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ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda 30: Other issues to be considered by the Technical Commission

CRV AND FTI IMPLEMENTATION STATUS IN INDIA

(Presented by India)

EXECUTIVE SUMMARY

This paper provides information on the status of implementation of **C**ommon Ae**R**onautical **V**irtual Private Network (CRV) and **F**uturistic **T**elecommunication **I**nfrastructure **(FTI),** which will provide high availability of service level agreement (SLA) based redundant communications infrastructure in India to augment ground-ground exchange of aeronautical data.

Strategic Objectives:	This working paper relates to Strategic Objectives: Air Navigation Capacity and Efficiency.
Financial implications:	NIL
References:	Doc 10004, *Global Aviation Safety Plan* Doc 9750, *Global Air Navigation Plan* APANPIRG Conclusions

1. INTRODUCTION

1.1 ICAO Asia and Pacific (APAC) States are urged to implement CRV in accordance to Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) guidance, DGCA Conference and the Beijing Declaration to facilitate the common ground/ground telecommunication infrastructure to support air navigation services (ANS) applications.

1.2 In accordance with the *Global Air Navigation Plan* (GANP, Doc 9750), advancement made in telecommunication infrastructure needs to be utilized in order to increase the efficiency of different air traffic management (ATM) applications pertaining to air traffic control, air traffic flow management and flight information sharing. In this context, India has taken up implementation of futuristic telecommunication infrastructure (FTI) for its ANS, which will provide reliable, high availability of links between various sites and airports.

2. DISCUSSION

2.1 India is engaged towards entering in to contract for common aeronautical virtual private network (CRV) in Q3 2019 and service readiness by Q4 2019 in line with CRV contract and service readiness by counterpart BBIS States.

2.2 India is planning CRV implementation (i.e. transition from existing IPLC circuits to CRV) in AAI (INDIA) in following staged manner:

First stage: Transition of existing IPLC circuit over CRV between BBIS States (i.e. Bangkok (Thailand), Singapore and Beijing (China) / BIS States (i.e. Karachi (Pakistan), Colombo (Sri Lanka), Paro (Bhutan), Dhaka (Bangladesh), Kathmandu (Nepal), Muscat (Oman), Nairobi (Kenya)) for ATS message handling system (AMHS)/aeronautical fixed telecommunication network (AFTN) data application.

Note.— However actual migration over CRV with these BBIS/BIS States will be subject to readiness of counterpart States on CRV and willingness to migrate over CRV with India.

Second stage: Existing IPLC for voice and automatic dependent surveillance — broadcast (ADS-B) application shall be migrated over CRV with counterpart States (i.e. Karachi (Pakistan), Yangon (Myanmar etc.) in the second stage.

2.3 In order to augment ground-ground communication infrastructure, India is implementing futuristic telecommunication infrastructure (FTI), which will provide high availability SLA based telecommunication links to connect various locations (initially between more than 90 locations) using advanced technology and redundant communications infrastructure. The salient features of FTI network under implementation in India are provided in the appendix to the Paper.

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APPENDIX

FUTURISTIC TELECOMMUNICATION INFRASTRUCTURE (FTI) SYSTEM ARCHITECTURE

1. FTI is a **network of dual telecommunication links** for transportation of aviation data from one location to multiple locations using IP multi-protocol label switching (MPLS) technology. **FTI** will provide high availability SLA based telecommunication links in between 92 locations using **latest technology** equipment and communications infrastructure at each location. For highly sensitive applications, where real time data is of great significance, three point to point and one V-SAT link has been provisioned for achieving RMA-1 (i.e. 99.999 per cent) availability.

2. **Centralized monitoring:** Performance of these links will be continuously monitored at network operation control centre (NOCC) at Delhi and Bangalore for various parameters like availability, latency, jitter and packet loss etc. to meet the global air traffic management (ATM) application performance requirement. All telecommunication links and each network equipment will be centrally monitored 24/7 for immediate response to fix any outages.

3. **Security operation control centre (SOCC)**: SOCC at Delhi and Bangalore will protect the network from cyber threats. All service connections and each equipment will be security hardened, monitored, and safeguarded against intrusion 24/7 with constant system updates against latest security threats.

4. The initiative will upgrade network operations, enhance security, and improve the performance, reliability and quality of India's ATM telecommunications network and a 15-year contract on build own operate (BOO) model has been entered with the vendor.

5. FTI high level architecture will result in 99.9 to 99.999 per cent availability of network to support real time services as per user requirement. All connections have at least two simultaneously available active paths ensuring that the end-user is not affected even if there is a failure in one of the paths. Service connections are configured to connect directly to AAI equipment allowing visibility up to the service delivery point. Annexure-1 & 2.

6. **Bandwidth availability**: Services are networked to high-bandwidth equipment allowing for an increase in bandwidth within short durations in case there is a need for bandwidth upgrade while using all of AAI's existing equipment technology and protocols.

7. **Performance-based network**: Mode S specific protocol (MSP) provides daily and monthly reports in real time of performance of each service connection and shall pay penalty for not meeting SLA.

8. **Disaster Recovery**: 24/7 NOCC and SOCC will also have mirrored operations between Delhi and Bangalore in case of any failure or natural disaster. Entire FTI network will be designed to **continue operations** even without NOCC and SOCC in case of catastrophic failure.

9. Building up of infrastructure is currently on and the services are going to be delivered in nine phases starting from **November 2019** and is likely to be completed as per schedule, within total period of 30 months from the signing of the contract i.e. 10 May 2018.

10. Details of FTI high level architecture are as given Figures 1 and 2.

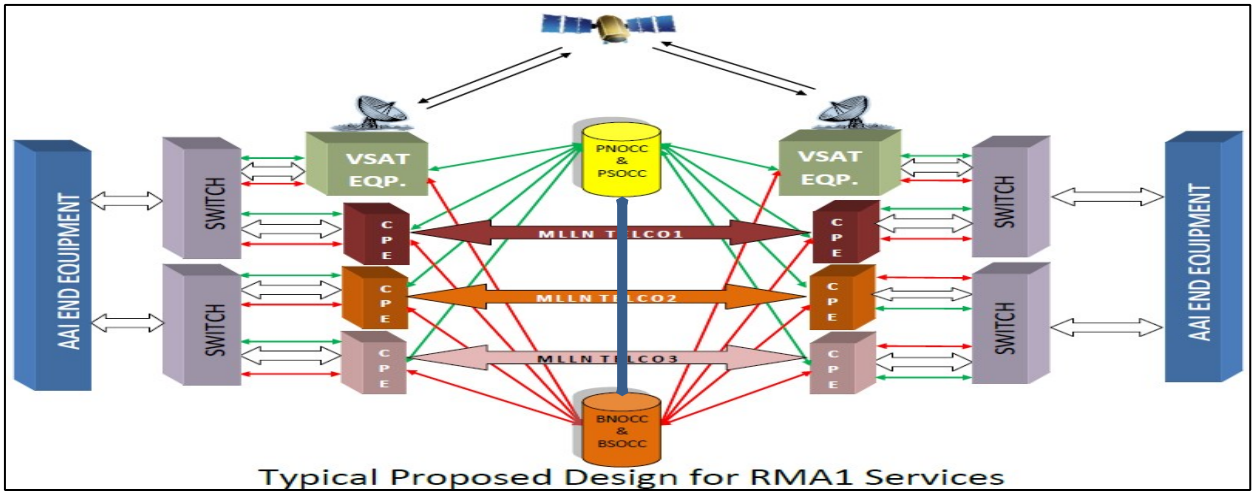

Figure 1. FTI high level architecture (99.999 per cent availability)

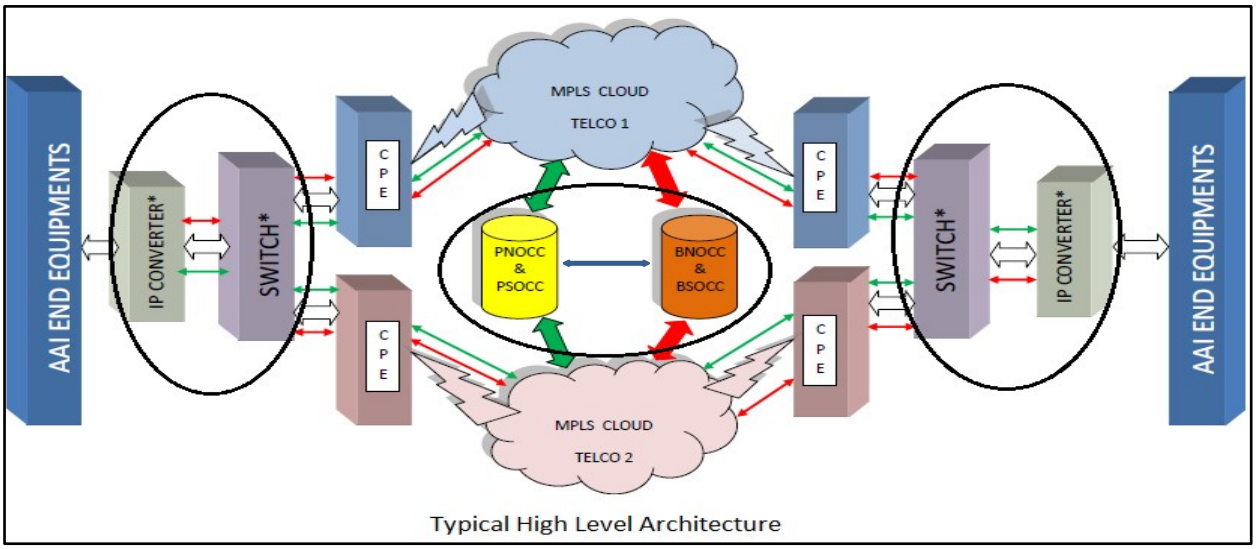

Figure 2. FTI high level architecture (99.9-99.99 per cent availability)

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