THALES

Response to TRAI's Consultation Paper on In Flight Connectivity (IFC)
Reference: TRAI Consultation Paper 14/2017
Issue Date: 29-09-2017

Submitted in confidence To :
Shri Syed Tausif Abbas,
Advisor (Networks, Spectrum and Licensing), TRAI
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Date: 02-11-2017

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THALES

2. COVER NOTE

Date: 02.11.2017

To: Shri Syed Tausif Abbas

Doc Reference: TRAI Consultation Paper 14/2017
Subject: Thales response and comments on TRAI Consultation Paper

Dear Sir,

Thales Avionics, Inc. (Thales), with its InFlyt Experience operations in Melbourne and Orlando, Florida and Irvine, California employing 3000 professionals, is a global leader in providing leading-edge inflight entertainment (IFE) and high-speed in-flight connectivity (IFC) services to commercial airlines, their passengers, and crews, with more than 700 aircraft under contract. Thales is pleased to provide its comments to the Consultation Paper on In-Flight Connectivity released by the Telecom Regulatory Authority of India (TRAI) on 29 September 2017.

As satellite and ground based networks have been deployed regionally throughout the world the desire for a connected aircraft by passengers and airlines has exploded.

Now with Inmarsat's Global Express worldwide Ka band service and other services being offered, a similar adoption rate is expected in other regions including India (see global forecast chart below). We see this in Asia where growth is predicted to be staggering – Up 33% yearly between 2015 (365 equipped aircraft) and 2025 (6,256 equipped Aircraft).
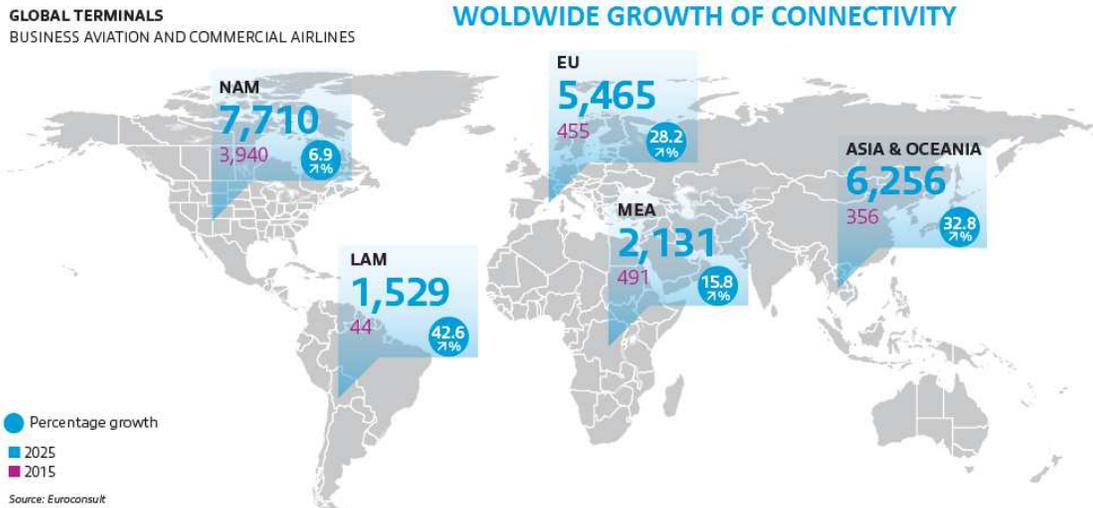
By adopting clear standards for licensing and operation India can insure their passengers and airlines enjoy the same benefits. Thales, as a worldwide leader in aircraft connectivity, stands ready to meet these operational needs through satellite, ground, and airborne terminal products and services and supports India's efforts for standardization and licensing.

Thales seeks to provide high-speed inflight internet connectivity (IFC) services to passengers and crew members on commercial airliners, using airborne Ka band transmit/receive satellite terminals, or Earth Stations Aboard Aircraft (ESAA). Thales's IFC service will provide Airlines with a new opportunity to meet passengers' increasing demands for reliable, robust, high-speed IFC while also providing Airlines with access to critical, real-time data streams from inflight aircraft to help improve operational efficiencies. Addressing these paramount passengers' needs on one hand and airline operational efficiency requirements will help the airlines registered to remain competitive while retaining their customer bases.

The connected aircraft will have both an in-cabin Wi-Fi LAN (for personal electronic devices) and a wired LAN (for seatback screens). Passengers will be offered IFC at various service levels, and will initiate a billing transaction that occurs between the aircraft and the ground via the satellite links. Once the purchase has been confirmed, connectivity sessions to/from the public internet will commence via the aircraft LAN, satellite WAN, and terrestrial WAN segments. IFC services for airline and crew use will also be provided, like live news, crew to ground messaging, live e-commerce transaction, aircraft tracking and IFE systems monitoring… and ultimately personalization of passenger experience based on curated services.

If you need additional information or have any questions, please do not hesitate to contact the undersigned.

Yours Sincerely,

For **THALES Avionics Inc.,**

/s/ Pat Amodio

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3. RESPONSE

IFC Services

Q.1: Which of the following IFC services be permitted in India?

Answer: a. Internet services
Thales strongly recommends that IFC services (Internet services through Wi-Fi on board) be permitted in and over Indian airspace.

Q.2: Should the global standards of AES/ESIM, shown in Table 2.1, be mandated for the provision of AMSS in Indian airspace?

Answer: Yes. Thales recommends and agrees that it is essential for conformance to global technical standard and operational requirements. Specifically, for Ka band, the global standards of earth station installed on aircraft (AES/ESIM) outlined in Chapter-II of the Consultation and summarized in Table 2.1.

Q.3: If MCA services are permitted in Indian airspace, what measures should be adopted to prevent an airborne mobile phone from interfering with terrestrial cellular mobile network? Should it be made technology and frequency neutral or restricted to GSM services in the 1800 MHz frequency band, UMTS in the 2100 MHz band and LTE in the 1800 MHz band in line with EU regulations?

Answer: Not answered by Thales

Q.4: Do you foresee any challenges, if the internet services be made available 'gate to gate' i.e. from the boarding gate of the departure airport until the disembarking gate at the arrival airport?

Answer: Thales does not foresee any issues or challenges, if the internet services are to be made available 'gate to gate'. In fact and especially considering the FAA report and ruling in 2013 on "Recommendations on Expanding the Use of Portable Electronic Devices During Flight". Also considering that Southwest Airlines offers Wi-Fi service from gate to gate since 2014. Adequate testing and precautions are in place to enable passengers to have the option of connecting to the aircraft's wireless Internet service from the time they board the aircraft to the time they leave. This is further supported by the issuance of new guidance, from both the Federal Aviation Administration (InFO 13010)[1] and European Aviation Safety Agency (SIB No: 2013-21)[2] which now permit the use of PEDs operating via Wi-Fi during all phases of flight.

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[1]
https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2013/InFO13010.pdf
[2] https://www.transportstyrelsen.se/globalassets/global/luftfart/flygoperativt/sib-2013-21_use-of-ped-during-commercial-aircraft-ops---withdrawal.pdf

Furthermore, Thales submits that, if it is not mandated by TRAI to use Indian Satellite systems or foreign satellites leased through DoS, the satellite backhaul links, IFC services and security considerations, are answerable by pass-through foreign satellites having earth stations and IFC service provider ground infrastructure, outside Indian territory.

Authorization for the provisioning of IFC service

Q.5: Whether the Unified Licensee having authorization for Access Service/Internet Service (Cat-A) be permitted to provide IFC services in Indian airspace in airlines registered in India?

Answer: Yes. A Unified Licensee having authorization for Access Service/Internet Service (Cat-A) may be permitted to provide IFC services in Indian airspace, but Thales recommends and prefers as an IFC service provider, if required by TRAI that it may enter into agreement, with an existing licensee who has also acquired ISP authorization to provide IFC services in India. Thales recommends that Unified license having authorization should not be considered as a necessary condition to offer IFC services as these increases the requirements and would likely constitute financial and regulatory burdens hindering implementation of IFC services, in a timely manner in the Indian airspace.

Q.6: Whether a separate category of IFC Service Provider be created to permit IFC services in Indian airspace in airlines registered in India?

Answer: Thales does not see the need or requirement for a separate category, if an existing licensee has already acquired ISP authorization and the IFC service provider is permitted to provide IFC services, after entering into an agreement with a Unified Licensee having the appropriate authorization. A separate category of IFC Service Provider may be created to permit TRAI authorization tracking in India.

Q.7: Whether an IFC service provider be permitted to provide IFC services, after entering into an agreement with Unified Licensee having appropriate authorization, in Indian airspace in airlines registered in India?

Answer: Yes. As stated above, Thales recommends as an IFC service provider, if required by TRAI as a Regulatory requirement to use an existing Unified Licensee, to be permitted to provide IFC services after entering into an agreement with Unified Licensee having appropriate authorization.

Q.8: If response to Q.7 is YES, is there any need for separate permission to be taken by IFC service providers from DoT to offer IFC service in Indian airspace in Indian registered airlines? Should they be required to register with DoT? In such a scenario, what should be the broad requirements for the fulfillment of registration process?

Answer: Thales does not see the need for a separate permission to be taken from DoT after entering into an agreement with Unified Licensee having an existing and appropriate filed authorization. A filing notice or submission to TRAI could be appropriate and required for the purposes of documenting the IFC service provider, providing the services in Indian airspace in Indian registered airlines. Thales strongly recommends, minimizing the number of requirements and regulatory burdens.

Q.9: If an IFC service provider be permitted to provide IFC services in agreement with Unified Licensee having appropriate authorization in airlines registered in India, which authorization holder can be permitted to tie up with an IFC service provider to offer IFC service in Indian airspace?

Answer: Thales recommends IFC/Internet, as a duly licensed operator with Internet Service provision authorization in India, could be permitted to tie up with an IFC Service Provider.

Q.10: What other restrictions/regulations should be in place for the provision of IFC in the airlines registered in India.

Answer: Thales does not recommend other additional restrictions or regulations, but if there are restrictions/regulations in place for the provision of IFC in the airlines registered in India, they should be clearly defined and the purpose described. If TRAI requires an IFC service provider to meet any restrictions/regulations (i.e. security considerations) and tie-up with an Indian Unified Licensee, TRAI should not mandate using a specific Indian company or Licensee. Thales strongly recommends that it should be the decision of the IFC service or Satellite provider, because of technical and/or business requirements to select the appropriate in-country (Indian) Licensee.

Q.11: What restrictions/regulations should be in place for the provision of IFC in the foreign airlines? Should the regulatory requirements be any different for an IFC service provider to offer IFC services in Indian airspace in airlines registered outside India vis-à-vis those if IFC services are provided in Indian registered airlines?

Answer: Thales does not recommend any unjustified restrictions/regulations be in place for the provision of IFC in the foreign airlines. Thales also recommends that, TRAI not mandated the use of an in-country (Indian) Unified Licensee, Indian Satellite systems or foreign satellites leased through DoS, for any purpose, including the satellite backhaul links, IFC services and security considerations. Since, these are all answerable by pass-through foreign satellites having earth stations and IFC service provider ground infrastructure, outside Indian territory. Thales notes that in 3.15 of the TRAI consultation paper, "The concept of reciprocity (i.e. "the granting of a right or benefit by a State to a foreign airline when it has no international obligation to do so, on the condition that the same treatment will be accorded to its airline by the home State of that airline") is used in the aviation sector. This concept stems from the Convention on International Civil Aviation (The Chicago Convention)." When considering the provision IFC to foreign based airlines, it is important to consider the principle of reciprocity. Indian registered airlines operating international flights and using other countries airspace are expected to require equivalent reciprocity – capabilities and continuity of service. The International aviation industry depends on the principles of reciprocity.

Q.12: Do you agree that the permission for the provision of IFC services can be given by making rules under Section 4 of Indian Telegraph Act, 1885?

Answer: Yes, Thales agrees.

Security Consideration

Q.13: Which of the options discussed in Para 3.19 to 3.22 should be mandated to ensure control over the usage on IFC when the aircraft is in Indian airspace?

Answer: Thales does not recommend mandating any of the options discussed in Para 3.19 to 3.22 to ensure control over the usage on IFC when the aircraft is in Indian airspace. Thales agrees that it should be ensured that the security concerns are fully addressed before permitting IFC, to monitor the traffic to and from user terminal in Indian airspace and to ensure Lawful Interception. Thales or a Satellite or IFC Service provider could have an MPLS (high speed data circuit) that takes traffic from the Satellite Ground Station aggregation point outside India to /from the IFC service provider telecommunications interconnect point (TIP). Lawful Intercept mediation devices and policy / traffic management software (User Managed Services by vendors) at this point is expected to be located at each TIP and could facilitate Lawful Intercept requests for passengers on aircraft with either Arrival or Destination airports in country.

- In Para 3.19, to mandate the use of Indian Satellite System while travelling over Indian airspace, would cause excessive financial and technical hardship on IFC service providers. Additional ongoing financial, non-recurring (NRE) and contractual requirements would have to be in-place. In addition, addressing technical capabilities to handover to/from Ka band Indian Satellite Systems.
- In Para 3.20, to permit the use of either Indian Satellite System or foreign satellite leased through DOS, is unnecessary. Under this option also, while over Indian airspace, airborne IFC equipment should get connected to Ground Earth Stations located in India. Nonetheless, to address Lawful Interception or data retention, monitor the traffic to and from user terminals, an IFC service provider we would not need any in-country equipment, located within India.
- In Para 3.21, the option proposes, for traffic to and from user terminals in Indian airspace may be sent to a node owned and operated by an Indian entity to address the requirement of lawful interception directly or in mirror mode. The Indian entity to address the requirement of lawful interception directly or in mirror mode would have to be an in-country (Indian) Unified Licensee, chosen by the IFC services providers, to meet the technical compatibility and requirements between the Licensee and IFC provider. There should not be required any such Indian entity requirement on the foreign/international airlines.

Q.14: Should the IFC operations in the domestic flights be permitted only through INSAT system (including foreign satellite system leased through DOS)?

Answer: As stated above, IFC service providers should have options to comply with security considerations; that IFC operations in the domestic flights should not be permitted only through INSAT system (including foreign satellite system leased through DOS), but also to use a foreign satellite system.

Q.15: Should the IFC operations in international flights (both Indian registered as well as foreign airlines) flying over multiple jurisdictions be permitted to use either INSAT System or foreign satellite system in Indian airspace?

Answer: As stated above, IFC service providers should have options to freely comply with security considerations; that both Indian registered as well as foreign airlines flying over

multiple jurisdictions should be permitted to use either INSAT System or foreign satellite system in Indian airspace.

Fee and Charges
Q.16: Please suggest how the IFC service providers be charged in the following cases? (a) Foreign registered airlines. (b) Indian registered airlines.

Answer: Thales recommends for (a), due to the principle of reciprocity mentioned above, it is common policy on this issue in other countries, that foreign airlines should not be charged for IFC service provisions, as they are already charged and regulated under the country of registration of the aircraft. Thales recommends for (b) no charges to the IFC service providers. If TRAI requires a proposed authorization under a duly authorized domestic service provider, the associated fees will already be paid accordingly by the Unified License, based on the commercial arrangement between the IFC provider and the licensee.

Satellite Bands of Operation
Q.17: Should satellite frequency spectrum bands be specified for the provisioning of the IFC services or spectrum neutral approach be adopted?

Answer: Yes, Thales strongly recommends Ka-band.

Q.18: If stakeholders are of the view that IFC services be permitted only in specified satellite frequency bands, which frequency spectrum bands should be specified for this purpose?

Answer: Yes, Thales recommends Ka-band, because of the following. As an overall radio principal, lower frequencies are used as a first choice, because of many technical aspects and better propagation characteristics of the Radio signals. Recently, users have moved up the spectrum ladder to Ka-band and found more available spectrum compared to Ku-band to develop and grow services. Today, Ku-band is nearly fully deployed around the world, with equipment and processes in place, but there is spectrum and capacity congestion for this legacy band. In reality, there are approximately 4-5 times as many Ku-band geostationary satellites orbiting the equator compared to Ka-band and these are positioned approximately two degrees apart.

Wide beam Ku-band satellites have lower power that varies across the footprint and divide available capacity amongst users in large areas. Inmarsat GX uses higher power spot beams and evenly spreads high capacity, power, and bandwidth allocation in small areas.[3]

In 2012, a paper was presented at MILCOM conference, "Ka and Ku Operational Considerations for Military SATCOM Applications". This paper also presented weather as a differentiator. Ku-band does enjoy an inherent availability advantage over Ka but the higher gain of equivalent size Ka-band antennas, along with the use of modern waveforms, hybrid systems, and site diversity moderates any difference in Ku-Ka availability.[4]

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[3] http://www.inmarsat.com/wp-content/uploads/2013/10/Inmarsat_APC_2013_05_George_Nicola.pdf
[4] https://gobcss.com/wp-content/uploads/2015/06/MILCOM_2012_KuKa_Operational_Considerations_Final_Submittal_080812.pdf