draft decision relating to

Case COMP/M.4403– Thales/Finmeccanica/Alcatel Alenia Space/Telespazio

1. The Advisory Committee agrees with the Commission that the notified operation constitutes a concentration within the meaning of Article 3(1)(b) of the EC Merger Regulation and that it can be deemed to have a Community dimension pursuant to Article 1(2) of that Regulation.
2. The Advisory Committee agrees with the Commission that the relevant product markets can be characterised as follows:
 - a) Ground Segment:
 - Launchers,
 - Space transportation and infrastructure; and
 - Satellites.
 - b) Space Segment:
 - Launchers,
 - Space transportation and infrastructure; and
 - Satellites:
 - *Satellite prime contracting for institutional satellites;*
 - *Satellite prime contracting for military satellites;*
 - *Satellite prime contracting for commercial telecommunications satellites; and*
 - *Satellite subsystems and equipment for commercial telecommunications satellites;*

- Travelling Wave Tubes (TWTs);
 - Electronic Power Conditioners (EPCs); and,
 - Travelling Wave Tube Amplifiers (TWTAs) (which includes Linearised TWTAs (LTWTAs), Channel Amplifier TWTAs (CTWTAs), and Linerarised Channel Amplifier TWTAs (LCTWTAs)).
3. The Advisory Committee agrees with the Commission that the geographic scope of the relevant product markets is:
 - Worldwide for commercial telecommunications satellites and satellite subsystems;
 - European or national for European institutional satellites and satellite subsystems; and
 - National (where a national supplier exists) or worldwide for military satellites and satellite subsystems.
 4. The Advisory Committee agrees with the Commission's view (and subsequent approach to the analysis) that the issue raised by the proposed concentration is whether or not the merger will give the new entity:
 - the ability and incentive to engage in input foreclosure in identified markets; and,
 - whether such a course of action would significantly impede effective competition downstream.
 5. The Advisory Committee agrees with the Commission that the proposed concentration will not significantly impede effective competition on the market for **TWTAs**.
 6. The Advisory Committee agrees with the Commission that the proposed concentration will not significantly impede effective competition on the **market for satellite prime contracting for commercial telecommunications satellites**.
 7. The Advisory Committee agrees with the Commission that the notified concentration must be declared compatible with the common market and the functioning of the EEA Agreement pursuant to Article 8(1) of the EC Merger Regulation.
 8. The Advisory Committee asks the Commission to take into account all the other points raised during the discussion.

<u>BELGIË/BELGIQUE</u>	<u>BULGARIA</u>	<u>ČESKÁ REPUBLIKA</u>	<u>DANMARK</u>	<u>DEUTSCHLAND</u>
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<u>ÉIRE/IRELAND</u>	<u>EESTI</u>	<u>ELLADA</u>	<u>ESPAÑA</u>	<u>FRANCE</u>
C. KEATING	---	---	E. LECERTUA AIZPURUA	O. HERY
<u>ITALIA</u>	<u>KYPROS/KIBRIS</u>	<u>LATVIJA</u>	<u>LIETUVA</u>	<u>LUXEMBOURG</u>
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R. HORTA	---	D. TOMŠE	---	J. NYLÄNDEN
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C. SZATEK	T. KRAJEWSKA			



EUROPEAN COMMISSION

The Hearing Officer

FINAL REPORT OF THE HEARING OFFICER
IN CASE COMP/M.4403 – THALES/FINMECCANICA/AAS &
TELESPAZIO

**(pursuant to Articles 15 and 16 of Commission Decision (2001/462/EC, ECSC)
of 23 May 2001 on the terms of reference of Hearing Officers
in certain competition proceedings – OJ L162, 19.06.2001, p.21)**

On 6 October 2006, the Commission received notification of a proposed concentration by which the undertakings Thales S.A. (*Thales*) and Finmeccanica Società per Azioni (*Finmeccanica*) acquire, within the meaning of Article 3.1 b) of Council Regulation (EEC) No 4064/89 (the “Merger Regulation”), joint control of the undertakings Alcatel Alenia Space SAS (AAS) and Telespazio Holding srl (*Telespazio*) by way of purchase of shares in two existing joint ventures to which additional assets are contributed.

After a preliminary examination of the notification, the Commission concluded that the notified transaction falls within the scope of the Merger Regulation and raised serious doubts as to its compatibility with the common market. It therefore decided, on 28 November 2006, to initiate proceedings under Article 6 (1) (c) of the Merger Regulation.

The parties had then access to the key documents of the file , in application of the Best Practices for merger case, through a non-confidential summary of the responses of third parties to the requests for information in first phase, which was provided to them on 7, 8 and 11 December 2006.

Following an in-depth market investigation, the Commission services considered that the serious doubts had been removed and that the proposed transaction would not significantly impede effective competition in the common market or a substantial part of it and that it hence should be declared compatible with the common market and the functioning of the EEA agreement. Accordingly, no Statement of Objections was sent to the parties.

No queries or submission have been made to me by the parties or any other third party. The case does not call for any particular comments as regards the right to be heard.

Brussels, 26 March 2007

signed
Serge DURANDE