Case No COMP/M.1601 –

ALLIED SIGNAL / HONEYWELL

Only the English text is available and authentic.

REGULATION (EEC) No 4064/89

MERGER PROCEDURE

Article 8(2) - compatibility

Date: 01/12/1999

PUBLIC VERSION

COMMISSION DECISION
of 01.12.1999 C(1999) 4057 final
declaring a concentration compatible with the common market and the functioning of the EEA Agreement

Case No COMP/M.1601 – AlliedSignal/Honeywell

Council Regulation (EEC) No 4064/89

(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 European Economic Area (EEA) Agreement, and in particular Article 57(2) (a) thereof,

Having regard to Council Regulation (EEC) No 4064/89 of 21 December 1989 on the control of concentrations between undertakings[1], as last amended by Regulation (EC) No 1310/97[2], and in particular Article 8(2) thereof,

Having regard to the Agreement between the European Communities and the Government of the United States of America regarding the application of their competition law[3], and in particular Articles II and VI thereof,

Having regard to the Commission decision of 30 August 1999 to initiate proceedings in this case,

Having regard to the opinion of the Advisory Committee on Concentrations[4],

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1 OJ L 395, 30.12.1989 p. 1; corrected version, OJ L 257, 21.9.1990, p. 13.

2 OJ L 180, 9. 7. 1997, p. 1,

3 OJ L 95, 27.4.1995, p. 47.

4 OJ C ...,...199. , p....

WHEREAS:

1. On 15 July 1999, the Commission received a notification of a proposed concentration pursuant to Article 4 of Regulation (EEC) No 4064/89 (hereinafter referred to as "the Merger Regulation") by which AlliedSignal (US) Inc. ("AlliedSignal") and Honeywell (US) Inc. ("Honeywell") propose to enter into a full merger within the meaning of Article 3(1)(a) of the Merger Regulation.

2. On 30 August 1999 the Commission decided in accordance with Article 6(1)(c) of the Merger Regulation to initiate proceedings in this case.

3. The proposed operation does not qualify for co-operation with the EFTA Surveillance Authority under the EEA Agreement.

I. THE PARTIES

4. AlliedSignal (US) is a manufacturing company with operations in the businesses of aerospace, automotive products and engineered materials (polymers, specialty chemicals and electronic materials).

5. Honeywell (US) is an international controls company that develops and supplies advanced technology products, systems and services to homes and buildings, industry, aviation and space.

II. THE OPERATION

6. Pursuant to an agreement entered into on 4 June 1999, Honeywell and AlliedSignal will merge into AlliedSignal, but the latter's name will be changed into Honeywell International Inc. Each share of Honeywell common stock will be exchanged for 1.875 shares of AlliedSignal common stock. The Board of Directors of the combined company will be comprised of nine members from the current AlliedSignal board and six members of the current Honeywell board.

III. CONCENTRATION

7. The operation whereby AlliedSignal and Honeywell merge into AlliedSignal is a full merger within the meaning of Article 3(1)(a) of the Merger Regulation.

IV. COMMUNITY DIMENSION

8. The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million[5] (AlliedSignal EUR 14 100 million, Honeywell EUR 7 500 million). Each of AlliedSignal and Honeywell have a Community-wide turnover in

[5] Turnover calculated in accordance with Article 5(1) of the Merger Regulation and the Commission Notice on the calculation of turnover (OJ C66, 2.3.1998, p. 25). Where figures include turnover for the period before 1.1.1999, they are calculated on the basis of average ECU exchange rates and converted into EUR on a one-for-one basis.

excess of EUR 250 million (AlliedSignal EUR […]* million, Honeywell 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 therefore has a Community dimension.

V. COMPATIBILITY WITH THE COMMON MARKET

9. This operation creates a company that will be active in the following sectors : aerospace, automotive products, engineered materials and home and industrial controls. The parties' activities overlap in the area of avionics. Even though the parties have important sales in the military and space avionics markets, these latter sales in the EEA are of a limited nature. It appears that effective competition within the EEA would not be significantly impeded as a result of the operation on any of the potential markets for avionics for military or space applications. Therefore, the effects of the operation are assessed only in relation to avionics having commercial applications.

A. "Product market"

10. Avionics products consist of a range of equipment, the controls of which are installed in the cockpit, and which are used for the control of the aircraft, for navigation and communication, and also for the assessment of flying conditions. AlliedSignal also manufactures other aerospace equipment (that is to say, non-avionics) such as auxiliary power units (APU), environmental control systems (ECS), aircraft lighting, landing systems (wheels and brakes) and engines for small business aircraft. (A full glossary of the technical terms and abbreviations used is given in Annex II).

1. General market characteristics

1.1. Different segments

11. The avionics sector is generally divided into six demand segments that are defined by types of aircraft: Air Transport, Regional Transport, Business Aviation, General Aviation, Helicopters and Military/Space Applications. The reason for this division lies in the non-homogeneous structure of supply and demand across these segments (integrated versus federated cockpit), in dissimilarities of technical interchangeability and prices of the products, and in the nature of the customers (airlines, original equipment manufacturers ("OEMs") or individual owners) as well as in differentiation for the applicable regulatory safety requirements.

12. The Commission's market investigation has confirmed that there are different segments defined by the types of aircraft, that the avionics products/(or sub-)systems for each segment are different according to their price, their size and their capabilities, and that the players in each segment are different. However, there is no clear segmentation between the Regional Transport and the Business Aviation segment with regard to the avionics products/(sub-)systems that are offered, since

* 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.

the latter are the same in terms of price, size and capabilities. Therefore, no further distinction will be drawn between the Regional Transport and Business Aviation segment ("Regional/Business segment").

13. Air Transport includes large commercial planes (greater than 100 passengers) which cost between USD 35 million and USD 140 million, Regional Transport covers medium commercial planes that are worth between USD 5 and USD 25 million, whereas Business Aviation includes small jets costing in general between USD 3 million and 35 million. General Aviation is composed of light planes ranging in cost between USD 150,000 and USD 500,000. The cost of avionics sold for these aircraft follows similar cost patterns. Helicopters consist of civil airborne vehicles with rotary wings. Military and Space Applications include every airborne military application as well as satellites, international space station and space shuttle.

14. In the Air Transport segment the customers of the avionics suppliers are two OEMs, namely Airbus Industrie ("Airbus") and Boeing, and the airlines. The products/(sub-)systems supplied in this segment are in general stand-alone products/(sub-)systems that are federated into an avionics cockpit suite by the OEMs (as forwardfit products) or are installed on existing aeroplanes by service "shops" or the OEMs as retrofit items (that is, as replacement parts or entirely novel products). The same avionics suppliers supply the same products/(sub-)systems used for forward-fit in new aeroplanes and for retrofit of existing aeroplanes.

15. In the Regional and Business segment a somewhat clearer distinction can be drawn between forward-fit and retrofit (even though this would not justify their designation as "separate product markets"), because of the fact that more products are sold as part of an integrated (forward-fitted) cockpit. With respect to forward-fit it is noted that the avionics suppliers provide integrated avionics suites to the OEMs (such as Aerospatiale Matra ATR, Bombardier, Embraer, Dassault, Raytheon, Gulfstream, British Aerospace, Fairchild Dornier). The latter do not integrate the avionics products/(sub-)systems themselves, but rely on the so-called system integration capabilities of the avionics suppliers (such as Honeywell, Rockwell Collins and Sextant Avionique ("Sextant")). If such a system integrator does not dispose of an avionics product, he will purchase the missing product from a supplier of stand-alone avionics products/(sub-)systems, such as AlliedSignal. (Some surveillance products, such as ACAS Processors, which are currently not part of the core avionics suite, are purchased by the aircraft owners, mainly as retrofit.) As regards retrofit, the avionics suppliers (such as AlliedSignal, Universal Avionics, and BF Goodrich) provide stand-alone avionics products/(sub-)systems to their customers, the aircraft owners.

16. In the General Aviation segment the cockpit is federated and the customers are OEMs and distributors. The avionics products/(sub-)systems used for forward-fit and for retrofit are supplied by the same avionics suppliers.

1.2. Buyer Furnished Equipment (BFE) / Supplier Furnished Equipment (SFE)

17. A further distinction often referred to in the industry is that between "Buyer Furnished Equipment" ("BFE") and "Supplier Furnished Equipment" ("SFE"), referring respectively to the buyer and the supplier of the airframe.

18. In the case of BFE, an airframe manufacturer will in general obtain certification for two or three substitutable avionics products/(sub-) systems between which the airline

can choose. The commercial terms are then set between the airline and the avionics supplier. The only role of the airframe manufacturer with regard to BFE relates to the certification of that product/(sub-)system.

19. Furthermore, SFE can either be SFE-standard or SFE-option. In the latter case an airframe manufacturer will obtain certification for more than one (and in general two) substitutable avionics products/(sub-)systems for that aircraft type and will leave it to the buyer of that aircraft, the airline, to choose one or other product/(sub-)system. The difference with BFE is that SFE-option (and SFE-standard) is purchased by the OEM and not by the airlines. SFE-option is found on Airbus aircraft. On Boeing aircraft SFE-option does not exist and competition between the SFE-avionics suppliers only takes place at the design phase of an aircraft. If an avionics product/(sub-)system is SFE-standard, meaning that the airframe manufacturer has only certified one product/(sub-)system, then the airline has no opportunity to choose a substitutable avionics product/(sub-)system from another supplier.

20. The market investigation has pointed out that there is a trend towards SFE replacing BFE.

21. The market investigation has also shown that for retrofit SFE the airlines will negotiate directly with the avionics supplier, such as Honeywell.

22. Given the fact that the qualification of a product as BFE or SFE may differ depending on the client and may vary over time, distinct markets for BFE and SFE are not warrented.

1.3. Certification

23. Each avionics product/(sub-)system to be installed on an aircraft has to be certified separately for each aircraft type on which it will be installed. Certificates for avionics equipment are granted in the U.S. by the FAA (Federal Aviation Administration) and in Europe via the JAA (Joint Aviation Authorities) by the national civil aviation authorities. The certification procedure is normally granted on an aircraft-level basis, whereby all components and parts of the aircraft are certified together, known as Type Certification (TC). For modifications on existing aircraft, a Supplemental Type Certification (STC) will be granted. Both TC and STC are forms of design approval. OEMs apply for TC and occasionally suppliers apply for STC. Production certifications to the supplier are granted only after the issuance of the TC/STC.

24. The certification procedure is lengthy (from one to three years for the avionics and other systems in a new aircraft and from one to six months in case of a supplemental certification where only a few components are being changed) and costly (between 5% and 20% of the development costs of the avionics for a new platform, that is, up to USD 10 Mio and between USD 0.1 and 1 Mio in case of a supplemental certification involving a change of a few components).

1.4. Standardisation

25. In the Air Transport segment, there is a considerable degree of standardisation in avionics products, at least for BFE sold to airlines. The airline operators depend on

standardised avionics to create interchangeability of avionics in order to promote competition and freedom of choice.

26. The standardisation is carried out by the Airlines Electronic Engineering Committee (AEEC). This organisation adopts standards that are formulated by the organisation ARINC (Aeronautical Radio Incorporated) on behalf of the AEEC. The AEEC comprises representatives from, amongst others, the major U.S. airlines, the European Airlines Electronics Committee (EAEC), and the Oriental Airlines Association. The major avionics suppliers and OEMs usually also take part in discussions on standardisation.

27. ARINC standards define the 'form, fit and function' of the avionics products to be inserted in the aeroplane. They cover a range of component characteristics, including interfaces (analogue and digital bus architecture), minimal functionality, inter-operability, size, weight, voltage, cooling and even colour.

28. ARINC standards apply foremost to BFE in the Air Transport segment. ARINC standardisation is carried out on a voluntary basis and is not a legal requirement; although it may help to obtain the necessary (FAA) certification, adherence to an ARINC standard is not required for certification purposes. ARINC standards currently exist for most of the avionics (BFE) equipment in Air Transport, with the notable exception for EGPWS/TAWS (Enhanced Ground Proximity Warning System/Terrain Avoidance Warning System) (see below).

29. For products sold in other aviation segments, standardisation generally does not apply. The organisation GAMMA (General Aviation Manufacturers Association) has a modest standardisation role in the Regional/Business and General Aviation segments. However, its standards cover a mere four digital bus specifications.

2. Affected product markets

30. The market investigation has shown that products that perform the functions necessary to operate an aircraft are constantly evolving as a result of product innovation and integration. Especially in the Air Transport segment, there is a trend towards product integration, whereby functions which were, for instance, carried out by two stand-alone avionics products are now being integrated into a single sub-system. The ADIRS/ADIRU (Air Data Inertial Reference System/Air Data Inertial Reference Unit) is an example of such an integrated product : it combines the functions of the IRS (Inertial Reference System) and the Air Data Computer. In the Regional/Business segment the integration process has already lead to fully integrated avionics suites, where all avionics functions are integrated into a system. In the General Aviation segment the cockpit is federated, which means that different stand-alone avionics products/(sub-)systems are wired together.

31. The parties have identified five product markets, which, due to the overlapping products of AlliedSignal and Honeywell, would be affected by the merger. In the Air Transport segment the affected markets are the market for ACAS (Airborne Collision Avoidance System) Processors and Mode S Transponders and the market for CMU (Communication Management Units) and ACARS (Aircraft Communication Addressing and Reporting Systems). In the Regional/Business segment the affected markets are also the market for ACAS Processors and Mode S

Transponders and the weather radar market. In the segment for Civil Helicopters the market for weather radar is affected by this operation.

2.1. ACAS Processor and Mode S Transponder

Air Transport

32. An ACAS Processor is considered to be the brain of the collision avoidance system. It provides pilots with information on surrounding traffic and provides alerts when nearby traffic is (or has the potential to become) a hazard. An ACAS Processor is mandatory in Europe and in the US for certain types of aircraft[6] - mainly, all aircraft in the Air Transport and Regional/Business segments. An ACAS Processor is generally BFE.

33. The Mode S Transponder sends and receives signals to and from other aircraft, including unique identification and altitude and speed information. Mode S Transponders function together with ACAS Processors for the identification of other planes and their bearing, as well as determining the appropriate response to a threat of collision. However, a Mode S Transponder also has functions other than working with the ACAS Processor, such as communication with the Air Traffic Control (ATC) system and for usage in the new FMS (Flight Management System). The anti-collision avoidance system further consists of antennae, control heads and a display.

34. The parties further submit that ACAS Processors and Mode S Transponders are generally bought together from the same avionics supplier. This has not been confirmed by the market investigation. It has become apparent that ACAS Processors and Mode S Transponders have different functions, although operating together. Moreover, the only suppliers of Mode S Transponders in this segment are the suppliers of ACAS Processors.

35. On the basis of the above, it could be concluded that ACAS Processors and Mode S Transponders belong to different product markets. However, given that the assessment of the case would not be different if ACAS Processors and Mode S Transponders were considered as belonging to one market, the definition of the relevant product market can be left open.

Regional/Business Aviation

36. In this segment ACAS Processors and Mode S Transponders do not only have different functions; they are generally not sold together. The Mode S Transponder is in general integrated in the avionics suite, whereas the ACAS Processor is supplied on a stand-alone basis.

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6 Europe : an ACAS is mandatory by 1 January 2000 for all aircraft with more than 30 seats or weighing more than 15000 kg carry and by 1 January 2005 for all aircraft with more than 19 seats or carrying more than 5700 kg.
US : an ACAS (called TCAS II) - which provides audible resolution guidance – has been mandatory for all passenger aircraft in excess of 30 seats since 1993. A TCAS I (i.e. an ACAS without audible resolution guidance) has been mandatory since 1995 for passenger aircraft with more than 10 seats.

37. On the basis of the above, it could be concluded that ACAS Processors and Mode S Transponders belong to different product markets. However, given that the assessment of the case would not be different if ACAS Processors and Mode S Transponders were considered as belonging to one market, the definition of the relevant product market can be left open.

2.2. CMU and ACARS

38. CMU provide the two-way communication link between an aircraft and the ground control centres. The system transmits and receives text and data messages. According to the information provided by the parties, ACARS provide the same functionality as CMU, but a CMU has additional functions that allow for routing and prioritisation of incoming information. The parties have submitted that prices of both products, at least of those provided by Allied Signal, are identical.

39. The results of the market investigation have indicated that CMU are largely viewed as an evolution of ACARS, since the former have a higher level of functionality. According to others, the current version of ACARS now implements the CMU protocols and the costs of both systems would be similar.

40. One of the major airframe manufacturers (Airbus) is installing the ATSU (Air Traffic Services Unit) system supplied by Aerospatiale Matra (which includes CMU/ACARS functions) on new aircraft. The parties claim that this product competes directly with their own CMU/ACARS products, which has been confirmed by the investigation.

41. On the basis of the above it can therefore be concluded that CMU and ACARS belong to the same product market.

2.3. Weather radar

Regional/Business Aviation

42. Weather radar provides pilots with detailed visual information on the weather surrounding and ahead of the aircraft, permitting the pilot to avoid dangerous weather conditions. It displays rainfall, turbulence and, in certain models, windshear. In the Regional/Business segment most weather radar is supplied as part of an integrated cockpit.

43. The market investigation has shown that weather radar in the different aviation segments clearly constitutes a different product in terms of size, functions and price. Weather radar in Air Transport is supplied as BFE, generally includes predictive windshear and has a much larger, heavier and more expensive antenna than in the other aviation segments. Weather radar in the General Aviation segment offers fewer features and lower performance.

44. On the basis of the above it can therefore be concluded that weather radar in the Regional/Business segment constitutes a different product market from weather radar in the other aviation segments.

Civil Helicopters

45. Weather radar for Civil Helicopters includes specialised search and surveillance features (used in search and rescue operations and to identify destinations, particularly off-shore oil platforms). These products have historically been installed principally in helicopters. The weather detection capability plays only a secondary role. Weather radar used in other aviation segments does not have these search and rescue characteristics.

46. On the basis of the above it can therefore be concluded that weather radar for Civil Helicopters constitutes a distinct product market.

3. Other avionics and non-avionics products for commercial aviation

47. Within the avionics sector, a number of other product markets can be identified which, according to the parties and the market investigation, would constitute separate product markets, but on which the parties have no directly overlapping activities (see also the table preceding paragraph 62). Some of the products listed below are in fact (sub-) systems that could be further distinguished into single products. However, the decision whether they constitute different product markets or not can be left open (with the exception of TAWS), since the assessment would not be different if such a further distinction were made.

48. Based on their functionality these avionics products/(sub-)systems can be grouped into four categories : equipment for surveillance, communication, navigation and a last category containing all other remaining avionics.

49. These avionics products/(sub-)systems are supplied in the Air Transport segment, in the Regional/Business segment and some also in the General Aviation segment. However, as mentioned above in paragraph 12, the products and systems belonging to different aviation segments constitute different product markets.

3.1 Surveillance products

50. TAWS (Terrain Avoidance Warning System) is a system that provides the flight crew with a map-like display of nearby terrain and sounds an audible alert about a minute's flight time or more away from the terrain (such as the ground, a mountain, etc.). AlliedSignal is the only supplier of a certified TAWS, with its EGPWS (Enhanced Ground Proximity Warning System). TAWS is SFE. However, as there will be a mandate for TAWS, many airlines are buying TAWS as retrofit. The predecessor of AlliedSignal's EGPWS is the GPWS (Ground Proximity Warning System).

51. On the basis of the above it can be concluded that there is a market for TAWS.

52. Other surveillance products are ACAS Processors and weather radar, respectively at paragraphs 32 to 37 and paragraphs 42 to 46.

3.2. Communication equipment

53. Communication Systems are a combination of avionics products that allow the flight crew to communicate with ground and air resources and to identify the aircraft to air traffic control systems and other aircraft. They include many products such as

radios, satellite communication systems (SatCom), CMU/ACARS, Multimode Radio/Receiver (MMR, which provides precision approach guidance to airports and non-precision approach guidance using its built-in GPS, meaning Global Positioning System) and others.

3.3. Navigation equipment

54. This equipment navigates the aircraft to the appropriate destination and includes many products such as Global Positioning Systems (GPS), the Air Data Computer, which computes aircraft airspeed, altitude and vertical speed, IRS (Inertial Reference Systems) which are the primary airframe motion sensors and navigation sensors used by a multitude of avionics systems, ADIRS/ADIRU (Air Data Inertial Reference System/Air Data Inertial Reference Unit) which combine the Air Data Computer with the IRS, Fly-by-Wire, Flight Controls (automatic pilots) and Flight Management Systems (FMS). The latter consists of a central processor, display and keyboard and is connected to the aircraft's sensors. Based on data received from those sensors and the pilot, the FMS calculates the most fuel-efficient route, controls speed and thrust for optimum fuel economy, automatically complies with speed and altitude restrictions, advises the pilot of proper landing speed and makes other calculations for a safe and efficient flight.

3.4. Other avionics products

55. These are, inter alia, displays, head-up displays, Cockpit Voice Recorders (CVR) and Flight Data Recorders (FDR). CVR and FDR are the so-called "black boxes" which safety investigators look for to determine the cause of an aircraft accident. Furthermore, there are still some other products, which the parties do not deal with (mainly controls).

3.5. Other non- avionics aerospace products

56. These include In-Flight Entertainment products, APUs and wheels and brakes.

4. New integrated products in surveillance avionics

IHAS (Integrated Hazard Awareness System)

57. The market investigation has pointed out that the trend towards further product integration in avionics is general, but that the area of hazard surveillance is particularly suited to further product integration. The product integration could be limited to ensuring a better inter-operability of the stand-alone hazard surveillance products. (Examples of such improved inter-operability already exist since it is currently possible to show weather radar and EGPWS information on a single display; also, with the assistance of Boeing, AlliedSignal has developed a system that prioritises alerts in the cockpit.) The integration of hazard surveillance products is actually expected to go much further - as far as the development of a new integrated 'black box' which integrates the functionalities of ACAS Processor, weather radar and TAWS. AlliedSignal has announced its commitment to developing a complete 'Integrated Hazard Awareness System' (IHAS) which they would like to have as standard equipment on the new Airbus 3XX. It has set up a business unit especially for IHAS development.

58. The market investigation has shown that there would be a clear demand for such a product, as it would lead to increased flight safety. Therefore, it can be concluded that a future market for an integrated hazard awareness system exists.

B. Geographic market definition

59. The relevant geographic market for avionics products is, according to the parties, world-wide. This has been recognised by the Commission in prior decisions relating to the equipment for civil aircraft[7] and has been confirmed by the investigation.

C. Competitive assessment

1. General

60. This operation will lead to the combination of first- and third-largest world-wide suppliers of commercial avionics, namely Honeywell and AlliedSignal. The parties' main competitors are Rockwell Collins and Sextant, but there are also smaller players such as Litton and Smiths Industries, who do not produce a range of avionics products. The parties' turnover in commercial avionics would account for 40% - 50 % of the overall turnover in commercial avionics, whereas Rockwell Collins and Sextant would have a share of 20% - 30% and 10% – 20% respectively.

61. The new entity will be present in all aviation segments : Air Transport, Regional/Business Aviation and General Aviation. The Air Transport segment represents [between 50-60%]* of all sales of commercial avionics, whereas the Regional/Business segment and the General Aviation segment represent [between 30-40%]* and [less than 10%]* respectively.

7 E.g. Case IV/M. 697 – Lockheed Martin/Loral Corporation, Commission Decision of 27 March 1996: OJ C314, 24.10.1996, p.9; Case IV/M.290 - Sextant/BGT-VDO, Commission Decision of 21 December 1992: OJ C9, 14.01.1993, p.3.

1.1. Air Transport

Table 1 : presence in the Air Transport segment

	Product	AlliedSignal	Honeywell	Rockwell Collins	Sextant	Others
SURVEIL.	Weather radar (BFE)	X	-----	X	------	-----
	ACAS Processor Mode S Transponder (BFE)	X	X	X	-----	-----
	TAWS (SFE)	X	-----	-----	------	------
COMMUNIC.	Com/Nav (BFE)	X	-----	X	X	-----
	SATCOM (BFE)	-----[8]	X	X	-----	-----
	MMR (BFE)	X	-----	X	X	-----
	CMU/ACARS (BFE)	X	-----	X	-----	Teledyne Aerosp./Matra
NAVIGATION	GPS (stand-alone) (BFE)	-----	X	-----	-----	Litton
	IRS and ADIRS / ADIRU (SFE-option on Airbus)	-----	X	-----	X[9]	Litton
	Air Data Comp. (SFE)	-----	X	-----	-----	Smiths
	FMS (SFE-option on Airbus)	-----	X	-----	X[10]	Smiths
	Flight Controls (SFE)	-----	X	X	X	GEC
OTHER AVIO.	Head-up displays (SFE)	-----	-----	X	X	-----
	Displays (SFE)	-----	X	X	X	-----
	Recorders (BFE)	X	-----	-----	-----	L3Communica-tions, Universal, SFIM
	Controls, Monitoring, Measurement and Warning systems	-----	-----	-----	X	BECO, Smiths, Eldec
NON-AVION.	In-Flight Entertainment	-----	-----	X	X	Sony, Matsushita
	APUs	X	-----	-----	-----	UTC
	Wheels and Brakes	X	-----	-----	-----	ABS, BFGoodrich, Dunlop, Snecma/Messier-Bugatti

8 Although AlliedSignal has been a distributor of an antenna (made by Dassault), this agreement has now come to an end and AlliedSignal is no longer active with regard to SATCOM.

9 Sextant is developing an ADIRU with Litton. This is a SFE-option on Airbus aircraft. Sextant/Litton have obtained half of the orders on new Airbus aircraft.

10 Sextant is developing and FMS with Smiths. This is SFE-option on Airbus aircraft. Sextant/Smiths have obtained two-thirds of the orders on new Airbus aircraft.

62. The merged entity will be able to provide a broader range of avionics products to the airlines (BFE) and to the two OEMs, Boeing and Airbus (SFE-avionics). As can already be seen from this Table (and as will be explained further below), in comparison with its competitors, the parties will be particularly strong in safety avionics, namely products used for surveillance (ACAS Processor, TAWS and weather radar). AlliedSignal and Honeywell are both strong suppliers of ACAS Processors and Mode S Transponders. AlliedSignal is one of the two suppliers of weather radar and is the only company with TAWS. On Airbus aircraft AlliedSignal's former product range offered to the airlines is extended with SatCom (BFE) and with FMS and ADIRS (both SFE-option). Honeywell's SFE product range is enlarged with TAWS (SFE). However, even after the merger there will be no company that can supply aeroplane to the airlines and to the OEMs all the avionics necessary to operate an Air Transport.

1.2. Regional and Business Aviation

63. As has already been mentioned, in this segment a further segmentation between forward-fit and retrofit can be made. The system integrators supplying the forward fit sub-segment, do not provide stand-alone products, whereas the suppliers of stand-alone products do not supply integrated avionics suites. The parties therefore submit that there is no competitive overlap between them. As regards forward-fit, there are only three system integrators : Honeywell and Rockwell Collins, each having a similar share of sales, with Sextant as an emerging player. AlliedSignal is an important provider of stand-alone products to airlines for retrofit, but also to system integrators.

1.3. General Aviation

64. Only AlliedSignal is present in this aviation segment and is an important supplier for many products.

2. Effects of the operation on the affected markets

2.1. General

65. The market data referred to below are generally based on the market investigation and on the parties' best estimates, acquired through their own market research. The parties have had to rely on such estimates owing to the absence of publicly available market research data. The parties have principally based their evaluation of the market on deliveries made of the product referred to, rather than on orders placed. The notifying parties submit that data based on orders are not reliable in determining actual future sales, since customers frequently reduce or eliminate (or sometimes expand) orders after they have been placed. For the products of the affected product markets there is only a short time-lag between the purchase order and the delivery, and therefore the parties are of the opinion that data based on purchase orders would not probably differ significantly from deliveries. In order to properly evaluate the market strength of the competitors in the market, the Commission considers it appropriate to look also at orders placed, given that these would better indicate the current competitive potential of the producers. However, the market investigation did not allow an adequate picture to be drawn on the basis of orders, one of the reasons being the apparent discrepancies in what market operators consider "orders" (only fixed orders or those inclusive of options). For the above reasons (and especially

because there is only a short time-lag between purchase orders and deliveries) the data used in the assessment are based on deliveries. Nevertheless, the assessment (paragraphs 66 *et seq*.) is also based on orders where appropriate.

2.2. ACAS Processors and Mode S Transponders

Air Transport

66. The total world-wide market for ACAS Processors and Mode S Transponders has expanded, following a European mandate for these products, from USD [between 50-60]* Mio in 1996 to USD [between 130-140]* Mio in 1998. On this market the notifying parties would have a combined market share of [between 65-75%]* (AlliedSignal [between 30-40%]*; Honeywell [30-40%]*). The only competitor is Rockwell Collins, with an estimated market share of [30-40%]*. Since 1996 AlliedSignal's market share has remained stable, whereas the market share of Honeywell has risen from [between 15-25%]* to [30-40%]*, leading to a decline of Rockwell Collins' share from [between 40-50%]* in 1996 to [25-35%]* in 1998.

67. The parties submit that Sextant has announced that it has, in conjunction with Dassault and Thomson-CSF, Sextant's parent company, the technology to produce ACAS. According to the parties, BF Goodrich, which already has a TCAS I product, and GEC Marconi are also likely potential entrants. However, third parties have indicated that it is not clear whether these projects mentioned by the parties will materialise, especially if the present merger were to be completed.

68. The parties argue that the large combined market share will not give them the chance to behave to any significant degree independently from competitors and customers, for the following reasons: (a) the shares of demand for ACAS fluctuate substantially between the world's regions and are not an indicator of market power; (b) the ACAS market volume is decreasing; (c) customers exercise great buyer-power; (d) the barriers to entry are low and (e) ACAS is susceptible to technology leap-frogging.

69. With regard to the parties' first argument, it has to be noted that the geographic scope of the market to be taken into account is world-wide and not regional. Furthermore, following the transaction the market structure in each region will be very similar: the parties will have a market share of [more than two thirds]*.

70. The parties submit as a second argument that the ACAS market volume is decreasing, since that almost all passenger aircraft in the US are equipped with ACAS and that approximately 90% of the potential retrofitting orders for Air Transport in Europe have already been placed. Since there is no after market for ACAS - as the system has an extremely long life-cycle - the future market for ACAS for Air Transport will acordingly be limited to new aircraft estimated to be 600 to 800 Air Transport aircraft per year world-wide. The parties submit that with decreasing demand, competition between the remaining suppliers is expected to become even more ferocious.

71. With regard to this argument it has to be noted that, given the decreasing volume, the likelihood that new suppliers will enter this market diminishes, since they will not be able to spread their development costs over a sufficient product volume.

72. With regard to buying power, the parties have submitted that there is a high degree of purchasing power in the market. The parties submit that should they seek to exercise any market power, customers are strong enough to retaliate. In fact, the parties

submit that their large product range makes them more vulnerable to such retaliation than smaller suppliers, since the effects of retaliation would have much greater consequences, by affecting the sale of all products in their range.

73. The Commission has considered whether the purchasing power is such that no competition concerns would arise, in spite of the high market share resulting form the merger. Demand in the Air Transport avionics market is indeed concentrated, as far as the OEMs are concerned. They undoubtedly have strong buying power. However, at the level of airlines this is much less the case, the group of customers being much larger and including many smaller (national) airlines. On the other side, the structure of supply in avionics is highly concentrated. That level of concentration will further increase following the merger. Consequently, the Commission has come to the conclusion that the purchasing power of the customers with regard to ACAS, which is bought by the airlines, would not outweigh the position of the new entity.

74. As regards barriers to entry, these are in general considered to be very high in the field of avionics, owing to the complex technical nature of the products. The market investigation has pointed out that market entry is not to be expected. With particular regards to ACAS Processors and Mode S Transponders, the parties themselves submit that it takes some two years and around USD 10 million to develop an ACAS Processor. Furthermore, the market investigation has shown that ACAS Processors and Mode S Transponders are sophisticated high-technology products that have to match the environment in which they have to operate.

75. Moreover, in order to enter the market and acquire a position on the market, the new entrant could offer the products at lower prices. However, this requires the new entrant to be able to sell at least large quantities of the products in order to amortise R&D costs. Given the presence of the combined entity, the new entrant may, however, be precluded from benefiting from the required economies of scale.

76. With regard to the parties' argument that the ACAS Processor will be susceptible to technological leap-frogging, it has to be noted that the market investigation has shown that it will take some 10 years before ADS-B ("Automatic Dependent Surveillance/Broadcast") - a satellite-based situational awareness tool - could be extended to include collision-avoidance functions and be certified by the civil aviation authorities. Therefore, this last argument cannot be accepted.

77. Furthermore, it has to be noted that the parties' strong position on the market for ACAS Processors also has an effect on the future market for IHAS, since the ACAS Processor is one of the key elements of this system (see also at paragraph 93 *et seq.*).

78. On the basis of the above, there are serious doubts about the compatibility of the operation with the common market and the EEA Agreement, on the grounds that the operation would lead to the creation of a dominant position with regard to ACAS Processors and Mode S Transponders in the Air Transport segment. However, the remedies described (see also at paragraph 125 *et seq.*) address this specific issue.

Regional/Business Aviation

79. The total world-wide market for ACAS Processors and Mode S Transponders in this segment has expanded, following the European mandate, from USD [45-55]* Mio in 1996 to USD [95-105]* Mio in 1998. On this market the notifying parties have a

combined market share of [70-80%]* (AlliedSignal [25-35%]* and Honeywell [40-50%]*). The competitors are Rockwell Collins with a market share of [20-30%]* and BF Goodrich with a [0-5%]* market share. The latter however, has no ACAS conforming to the European mandate, but only has a TCAS I product (see also at paragraph 67). Since 1996 AlliedSignal's and Honeywell's market share has been increasing from [10-20%]* and [10-20%]* respectively, to [25-35%]* and [40-50%]*, leading to a decline in Rockwell Collins' share from [60-70%]* in 1996 to [20-30%]* in 1998.

80. The parties submit that after the execution of the European mandate the market volume for ACAS in Regional and Business Aviation will be decreasing and will consist only of 150 to 250 new aircraft annually world-wide. The parties submit that with decreasing demand, competition between the remaining suppliers is expected to become even more ferocious.

81. With regard to this argument it has to be noted that, given the decreasing volume, the likelihood that new suppliers will enter this market diminishes, since they will not be able to spread their development costs over a sufficient product volume.

82. Further reference must also be made to the section on ACAS Processors and Mode S Transponders in Air Transport, since the same reasons as regards barriers to entry and buying power apply to this aviation segment.

83. On the basis of the above there are serious doubts about the compatibility of the operation with the common market and the EEA Agreement, on the grounds that the operation would lead to the creation of a dominant position with regard to ACAS and Mode S Transponders in the Regional/Business segment. However, the remedies described below (at paragraph 125 *et seq.*) address this specific issue.

2.3. CMU/ACARS

84. CMU is generally BFE. In 1998 the market was worth USD [15-25]* Mio. According to the information provided by the parties, AlliedSignal had a share of sales of [45-55%]* world-wide in 1998. Honeywell has not yet started to supply its stand-alone CMU, but has already been able to secure orders for it. Rockwell Collins has a [30-40%]* and Teledyne an [5-15%]* estimated market share. This information has been largely confirmed by the market investigation, although the share of the new entity is even smaller.

85. Aerospatiale Matra is offering the ATSU on Airbus aircraft. The parties expect that by the beginning of 2000 over 95% of the Airbus aircraft with datalink will have the ATSU system and will therefore no longer need a CMU or ACARS.

86. The proposed operation will have the effect that AlliedSignal's position will be reinforced, since Honeywell has already been able to secure orders for its stand-alone CMU. However, given the fact that Rockwell Collins and Teledyne are now also offering a stand-alone CMU and that Aerospatiale Matra has launched the ATSU, the operation will not lead to the creation or strengthening of a dominant position with regard to CMU and ACARS.

2.4. Weather radar

Regional/Business Aviation

87. The total world-wide market for weather radar for Regional/Business Aviation has grown from [25-35]* Mio USD in 1996 to [35-45]* Mio USD in 1998. On this market the notifying parties have a combined market share of [35-45%]* (AlliedSignal [0-10%]*; Honeywell [30-40%]*). The only competitor is Rockwell Collins, with an estimated market share of [55-65%]* in 1998.

88. Given that the increment in market share is very small, that AlliedSignal is mainly a supplier of weather radar for retrofit whereas Honeywell is a supplier of weather radar for forward-fit, and that the parties' only competitor has a market share of more than 50%, it can be concluded that no dominant position will be created or strengthened on the market for weather radar for Regional/Business Aviation.

Civil Helicopters

89. The total world-wide market for weather radar for civil helicopters amounts to USD [5-15]* Mio in 1998. On this market the notifying parties have a combined market share of 100% (AlliedSignal [75-85%; Honeywell [15-25%]*), whereby AlliedSignal is supplying a stand-alone weather radar for retrofit and federated cockpits and Honeywell focuses on forward fit integrated cockpits.

90. The parties submit that Fiar is competing for new programs and that Rockwell Collins has a weather radar product designed for military aviation that could be certified for use on civil helicopters.

91. The parties further submit that as the beaconing capabilities of the weather radar will be no longer needed an account of the elimination of beacon technology and its replacement by GPS, weather radar in civil helicopters can be replaced by weather radar for General Aviation or by higher-end avionics suites.

92. However, given the fact that there are no other actual suppliers of weather radar for Civil Helicopters, there are serious doubts about the compatibility of the operation with the common market and the EEA Agreement, on the grounds that the operation would lead to a strengthening of a dominant position on the market for weather radar for Civil Helicopters. However, the remedies described below (at paragraph 125 *et seq.*) address this specific issue.

3. Effects of the operation on other markets

TAWS and IHAS

93. The merger raises serious doubts about the compatibility of the operation with the common market and the EEA agreement, on the grounds that a dominant position would be strengthened on the market for TAWS and would be created on the future market for Integrated Hazard Awareness Systems (IHAS), for the reasons set out below. Although, as explained in the section on 'product market definition' above, one may distinguish the TAWS market according to the aviation segment in which it is sold, the analysis below covers all aviation segments where AlliedSignal is currently active.

The new entity currently has a dominant position on the market for TAWS

94. With its Enhanced Ground Proximity Warning System (EGPWS), AlliedSignal currently has a 100% market share.

95. The parties have submitted, however, that some five companies have TAWS products in development. These are Sextant, Universal Avionics, BF Goodrich, EuroTelematik GmbH (ETG) and British Aerospace.

96. The market investigation has pointed out that, although these companies have competing TAWS products in development and are anticipating their market entry, currently none of them has an established TAWS product on the market. Certification procedures are underway for Sextant's and Universal Avionics' TAWS products[11]. BF Goodrich's is developing a product that will be suited to a smaller number of business aircraft. ETG has a TAWS product available, although it is only suited for the General Aviation segment. British Aerospace's TAWS only has applications on military aircraft, so it is questionable how far their product would be suited for commercial applications.

97. The above shows that although currently AlliedSignal has a dominant position for TAWS, and any market entry will not be immediate, several companies may attempt to enter the market in the coming years and challenge the position of the new entity as the sole supplier. The expected growth in the market for TAWS (see below) makes such market entry attractive. However, as explained below, the merger will have the effect of increasing barriers to entry for such new entrants.

The anticipated growth in the market for TAWS leaves significant scope for market entry

98. Considerable market growth is anticipated for TAWS. That growth will be supported by the fact that mandates for TAWS will come into place. The earlier generation ground proximity warning systems (GPWS) are currently mandated in the US and Europe for all turbine-powered commercial aircraft and for turbine powered aircraft for 10 passengers or more. For TAWS (EGPWS), currently no mandate exists but there is a proposed FAA mandate which will make TAWS mandatory in 2002/2003 for new aircraft and by 2005 for existing aircraft respectively (for aircraft with a minimum of six passengers). In anticipation of those mandates, and because of the safety improvement which the product confers, the number of orders is expected to increase strongly. Currently, AlliedSignal has already taken orders for some 8,000 EGPWS. The parties have submitted that the current market for TAWS may cover as many as [10-20,000]* aircraft. The size of the market may be expected to attract new entrants. A further driver for market entry is that AlliedSignal has been until now the only supplier of TAWS, and market operators (including the parties) are expecting new TAWS suppliers to push market prices downwards, to the benefit of customers. However, in spite of (future) demand, new entrants, which already have to face certain hurdles in entering the market, are confronted with additional barriers to entry created by the merger.

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[11] The parties have provided information that Universal has in fact already sold its TAWS to an Indonesian (regional) airline company. However, type certification has still to be obtained.

As a result of the merger market entry barriers for competing TAWS are increased.

99. As was described in paragraph 97 and 98, a number of potential entrants exist on the market for TAWS. Even without the merger, these potential competitors would have a number of hurdles to overcome in order to enter the market. For instance, new entrants face the problem that they do not have a reputation with an established TAWS product. Moreover, not all of the potential suppliers mentioned above have an established position both in Air Transport and in the Regional/Business aviation segment. For example, Universal Avionics is historically not a supplier of avionics in the Air Transport segment. In addition, in contrast with AlliedSignal, newcomers do not have an installed base of an earlier-generation product (i.e. the GPWS), which, apart from the reputation that it provides, can be beneficial for retrofit sales with existing customers. Finally, a new supplier would face (initially least) disadvantages relating to economies of scale.

100. From the fact that the above-mentioned suppliers are indeed working towards market entry, it may be concluded that although certain obstacles already existed prior to the merger, these are not considered insurmountable. However, the investigation has pointed out that as a result of the merger further obstacles are created, to the detriment of new entrants.

101. The new entity will be able to technically link its EGPWS to other avionics equipment, so as to reduce (potential) competition on the TAWS market. Indeed, Honeywell has a considerable market share for products with which a TAWS must inter-operate (on the input as well as on the output side), both in Air Transport and in the Regional/Business segment. Those products are, amongst others, the GPS, FMC (Flight Management Computer), Flight Controls and displays. In the Regional/Business segment, Honeywell has delivered around half of the integrated cockpits, into which a TAWS is to be retrofitted. If a new TAWS competitor were to wish to connect its product to such Honeywell equipment, it would have to have access to the technical interface information of that other equipment, so as to be able to make its TAWS inter-operable. The new entity could deprive any newcomer of such essential information (to the advantage of its own EGPWS), and thereby significantly limit the scope for market entry, both for retrofit and for forward fit TAWS.

102. The requisite interface information not only involues hardware specifications (for example as regards the size of the LRU (Line Replaceable Unit) and form of the connections), but also data, such as data on the electrical signals and the software specifications**.** Although a piece of the interface data may be defined in a public format, a large part of the interface information may be of a proprietary nature. It is noted that in the Regional/Business segments ARINC standards that would ensure an open infrastructure do not apply and that the interface data are completely of a proprietary nature[12].

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[12] In this regard an example provided by the parties may serve as an illustration: the parties have submitted a contract which shows that for previous integration of the EGPWS with a Honeywell display-product (EFIS-display), AlliedSignal had to pay a considerable amount of money to Honeywell to obtain the technical specifications of the EFIS, so that it could make the EGPWS compatible. Now, these costs would fall away, to the detriment of competitors of EGPWS, which either would not obtain the specifications or would have to pay large amounts, of money for them.

103. Therefore, whereas in general the technical bundling of avionics products would not be detrimental to competition (owing to the role of the OEMs and ARINC standardisation: see below (at paragraph 112 *et seq.*) under technical integration), in the area of surveillance products, and notably as regards TAWS, such negative effects could indeed occur. However, the undertakings submitted by the parties will provide adequate safeguards in the sense that they will ensure that Honeywell products and systems will have open standards so that future TAWS providers will not be further hampered in their attempts to enter the market. These undertakings are further described below (at paragraph 125 *et seq.*).

In the absence of alternative TAWS suppliers, the merged entity will be in a position to foreclose competition on the future market for IHAS (Integrated Hazard Awareness Surveillance System)

104. As was described above in paragraph 97 and 98, a number of companies are expected to try to enter the market with a competing TAWS technology. However, it is not certain that their entry will be successful. It may be, for example, that their technology proves to be inferior to the EGPWS. For the time being, there is no alternative TAWS available. In the investigation, market operators have stated that they feel that market entry may still take several years. They have expressed the view that if EGPWS technology remains the only established TAWS technology available, the new entity would, as a result of the merger, be able to foreclose competition for IHAS.

105. Although AlliedSignal already had available in-house the three products necessary for an integrated hazard surveillance system, Honeywell's engineering know-how will permit the new entity successfully to develop an IHAS, for the following reasons. According to its statements, AlliedSignal is primarily a provider of stand-alone products. Until now, AlliedSignal, although it has already announced the IHAS development, has had to rely on third parties (Boeing and Airbus) for further product integration. The fact that in the negotiations with Rockwell Collins for the supply of the EGPWS, AlliedSignal has insisted on a development in co-operative form and has insisted on obtaining a grant-back licence for newly developed integration technology, is an illustration of the more limited engineering capacity of AlliedSignal. Honeywell is a company that has long experience in integrating products and even supplying fully integrated cockpits. That experience is regarded as essential in designing an IHAS. [reference to internal document]*

106. As has been stated, a systems integration potential (engineering know-how) is required to further develop an integrated hazard surveillance system. That integration capability, in the general sense, is available with at least two other suppliers on the market, Sextant and Rockwell Collins, and, to a considerable degree also with the Air Transport OEMs. Rockwell Collins has shown its interest in obtaining the EGPWS functionality for further product integration and product development.

107. At present, the EGPWS of AlliedSignal is an essential element of an IHAS. Therefore the new entity will be able to control the future IHAS market. The parties have submitted that there are already a number of alternative suppliers of TAWS technology on the market. However as was explained in paragraph 96, there is as yet no established alternative for the EGPWS, and any third party wishing to develop an IHAS currently has to rely on AlliedSignal's EGPWS technology. That technology is

protected by several hundreds of patent, some of which are considered "key patents", especially for further product development.

108. Before the merger, AlliedSignal has shown a willingness to provide the EGPWS to third parties with a system integration capacity (see above as regards the Memorandum of Understanding negotiated with Rockwell Collins), which would allow such product development. After the merger, the new entity will have no incentive to supply such an essential input to its competitors. The product development of IHAS in a more competitive environment will therefore be restricted, and as a result the new entity would have the capacity and capability to become dominant on the future market for IHAS.

Conclusion for the TAWS market and the future market for IHAS

109. For the above reasons, the Commission considers that there are serious doubts as to the compatibility of the operation with the common market and the EEA Agreement, on the grounds that the merger will lead to the strengthening of a dominant position for TAWS and to the creation of a dominant position on the future market for IHAS. However, the undertakings provided by the parties discussed below (at paragraph 125 *et seq.*) will provide an adequate remedy.

4. Range-effects

110. Third parties, and in particular competitors, have complained that the merger would harm competition because of foreclosure effects that would occur. Such effects would be due to the fact that the new entity would be in a position to offer a broader product range (of avionics as well as non-avionics products) than any other competitor. That broader product range would give the new entity an increased ability to technically integrate products and to offer packages of avionics products (multi-product bids). According to those third parties, the consequence would be that competitors who offer (stand-alone) products in competition with the new entity, but who cannot benefit from a similar product range, would be put at such a competitive disadvantage that clients would no longer consider buying products from them. In the end, this would lead to a loss of competitors, which, in an industry which is already highly concentrated, would work to the detriment of customers of avionics.

111. Given these allegations, the Commission has investigated in how far the merger would offer the new entity such competitive advantages and if these would result in the creation or strengthening of a dominant position.

4.1. Technical integration

112. The market investigation has shown that in general it is considered an advantage that a company is able to supply a larger range of products. A supplier can thereby ensure a certain common core in its product range and ensure an enhanced inter-operability of such products, especially where these products are within the same category of avionics products (communication, navigation, and surveillance). From internal documents supplied by the parties it appears that they themselves see improved interfaces between their respective avionics products as a particular opportunity resulting from the merger. As long as such technical integration does not lead to foreclosure effects, improved technical inter-operability may generally be considered to be in the interest of customers (although OEMs in the Air Transport segment in

many instances prefer to carry out technical integration themselves and therefore do not necessarily see this as a benefit).

113. The investigation has shown it to be unlikely that the potential of the new post-merger entity to technically bundle products will significantly impede competition. Firstly, this is because, in the Air Transport segment, the OEMs have a considerable engineering capability themselves and would only allow the technical bundling of avionics to take place if it was to their own advantage. Secondly, ARINC standardisation is widespread in Air Transport, so that the potential to link products through proprietary interface technology is very limited. Thirdly, there are third-party suppliers available for all the products which the new entity would supply, (with the exception of TAWS; see paragraph below), so that there is scope for customers to retaliate in the event of any unwanted technical bundling. Lastly, for the Regional/Business segment the technical bundling issue would not manifest itself to the same extent, since competition already takes place for complete integrated cockpits, and in the General Aviation segment, cockpits are 'federated' (non-integrated) and there are no indications that this will change subsequent to the merger.

114. A notable exception to the above, however, is the area of TAWS and surveillance equipment, where the new entity would be the only supplier with a TAWS. Also it will be in a strong position for weather radar and ACAS Processors and Mode S Transponders. The above description of TAWS and IHAS makes clear that, in the absence of the undertakings discussed below, foreclosure effects might occur as a result of technical bundling practices, both in the Air Transport and in the Regional/Business segments. The remedies described below (at paragraph 125 *et seq.*) will serve to prevent such a situation from occurring.

4.2.Commercial aspects

Range-effect in relation to the OEMs in Air Transport

115. The market investigation has indicated that any range-effect relating to multi-product bids is not likely to arise in relation to the OEMs, who are the customers for SFE and SFE-option. In developing a new aircraft, the OEMs request separate bids for non-avionics and avionics products, which take place at different stages in the development phase of an aircraft, as well as separate bids for the individual avionics products.

Range-effect in relation to the airlines

116. As was mentioned in paragraphs 17 to 21, airlines buy BFE avionics and choose SFE-option avionics, which are in fact purchased by the OEMs. Following the merger, the product range that the new entity will have on offer to airlines will not be significantly extended. The focus of Honeywell's activities has been on the OEMs (SFE sales), with the exception of ACAS/Mode S Transponders and SatCom. Following implementation of the undertakings described below, Honeywell's ACAS/Mode S Transponders will be divested, whilst SatCom represents a relatively modest value, the overall world-wide market representing a value of some USD [30-40]* million.

117. The new entity will have a larger product range than its competitors. However, Rockwell Collins has an almost equivalent product range to be sold to airlines, and in

fact the value of all BFE avionics sold by Rockwell Collins is higher. Sextant also has a product range that is sold to airlines and it has a growing presence for SFE-option avionics (FMS and IRS/ADIRS/ADIRU[13]).

118. In addition, there is scope for competitors to extend their product range, either via internal development of products or by "teaming" with other competitors. Although competitors have pointed out that teaming is not an alternative, on account of the extra cost and organisation involved, it is considered that teaming can still be a realistic alternative. This is for instance the case for technical teaming, if an OEM asks avionics suppliers to co-operate in order to develop a new product (for example: Airbus has requested Sextant and Smiths to develop a new FMS and Sextant and Litton to make an ADIRU). With regard to commercial teaming it is true that disadvantages exist, but there are several examples where commercial teaming has been successful.

119. In relation to the airline customers the investigation has shown that the practice of negotiating packages of avionics products is relatively common in the industry, although data obtained from the parties show that such bids occur only in a minority of cases. Where such packaging has occurred, it has mostly taken place for forward-fit on new aircraft.

120. Moreover, the investigation has shown that customers can and do break the packages by "mixing and matching" products from various suppliers. That mixing and matching is facilitated by the fact that ARINC standards make products interchangeable. The parties have provided data, which show that only [20-30%]* of AlliedSignal's multi-product bids (representing [less than 10%]* of the total bid value) are not broken - that is, where airlines have decided to buy the whole package from the same supplier.

121. As to the option the new entity will have, just as AlliedSignal does at present, of offering packages of avionics and non-avionics, it must be noted that although packages of non-avionics and avionics have existed, they nevertheless are rare. In this respect the merger does not change the situation to any great degree. Moreover, there is no natural link between avionics and non-avionics. The airlines are sophisticated buyers who seek to purchase the best products from the various suppliers. It is therefore not likely that their choice of avionics products will be determined by the non-avionics products. In addition, Rockwell Collins and Sextant are both engaged in the rapidly growing market of In-Flight Entertainment, which are high-value products, whereas the new entity is not active in this respect. The annual market value of In-Flight Entertainment is estimated to be USD [1,000-2,000]* Mio, whereas the annual market value of APUs and wheels and brakes is estimated to be USD [150-250]* Mio and USD [800-1,300]* Mio respectively. In terms of the ability to supply avionics and non-avionics, these competitors would therefore be able to offer significant competition to the new entity. In any event the Commission notes that the parties have undertaken that they will not bundle avionics and non-avionics products in a single proposal to any aerospace customer unless (i) the customer to

[13] The ADIRU developed jointly by Sextant and Litton has obtained half of the orders on new Airbus aircraft. On FMS, Sextant is developing, together with Smiths, a new FMS for Airbus aircraft and they have secured two-thirds of the orders for new aircraft.

whom the proposal is submitted has requested this or (ii) a competitor has offered a similar bundle of products and the offer is intended to meet competition. If a customer requests alternative sources for any avionics product included in the bundle of products the parties will include alternative sources for that product in its offering.

122. In addition, the packages sold to airlines are likely to decrease in importance, given the increasing trend for supplies to be made on an SFE-basis rather than on a BFE-basis. This trend, which has been widely confirmed by the investigation, will have the effect that the OEMs, which already enjoy buying power, will be able to ensure the availability of choice.

123. As regards the airlines, therefore it can be concluded that the proposed operation will not give the new entity the scope to create or strengthen a dominant position.

Regional/Business Aviation

124. The market investigation also made it clear that in this segment Honeywell's product range is extended with TAWS, for which AlliedSignal is currently the only supplier. Consequently, Honeywell will have a commercial advantage over Rockwell Collins and Sextant, the only two competitors supplying integrated avionics suites. Indeed, the latter are dependent upon supplies of AlliedSignal/Honeywell in order to be able to supply an avionics suite, which includes TAWS. However, the remedies described below address this specific issue.

VI. UNDERTAKINGS SUMITTED BY THE PARTIES

125. In order to remove the serious doubts raised by the operation, AlliedSignal and Honeywell submitted on 15 October 1999 a proposal for modification of the operation in accordance with the terms of Article 8(2) of the Merger Regulation. This proposal involved undertakings related to the world-wide markets for ACAS Processors and Mode S Transponders (for Air Transport and Regional/Business Aviation) weather radar for Civil Helicopters and TAWS (all aviation segments)[14].

1. Description of the undertakings

126. As regards ACAS Processors and Mode S Transponders the parties have undertaken to divest Honeywell's entire TCAS business (including Mode S Transponders) in favour of a viable and independent third party, within six months of the Commission's decision. Once implemented, this will remove the overlap between the parties' activities in ACAS Processors and Mode S Transponders. An independent trustee will be appointed to report to the Commission, on inter alia the hold-separate obligation, the suitability of the purchaser, the conduct of the negotiations and whether the agreements with the purchaser properly provide for the divestiture of the relevant assets and business.

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[14] The parties have also submitted undertakings to the United States Department of Justice (DoJ). These commitments are the same as the ones submitted to the Commission, with two exceptions : the undertakings on TAWS are not included, but a divestiture of the parties' overlapping activities as regards their space and military activities is foreseen. In particular the parties have undertaken to divest AlliedSignal's Teterboro Space and Navigation Business (gyroscopes and navigation and pointing systems), its Cheshire Operations (IMU and gyroscopes), and its MicroSCIRAS Technology.

127. With respect to weather radar, the parties undertake to divest AlliedSignal's weather radar business which consists of the RDR-1400 and RDR-1500 series search and weather radar, in favour of viable and independent third party within six months of this Decision. Once executed, this will remove the overlap between the parties' activities with regard to weather radar for Civil Helicopters. As for ACAS Processors and Mode S Transponders, an independent trustee will be appointed to report to the Commission on the issues mentioned above.

128. In respect of TAWS, the parties undertake to provide any supplier of TAWS seeking to make its TAWS product interface with any of the parties' other avionics products with all licenses and interface specification data necessary to enable the TAWS product to interface with the parties' avionics products. These undertakings will be of unlimited duration. The parties also undertake to supply EGPWS boxes, EGPWS modules (that is, a circuit card assembly module with a standard or a customised interface) and future products with TAWS functionality on a non-discriminatory basis to other (potential) avionics suppliers and aircraft manufacturers. The parties will also provide them with all licenses and interface specification data necessary to enable them to interface their products with the EGPWS boxes, EGPWS modules and future products with TAWS functionality supplied by the parties. This undertaking will remain in effect for a period of eight years from the date of the Commission's decision. However, supplies of EGPWS boxes, EGPWS modules or other implementations of TAWS functionality pursuant to the undertakings, as well as interface data, will be provided as long as an aircraft and/or platform in which that product is installed or designed to be installed remains in production. To ensure compliance with the undertaking relating to TAWS, an independent expert will be nominated and an arbitration procedure will be established.

129. The Commission conducted a market test to verify that the proposed undertakings were sufficient to remove the competitive concerns raised by this operation. In view of the market test certain modifications to the proposed undertakings were submitted on 27 October 1999. The final divestment proposal is set out in more detail in the text of the modification as accepted, which is annexed hereto and forms an integral part of this Decision.

2. Assessment of the undertakings

130. The undertakings have the effect of eliminating the overlap created by the merger for ACAS Processors and Mode S Transponders in the Air Transport and Regional/Business segments and for weather radar for Civil Helicopters. With respect to TAWS, the undertakings have the effect of removing the barriers to entry created by the merger and will ensure that further product integration and future product development by third parties remains possible.

131. In first phase, the parties also submitted undertakings with respect to ACAS Processors and Mode S Transponders and weather radar for Civil Helicopters. However, these undertakings were not considered to be sufficient to remove serious doubts, for the following reasons. Firstly, with respect to ACAS Processors and Mode S Transponders, the parties undertook to divest AlliedSignal's business. According to the market investigation, AlliedSignal's products were the less advanced products of the parties' ACAS Processors and Mode S Transponders. Secondly, as regards weather radar for Civil Helicopters, the parties undertook to

divest only one product line, which, according to the market investigation, did not constitute a viable business.

132. The proposed divestment, submitted in the second phase, of Honeywell's TCAS business, including ACAS Processors and Mode S Transponders, which are according to the market investigation the state-of–the-art products, corresponds to a market share of [30-40%]* in the Air Transport segment and of [40-50%]* in the Regional/Business segment and removes all overlap between the parties on these markets. Moreover, the TCAS divestment, together with the undertakings concerning TAWS, will influence the parties' position in the area of surveillance avionics. This divestment will also allow the purchaser of this business to extend its scope for offering packages of avionics products.

133. With respect to the proposed divestment of AlliedSignal's weather radar business for Civil Helicopters, it has to be noted that this divestment represents a market share of [75-85%]* and eliminates all overlap between the parties on this market.

134. As regards TAWS, the parties' commitment to provide any supplier of TAWS with all licences and interface specification data necessary to enable its TAWS product to interface with the parties' avionics products, will have the effect of removing the barriers to entry created by the merger. The new entrant will be able to hold, free of charge and for an unlimited period, all the information needed to make its TAWS product inter-operate with the merged entity's products.

135. With respect to the parties' commitment to supply EGPWS boxes, EGPWS modules and future products with TAWS functionality to other (potential) avionics suppliers and aircraft manufacturers (including all licences and interface specification data necessary for interface purposes), this undertaking has the effect that (potential) avionics suppliers and aircraft manufacturers desiring to integrate the merged entity's TAWS products into their integrated avionics suite or into a new integrated surveillance system can do so on equal terms. Further product development of more integrated systems, including IHAS, will therefore remain possible, both technically and commercially.

VII. CONCLUSION

136. Consequently, the Commission concludes that, subject to full compliance by AlliedSignal and Honeywell, their subsidiaries, successors and assigns, including the new company created by the merger, namely Honeywell International Inc., with the conditions and obligations laid down in Annex I, the proposed concentration will not create or strengthen a dominant position as a result of which effective competition would be significantly impeded in the common market, or in a substantial part of it, or in the EEA,

HAS ADOPTED THIS DECISION:

Article 1

Subject to full compliance by AlliedSignal and Honeywell, their subsidiaries, successors and assigns including the new company created by the merger, Honeywell International Inc, with the conditions and obligations contained in the commitments laid down in Annex I, the concentration by which AlliedSignal and Honeywell propose to enter into a full merger is declared compatible with the common market and the functioning of the EEA Agreement.

Article 2

This Decision is addressed to:

AlliedSignal Inc.
101 Columbia Road
PO Box 1087
Morristown
New Jersey 07962-1087
USA

and

Honeywell Inc.
Honeywell Plaza
PO Box 524
Minneapolis
Minnesota 55440-0524
USA

Done at Brussels, 01.12.1999

For the Commission,

Mario MONTI
Member of the Commission

Annex II Glossary

Product	***Description***
ACARS	*Aircraft Communication Addressing and Reporting system*
ACAS Processor	*Airborne Collision Avoidance System:* helps prevent collisions by identifying and displaying the location of surrounding aircraft providing audible warnings and in advances versions manoeuvring instructions.
ADIRS/ADIRU	*Air Data Inertial Reference System/Unit:* device that combines the functions Air Data Computer and Inertial Reference System.
AEEC	*Airlines Electronic Engineering Committee*
Air Data Computer	The Air Data Computer computes aircraft "true" airspeed, altitude and vertical speed.
APU	*Auxiliary Power Unit:* generates the electrical power on the aircraft
ARINC	*Aeronautical Radio Incorporated*
ATC	*Air Traffic Control*
BFE	*Buyer Furnished Equipment:* refers to the buyer of the aircraft
CMU	*Communication Management Unit:* manages the two-way text and data communication link between an aircraft and ground control centres
Com/Nav	*Communication/Navigation:* transmits and receives pilot voice and other communications to/from ground or airborne operation centres.
CVR	*Cockpit Voice Recorder*
Displays	Electronic instrument systems that display information from avionics subsystems.
EAEC	*European Airlines Electronics Committee*
ECS	*Environmental Control Systems* : air conditioning systems, blend air control systems, cabin pressure systems and smoke detection systems
EGPWS/GPWS	*(Enhanced) Ground Proximity Warning System):* displays nearby terrain and warns of potential impact.
FAA	*Federal Aviation Administration (US)*
FDR	*Flight Data Recorder*
Flight Controls	autopilot systems.

FMC	*Flight Management Computer*
FMS	*Flight Management System:* helps flight crews compute the most efficient flight profile and automatically navigates the aircraft.
GPS	*Global Positioning System (satellite based)*
IHAS	*Integrated Hazard Awareness (or: Avoidance) System*
IRS	*Inertial Reference System:* are airframe motion sensors and navigation sensors that are used by other navigation systems (autopilot/flight director, attitude/heading display, flight management system weather radar antenna stabilisation and SATCOM antenna pointing).
JAA	*Joint Aviation Authorities (Europe)*
LRU	*Line Replaceable Unit:* standardised equipment 'black box'
MMR	*(Multi-Mode Radio/Receiver):* provides precision approach guidance to airports that have traditional ground-based instrument landing systems (ILS) and satellite-based non-precision approach guidance using a built-in global positioning system (GPS)
Mode S Transponder	functions together with ACAS Processors for the identification of other planes and their bearing, as well as determining the appropriate response to a threat of collision
OEM	*Original Equipment Manufacturer:* the aircraft manufacturer in this industry
Recorders	record flight data information and cockpit voice.
SatCom	*(Satellite Communications):* sends and receives data and voice telephony to the ground via satellite.
SFE	*Supplier Furnished Equipment:* refers to the seller of the aircraft
STC	*Supplementary Type Certification*
TAWS	*Terrain Avoidance Warning System*
TC	*Type Certification*
TCAS	*Traffic Alert and Collision Avoidance System:* the US term for ACAS
Weather Radar	displays rainfall, turbulence and, in certain models, wind shear.

Annex I October 27, 1999

Proposed Undertakings Re: Case No. IV/M.1601 AlliedSignal/Honeywell

1. AlliedSignal Inc. (hereinafter "AlliedSignal") and Honeywell Inc. (hereinafter "Honeywell") (hereinafter jointly referred to as the "Parties") undertake to divest to a suitable purchaser: (A) Honeywell's Traffic Alert and Collision Avoidance System ("TCAS") business (hereinafter the "TCAS Divestiture") and (B) AlliedSignal's search and surveillance weather radar ("SSWR") business (hereinafter the "SSWR Divestiture"). The Parties also undertake to maintain open interfaces with respect to AlliedSignal's Terrain Avoidance Warnings Systems ("TAWS"), marketed by AlliedSignal under the name Enhanced Ground Proximity Warning Systems ("EGPWS"), and with respect to competitors' TAWS products. These undertakings shall be subject to the issuance of a final decision pursuant to Article 8(2) of Regulation 4064/89 declaring the Parties' merger (hereinafter the "Merger") compatible with the common market (hereinafter, the "Decision") and shall take effect upon the date of the Decision. These undertakings will be binding on the Parties, their subsidiaries, successors and assigns including the company surviving in the merger, Honeywell International Inc.

A. TCAS Divestiture

2. The Parties undertake to divest Honeywell's entire TCAS business, included but not limited to its TCAS 1500 and TCAS 2000 product lines (hereinafter "TCAS Business") within six months following the Decision, subject to the provisions of paragraphs 3 to 8 below. Prior to entering into a binding agreement for the sale of the TCAS Business, the Parties will obtain the confirmation of the Commission that the purchaser is suitable.

3. The TCAS Business, unless not required by, and agreed with, the purchaser, comprises Honeywell's TCAS II Computer, TCAS 2000 Computer, TCAS 1500 Computer (still under development), TCAS directional antenna,

dedicated TCAS controller, and the dedicated TCAS display ("TCAS System"). Also included, as common to the TCAS System and other systems of Honeywell, are the Vertical Speed Indicator/Traffic Resolution Advisory ("VSI/TRA"), pressure transducer, and ARINC Diversity/Mode S transponder used with the basic TCAS System, and the following:

(a) all tangible assets used in connection with the TCAS Business, including research and development activities; all manufacturing, personal property, inventory, office furniture, materials, supplies, and other tangible property or improvements used in the TCAS Business; all licenses, permits and authorizations issued by any governmental organization relating to the TCAS Business; all contracts, teaming arrangements, agreements, leases, commitments and understandings pertaining to the TCAS Business including supply agreements; all customer lists and credit records; and all other records maintained in connection with the TCAS Business,

(b) at the purchaser's request, a lease to any real property currently utilized for the TCAS Business;

(c) any or all intangible assets used in connection with the TCAS Business, including, but not limited to:

(i) all intellectual property rights used exclusively in the TCAS Business;

(ii) with respect to intellectual property rights used predominantly in the TCAS Business, but also in other Honeywell businesses (“Shared IP”), (A) an exclusive, transferable, paid-up license limited to the use of the Shared IP in the TCAS Business, or (B) at the purchaser’s option, a transfer of the Shared IP subject to a grant-back to the Parties of an exclusive, paid-up, transferable license for the use of the technology in all fields of use other than the TCAS Business (including all rights necessary to enforce the Shared IP) and to the purchaser agreeing to take all steps necessary to maintain and enforce all intellectual property rights to the technology;

(iii) with respect to other intellectual property rights used in the TCAS Business, but also in other Honeywell businesses, an exclusive,

transferable, paid-up license limited to the use of those intellectual property rights in the TCAS Business;

(iv) all existing licenses and sublicenses relating exclusively to the TCAS Business; and

(v) a sublicense, limited to use in the TCAS Business, to all other existing licenses and sublicenses relating to the TCAS Business.

Intellectual property comprises, but is not limited to, patents, technical information, computer software and related documentation, know-how, trade secrets, drawings, blueprints, designs, design protocols, specifications for materials, parts and devices, safety procedures for the handling of materials and substances, quality assurance and control procedures, design tools and simulation capability, and manuals and technical information.

(d) all research data concerning historic and current research and development efforts relating to the TCAS Business, including, but not limited to, designs of experiments, and the results of successful and unsuccessful designs and experiments;

(e) the transfer of all employees of the TCAS Business. The Parties and the purchaser will mutually agree upon the employees who will be transferred with the TCAS Business, and the Parties will provide the purchaser with a list of employees classified by function relating to the TCAS Business. Employee transfers will include engineers, operations support personnel, and sales and marketing as well as support staff; and

(f) to the extent that any employees of the TCAS Business are not hired by the purchaser, the purchaser's right to reasonable access to the technical, sales, production and administrative employees of the Parties for a period not to exceed eighteen months from the date of the purchase.

4. Until completion of the TCAS Divestiture, the Parties undertake:

(a) to maintain Honeywell's TCAS Business as an independent competitive business with research, development, production, sales, operations and books and records of the business to be held entirely separate,

distinct and apart from those of AlliedSignal's traffic collision avoidance systems business and to take all necessary steps to make certain that the production, marketing and sales of Honeywell's TCAS Business are not coordinated with AlliedSignal's traffic collision avoidance systems business;

(b) to use all reasonable efforts to ensure that:

(i) the production capacity and selling activities of the TCAS Business are maintained, pursuant to good business practices, at their current level;

(ii) all contracts necessary to preserve the TCAS Business are entered into or continued in accordance with their terms, consistent with good business practice and the ordinary course of business;

(iii) all services provided by Honeywell or any of its subsidiaries to the TCAS Business will continue to be provided efficiently and satisfactorily; and

(iv) there is no communication between the employees of Honeywell's TCAS Business and the employees of AlliedSignal's traffic collision avoidance systems business;

(c) to maintain sufficient administrative and management functions relating to the TCAS Business; and

(d) to provide and maintain sufficient working capital for the TCAS Business.

5. The Parties undertake, subject to the provisions set out below, to effect the sale of the TCAS Business within six months of the Decision to an independent third-party purchaser who satisfies the criteria specified in paragraph 8 below and who is approved by the Commission (whose approval shall not be unreasonably withheld).

6. The Parties shall be deemed to have complied with paragraph 5 if, within six months of the Decision, they have entered into a binding contract for the sale of the TCAS Business (subject to due diligence and any other conditions not

within the control of the Parties or the purchaser), provided that such sale is completed within a time limit then agreed to by the Commission.

7. The Parties shall inform both the Commission and the United States Department of Justice at the same time in writing of any prospective purchaser who indicates a serious desire to purchase the TCAS Business and to whom the Parties are considering the sale of the TCAS Business.

8. The Commission, following consultation with the United States Department of Justice, shall inform the Parties, as soon as reasonably practicable, which purchasers it approves. The Commission, in determining whether any proposed purchaser is suitable, will take into account whether the prospective purchaser concerned

(a) possesses the status and resources necessary to own and operate the TCAS Business over the long term as a viable and significant competitor to the merged entity;

(b) is independent of and unconnected with either of the Parties; and

(c) has, or reasonably can obtain, all necessary approvals for the purchase from the relevant competition and other regulatory authorities in the European Community and elsewhere.

B. SSWR Divestiture

9. The Parties undertake to divest AlliedSignal's RDR-1400 and RDR-1500 series search and surveillance weather radar (hereinafter the "SSWR Business") within six months following the Decision, subject to the provisions of paragraphs 10 to 15 below. Prior to entering into a binding agreement for the sale of the SSWR Business, the Parties will obtain the confirmation of the Commission that the purchaser is suitable.

10. The SSWR Business, unless not required by, and agreed with, the purchaser, includes AlliedSignal's RDR-1400 and RDR-1500 product lines, and the following:

(a) all tangible assets used in connection with the SSWR Business, including research and development activities; all manufacturing, personal property, inventory, office furniture, materials, supplies, and other tangible property or improvements used in the SSWR Business; all licenses, permits and authorizations issued by any governmental organization relating to the SSWR Business; all contracts, teaming arrangements, agreements, leases, commitments and understandings pertaining to the SSWR Business, including supply agreements; all customer lists and credit records; and all other records maintained in connection with the SSWR Business;

(b) at the purchaser's request, a lease to any real property currently utilized for the SSWR Business;

(c) any or all intangible assets used in connection with the SSWR Business, including, but not limited to:

(i) all intellectual property rights used exclusively in the SSWR Business;

(ii) with respect to intellectual property rights used predominantly in the SSWR Business, but also in other AlliedSignal businesses ("Shared IP"), (A) an exclusive, transferable, paid-up license limited to the use of the Shared IP in the SSWR Business, or (B) at the purchaser's option, a transfer of the Shared IP subject to a grant-back to the Parties of an exclusive, paid-up, transferable license for the use of the technology in all fields of use other than the SSWR Business (including all rights necessary to enforce the Shared IP) and the purchaser agreeing to take all steps necessary to maintain and enforce all intellectual property rights to the technology;

(iii) with respect to other intellectual property rights used in the SSWR Business, but also in other AlliedSignal businesses, an exclusive, transferable, paid-up license limited to the use of those intellectual property rights in the SSWR Business;

(iv) all existing licenses and sublicenses relating exclusively to the SSWR Business; and

(v) a sublicense, limited to use in the SSWR Business, to all other existing licenses and sublicenses relating to the SSWR Business.

Intellectual property comprises, but is not limited to, patents, technical information, computer software and related documentation, know-how, trade secrets, drawings, blueprints, designs, design protocols, specifications for materials, parts and devices, safety procedures for the handling of materials and substances, quality assurance and control procedures, design tools and simulation capability, and manuals and technical information;

(d) all research data concerning historic and current research and development efforts relating solely to the SSWR Business, including but not limited to, designs of experiments, and the results of successful and unsuccessful designs and experiments;

(e) the transfer of all employees of the SSWR Business. The Parties and the purchaser will mutually agree upon the employees who will be transferred with the SSWR Business, and the Parties will provide the purchaser with a list of employees classified by function relating to the SSWR Business. Employee transfers will include engineers, operations support personnel, and sales and marketing as well as support staff; and

(f) to the extent that any employees of the SSWR Business are not hired by the purchaser, the purchaser's right to reasonable access to the technical, sales, production and administrative employees of the Parties for a period not to exceed eighteen months from the date of the purchase.

11. Until completion of the SSWR Divestiture, the Parties undertake:

(a) to maintain AlliedSignal's SSWR Business as an independent competitive business, with research, development, production, sales, operations and books and records of the business to be held entirely separate, distinct and apart from those of Honeywell's weather radar business, and to take all necessary steps to make certain that the production, marketing and sales of AlliedSignal's SSWR Business are not coordinated with Honeywell's weather radar business;

(b) to use all reasonable efforts to ensure that:

(i) the production capacity and selling activities of the SSWR Business are maintained, pursuant to good business practices, at their current level;

(ii) all contracts necessary to preserve the SSWR Business are entered into or continued in accordance with their terms, consistent with good business practice and the ordinary course of business;

(iii) all services provided by AlliedSignal or any of its subsidiaries to the SSWR Business will continue to be provided efficiently and satisfactorily;

(iv) there is no communication between the employees of AlliedSignal's SSWR business and the employees of Honeywell's weather radar business;

(c) to maintain sufficient administrative and management functions relating to the SSWR Business; and

(d) to provide and maintain sufficient working capital for the SSWR Business.

12. The Parties undertake, subject to the provisions set out below, to effect the sale of the SSWR Business within six months of the Decision to an independent third-party purchaser who satisfies the criteria specified in paragraph 15 below and who is approved by the Commission (whose approval shall not be unreasonably withheld).

13. The Parties shall be deemed to have complied with paragraph 12 f, within six months of the Decision, they have entered into a binding contract for the sale of the SSWR Business (subject to due diligence and any other conditions not within the control of the Parties or the purchaser), provided that such sale is completed within a time limit then agreed to by the Commission.

14. The Parties shall inform both the Commission and the United States Department of Justice at the same time in writing of any prospective purchaser who indicates a serious desire to purchase the SSWR Business and to whom the Parties are considering the sale of the SSWR Business.

15. The Commission, following consultation with the United States Department of Justice, shall inform the Parties, as soon as reasonably practicable, which purchasers it approves. The Commission, in determining whether any proposed purchaser is suitable, will take into account whether the prospective purchaser concerned

(a) possesses the status and resources necessary to own and operate the SSWR Business over the long term as a viable and significant competitor to the merged entity;

(b) is independent of and unconnected with either of the Parties; and

(c) has, or reasonably can obtain, all necessary approvals for the purchase from the relevant competition and other regulatory authorities in the European Community and elsewhere.

C. Appointment and Mandates of Trustee(s)

16. Not later than two weeks after the Decision, a Trustee, approved by the Commission and the United States Department of Justice in consultation with each other, shall be appointed to exercise the functions set out in paragraphs 17 to 19 below.

17. The Trustee's mandate, which shall be approved by the Commission, shall cover the following functions:

(a) monitor compliance by the Parties with the obligations set forth in paragraph 4 with respect to the TCAS Divestiture and/or paragraph 11 with respect to the SSWR Divestiture.

(b) monitor the satisfactory discharge by the Parties of the obligations entered into by the Parties. In particular, the Trustee shall:

(i) monitor and advise the Commission as to the adequacy of the procedure for selecting the purchaser, the suitability of the purchaser, and the conduct of the negotiations, and

(ii) monitor and advise the Commission as to whether the agreements with the purchaser properly provide for the divestiture of the relevant assets and business.

(c) provide written reports ("Trustee reports") to the Commission on progress with the discharge of the Trustee's mandate, identifying any respects in which he has been unable to discharge his mandate. Such reports shall be provided at regular monthly intervals commencing one month after the date of his appointment, or at such other time(s) or time periods as the Commission may specify.

18. For the purpose of, and to the extent necessary to perform his functions, the Trustee shall have full and complete access to the personnel, books, records, documents, facilities and technical information relating to the research, development, manufacture, importation, distribution, and sale of the products of the relevant businesses. The Trustee shall also have such access to any other relevant information, as the Trustee may reasonably request, including all documents and records kept in the normal course of business that relate to the cost of manufacturing the relevant products.

19. If the Parties fail to enter into a binding agreement with a suitable purchaser for a divestiture within six months of the Decision, despite having used best efforts to do so, the Trustee will carry out the following additional functions ("Request"), and the Trustee's mandate shall be deemed to be extended accordingly. In the event of conflict with the initial functions, such Trustee shall give priority to the discharge of these additional functions:

(a) conduct negotiations on behalf of the Parties for the sale of the business;

(b) ensure that all the assets and business activities to be divested are operated on an independent arm's length basis consistent with their status;

(c) ensure the proper divestment of all relevant business assets and activities to a qualified purchaser; and in particular, within no later than six months (or such other date as the Commission may specify) of being notified of the Request, submit to the Commission for approval an agreement for sale of the relevant business to a suitable purchaser, such agreement to be unconditional on

both purchaser and seller and irrevocable except for the approvals of any appropriate regulatory body and customary closing conditions;

(d) in such Trustee's reports, or in any event within no later than one month of being notified of the Request, submit to the Commission a proposal for the method and timescale proposed by the Trustee for the divestiture of the relevant assets and business activities. The Commission shall, as soon as reasonably practicable, approve the proposal or indicate any changes that may be required;

(e) in the Trustee's reports, or as soon as negotiations are entered into with prospective purchasers, provide to the Commission sufficient information to enable it to decide on the suitability of the purchasers in question; and

(f) cease negotiations with any prospective purchasers, if the Commission determines that the prospective purchaser is not a suitable purchaser.

20. The Parties shall provide the Trustee with all such assistance and information, including copies of all relevant documents, as he may require in carrying out his mandate, and to pay reasonable remuneration for his services. As an incentive to the Trustee to use his best efforts in arranging a prompt value-maximizing sale of the divested businesses, the Trustee's remuneration will provide incentives for prompt divestitures.

D. Terrain Avoidance Warning Systems

21. AlliedSignal currently manufactures Terrain Avoidance Warning System ("TAWS") products that it markets under the name "Enhanced Ground Proximity Warning System" ("EGPWS"). As defined in the Federal Aviation Administration's Technical Standard Order C-151a, TAWS products provide both aural and visual alerts and terrain information on a display to help prevent Controlled Flight Into Terrain ("CFIT") accidents. The current generation of EGPWS is configured as a stand-alone box ("EGPWS box") designed to be interconnected with other avionics systems. AlliedSignal is currently developing the capability to supply TAWS functionality in a circuit card assembly module ("EGPWS module") expected

to be integrated in a generic Modular Avionics Cabinet ("MAC") capable of performing multiple avionics functions. The MAC will have numerous input/output ("I/O") interfaces.

22. The Parties offer the following undertakings designed to assure that (a) the EGPWS box, the EGPWS module, and any other future implementation of TAWS functionality (including hardware or software formats) developed by the Parties can interface with the avionics products of other existing or potential suppliers of avionics products and aircraft manufacturers and are supplied on a non-discriminatory basis to other existing or potential suppliers of avionics products and aircraft manufacturers, and (b) competing TAWS products or products (in hardware or software format) having functionalities of TAWS can interface with the Parties' other avionics products.

EGPWS Box

23. The Parties will supply on a non-discriminatory basis to other existing or potential suppliers of avionics products and aircraft manufacturers (other than for resale as a stand-alone product) any EGPWS box they produce currently or in the future at the lowest price and on the most favorable terms and conditions offered to any other customer within the prior three months for similar quantities for installation by the same class of customer (e.g., OEM, airline, operator) on the same type of aircraft (e.g. Air Transport, Regional and Commuter, Business Aviation, or General Aviation) for the same purpose (e.g., forward-fit, retrofit, or repair and overhaul).

24. The Parties will provide any existing or potential supplier of avionics products or aircraft manufacturer with products that interface with TAWS products on the input or output side with all licenses and interface specification data necessary to enable its products to interface with the Parties' EGPWS boxes as follows:

(a) The Parties will grant, on a non-exclusive and paid-up basis, to any existing or potential supplier of avionics products or aircraft manufacturer seeking to design or develop an interface between EGPWS and any other avionics product, on either the input or the output side, any license

necessary to achieve a functioning interface, the field of use of which shall be limited to that purpose.

(b) The Parties will provide to any existing or potential supplier of avionics products or aircraft manufacturer requesting data all necessary interface specification data needed to achieve a functioning interface for all aircraft on which an EGPWS is installed. These data will be submitted in the form of a so-called Interface Control Document ("ICD"). These data at least include relevant part numbers, a system overview, reference documents, computer design criteria, external interface data, functional input and output data, system functions, connector interfaces, program pin usage, ARINC DITS output data, aircraft interface tables, and terrain display configuration data tables. The Parties will provide the ICD specification data at no cost within five business days of the requestor signing a standard proprietary information nondisclosure agreement (in the form attached as Annex 1). The Parties will notify and make available to any third party to which prior specification data were provided any revisions or updates of the ICD or other specification data within five business days of internal release.

(c) In addition to the ICD data, the Parties will make available within a reasonable time to any existing or potential supplier of avionics products or aircraft manufacturer requesting it and signing a standard proprietary information nondisclosure agreement (in the form attached as Annex 1) any additional I/O and interface signal data needed to achieve a functioning interface (including descriptions, data sheets, diagrams, or other equivalent types of technical documentation, design and development guidelines, and instructions), as well as reasonable technical assistance and support needed for that purpose. The Parties will designate technically competent persons to be reasonably accessible during business hours for this purpose. The Parties will provide up to 20 hours of technical assistance and support at a lump-sum cost of $3,000. Any further technical assistance and support will be provided at reasonable charges not to exceed the standard rates for engineering work charged to the U.S. Government for government contracts. Such charges will be subject to audit by an independent third-

party accounting firm agreed to by the Parties and the existing or potential supplier of avionics products or aircraft manufacturer.

EGPWS Module and Future TAWS Functionality

25. Whenever the Parties complete development of any EGPWS module(s) or any other future implementation of TAWS functionality (including hardware or software formats) in a product sold commercially, other than customized modules developed at the request of a third party, the Parties will supply the module or other implementation on a non-discriminatory basis to other existing or potential suppliers of avionics products and aircraft manufacturers (other than for resale as a stand-alone product) at the lowest price and on the most favorable terms and conditions offered to any other customer for the new module or product within the prior three months for similar quantities for installation by the same class of customer (e.g., OEM, airline, operator) on the same type of aircraft (e.g. Air Transport, Regional and Commuter, Business Aviation, or General Aviation) for the same purpose (e.g., forward-fit, retrofit, or repair and overhaul) (the "reference price"). If the Parties have not sold a new module or other implementation of TAWS functionality as a separate product to any other customer, the price pursuant to this paragraph shall be the reference price for an existing product with similar functionality (the "reference product"), less the difference in direct manufacturing costs between the reference product and the new module or implementation.

26. The Parties will provide any third party having or developing a MAC or other avionics product designed to interface, on the input or output side, with an EGPWS module or any future product developed by the Parties containing TAWS functionality, with all licenses, interface specification data, and technical assistance necessary to enable its products to interface with whatever EGPWS modules or TAWS products the Parties have available for sale to third parties or for incorporation into its own MAC, on the same terms and conditions as set forth above in paragraph 24 with respect to the Parties' line of EGPWS boxes.

Customized EGPWS Interfaces

27. For any third party desiring to have the Parties design a customized interface for any EGPWS box, EGPWS module, or future TAWS product developed by the Parties, the Parties will, within a reasonable time of receiving from the third party its specifications for such custom interface, develop and supply the requested customized interface. The Parties shall attempt in good faith to agree with the third party on a reasonable time period for the development and production of the customized interface, and in the absence of agreement the time period shall be set by arbitration in accordance with paragraph 32 below. The Parties shall not be required to develop any customized interface that an arbitrator determines is not reasonable in light of then-existing engineering capabilities.

28. The Parties will sell the relevant EGPWS or TAWS product with a customized interface at the price and on the terms and conditions specified in paragraphs 23 and 25 above, plus a reasonable charge for the required engineering work for the customized interface, not to exceed the standard rates for engineering work charged to the U.S. Government for government contracts. Such charges will be subject to audit by an independent third-party accounting firm agreed to by the Parties and the existing or potential supplier of avionics products or aircraft manufacturer.

29. To protect any proprietary information provided to the Parties for purposes of developing and producing customized interfaces, the Parties will execute and comply with a standard proprietary information nondisclosure agreement (in the form set forth in Annex 1).

Interface of Competing TAWS Products

30. The Parties will provide any existing or potential supplier of any competing TAWS product or aircraft manufacturer seeking to make the competing TAWS product interface with any of the Parties' other avionics products on either the input or output side with all licenses and interface specification data necessary to enable the TAWS product to interface with the Parties' avionics products as follows:

(a) The Parties will grant, on a non-exclusive and paid-up basis, to any existing or potential supplier of any competing TAWS product

or aircraft manufacturer seeking to design or develop an interface between its TAWS product and any of the Parties' avionics products, on either the input or the output side, any license necessary to achieve a functioning interface, the field of use of which shall be limited to that purpose.

(b) The Parties will provide to any existing or potential supplier of any competing TAWS product or aircraft manufacturer all necessary interface specification data needed to achieve a functioning interface between the competing TAWS product and the Parties' other avionics products. These data will be submitted in the form of a so-called Interface Control Document ("ICD"). These data at least include relevant part numbers, a system overview, reference documents, computer design criteria, external interface data, functional input and output data, system functions, connector interfaces, program pin usage, ARINC DITS output data, aircraft interface tables, and terrain display configuration data tables. The Parties will provide the ICD specification data at no cost within five business days of the requestor signing a standard proprietary information nondisclosure agreement (in the form attached as Annex 1). The Parties will notify and make available to any third party to which prior specification data were provided any revisions or updates of the ICD or other specification data within five business days of internal release.

(c) In addition to the ICD data, the Parties will make available within a reasonable time to any potential or existing supplier of any competing TAWS product or aircraft manufacturer requesting it and signing a standard proprietary information nondisclosure agreement (in the form attached as Annex 1) any additional I/O and interface signal data needed to achieve a functioning interface (including descriptions, data sheets, diagrams, or other equivalent types of technical documentation, design and development guidelines, and instructions), as well as technical assistance and support during the design and development, testing, and integration. The Parties will designate technically competent persons to be reasonably accessible during business hours for this purpose. The Parties will provide up to 20 hours of technical assistance and support at a lump-sum cost of $3,000. Any further technical assistance and support will be provided at

reasonable charges not to exceed the standard rates for engineering work charged to the U.S. Government for government contracts. Such charges will be subject to audit by an independent third-party accounting firm agreed to by the Parties and the existing or potential supplier of avionics products or aircraft manufacturer.

New Products and Alterations

31. The Parties will provide third-party existing or potential suppliers of avionics products and aircraft manufacturers advance notice of any new EGPWS or TAWS products or any alterations to products that contain the TAWS functionality or that interface with competitors' TAWS products as soon as practicable after the Parties determine to produce such product or make such alteration, but in no event less than three months before initial commercial orders are accepted for such product or alteration.

Enforcement

32. To ensure full compliance with the undertakings in paragraph 21-31, the Parties will establish, within one month of the Decision, an independent and competent arbitration procedure under a single Arbitrator approved by the Commission. The Arbitration procedure will be efficient, fair, transparent and objective, and will have appropriate procedural rules ensuring this procedure will be applied.

(a) The Arbitrator will have the experience, competence and independence necessary for his mission and will have had no direct or indirect employment, consultancy, or other relationship with the Parties during the past five years.

(b) The Arbitrator will decide, with no possibility of appeal, all disputes brought to him by any existing or potential supplier of avionics products, aircraft manufacturer or the Parties.

(c) The Arbitrator will have broad powers of investigation and injunction, and will be able to order all measures, including protective and interim measures, necessary to the accomplishment of his mission. In particular, the Arbitrator will be allowed to have access to all confidential

information needed to carry out any investigation or evaluation missions within the Parties and to order all measures, including protective and interim measures, necessary to the realisation of his mission.

(d) Any existing or potential supplier of avionics products, aircraft manufacturer or the Parties may initiate an arbitration proceeding by a registered letter with acknowledgement of receipt. The object of the dispute and the complainant's request must be set forth in the letter. The respondent will receive from the Arbitrator a copy of the letter with no delay. The parties to the dispute and the Arbitrator will agree, within 15 days from the receipt by the respondent of the complainant's letter, on the scope of the Arbitrator's mission. In case of disagreement on the mission's scope, the Arbitrator ultimately decides. The parties to the arbitration will have 15 days to present their arguments. The Arbitrator must issue his decision at the latest within one month from the submission of the arguments. The Arbitrator will set the amount of his fees in the decision, which will be shared equally by the parties.

(e) The Parties undertake to comply without any delay with any decision of the Arbitrator.

(f) The documents initiating any arbitration and the Arbitrator's decision will be communicated to the Commission without delay. In addition, the Parties will communicate to the Commission, for the period that the undertakings remain in effect, an annual report summarizing the activities of the Arbitrator, and indicating in particular the measures taken by the Parties to comply with any decision of the Arbitrator.

33. In addition to the above, within one month from the date of the Decision, the Parties undertake to appoint an independent expert acceptable to the Commission to monitor compliance with paragraphs 21 – 31 above. Such expert shall be mandated to monitor and advise the Commission as to the adequacy of the arrangements adopted in compliance with paragraphs 21 - 31 above, and to provide the Commission annually with written reports on the efficacy of the arrangements. The expert shall notify the Commission promptly if the expert at any time determines that the Parties are not in

compliance. The Parties undertake to provide the expert with all such assistance and information as the expert may require in carrying out his or her mandate and to pay reasonable remuneration for the expert's services.

E. General Provisions

34. With respect to the undertakings in paragraphs 23 - 29 and paragraphs 31 and 32 as they relate thereto, the obligations of the Parties shall remain in effect for a period of eight years from the date of the Decision.

35. With respect to the undertakings in paragraphs 23 - 29, the Parties agree to provide to the existing or potential suppliers of avionics products and aircraft manufacturers that purchased an EGPWS box, an EGPWS module or other implementation of TAWS functionality pursuant to these undertakings such relevant products, as well as interface data, for as long as an aircraft and/or platform in which that product is installed or designed to be installed remains in production.

36. With respect to the undertakings in paragraph 30 and paragraphs 31 and 32 as they relate thereto, the obligations of the Parties shall be of unlimited duration.

37. At any time the Parties believe that market conditions have changed in such a way as to render the continuation of the undertakings in paragraphs 21 through 33 unnecessary, the Parties may request to be released from their obligations thereunder.

38. If prior to the closing of the Merger the Parties irrevocably abandon the Merger, the undertakings shall be null and void in their entirety.

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Edward D. Grayson	Peter M. Kreindler
Vice President and	Senior Vice President,
General Counsel	General Counsel & Secretary
Honeywell Inc.	AlliedSignal Inc.