



International civil aviation organization

COM CO-ORDINATION MEETING
(Afghanistan, India, Islamic Republic of Iran and Pakistan)

16 – 17 December 2014, New Delhi, India



Agenda item 5: To be briefed the current surveillance and air/ground communication capability in Afghanistan airspace

AFGHANISTAN VSAT NETWORK

(Presented by IATA)

SUMMARY

The original VSAT network was implemented in 1999 in Kabul Afghanistan to provide upgraded CNS/ATM facilities and related Air Traffic Management services for both national and international flights within the Kabul FIR. The Project included RNAV/GNSS procedures for the 5 main airports as an urgent safety requirement.

1. INTRODUCTION

Besides linking Kabul (Redundant), Herat, Mazar-I-Sharif, Khandahar and Jalalabad, the base VSAT network in Kabul was linked to Karachi and Lahore by a 256kbps data channel on the VSAT network. This provided VHF RCAG (4 Sites), Koh Asmayee VHF RCAG and APP service, ATC Direct Speech and AFTN communications between all stations. The AFTN gateway was via Karachi with Lahore as backup as per the ICAO APAC Air Navigation Plan amendment (original was Tehran).

1.1 Subsequently the VSAT links between Afghanistan ACC and Tehran / Tashkent / Termez / Dushanbe / Ashgabat ACC's were progressively added to the network with a 256kbps channel on the VSAT network using bandwidth on Asiasat 2. Asiasat 2 was seamlessly upgraded to Asiasat 5 in late 2009.

1.2 In 2011, the VSAT terminal equipment in Afghanistan were upgraded from IDU5000 to IDU7000. Changes were made to the satellite modem uplink frequencies. However, this change was not coordinated with its neighbouring ACCs and the network links went down. Subsequently, the VSAT equipment in Pakistan had broken down and no repair nor replacement was made.

2. DISCUSSION

Current status of Afghanistan ATS

2.1 The current ATS in Afghanistan is supported by VSATs linking up the various sites domestically. There are no succession or contingency plans in place to technically and operationally support these sites. There a total of 13 VSAT stations installed throughout Afghanistan for domestic communication and communication with its neighbouring states. Latest status of the sites are as below :

Operational sites

- 1) Kabul (Hub)
- 2) Khandahar
- 3) Herat
- 4) Mazar-I-sharif
- 5) Bagram

Sites that are no longer operational

- 6) Kanduz
- 7) Khost
- 8) Ghazni
- 9) Bastion
- 10) Chaghcharan

Sites that have been decommissioned

- 11) Maimana
- 12) Farah
- 13) Bamiyan

Current Issues

2.2 The current VSAT bandwidth contract on Asiasat5 is approaching its expiry date, that is, 28 February 2015. If the contract for the VSAT bandwidth on Asiasat5 is cancelled, frequencies on this bandwidth will be reassigned and will no longer be available. If no succession or contingency plans are in place, all communications will come to a halt.

2.3 There is no communication between Afghanistan and its neighbouring ACCs due to the change in frequencies on Kabul's hub and incompatible equipment on its neighbouring ACCs's sites.

Proposed Solutions

2.4 Contract arrangement of VSAT bandwidth on Asiasat5 through its existing satellite provider. This requires immediate attention. Without the VSAT bandwidth on Asiasat5, all domestic links within Afghanistan will come to a standstill if there is no succession plan. If the succession plan involves switching to a different satellite provider, considerations have to be made as follows:

2.5 The current system design and link budgets are predicated around Asiasat 5. Asiasat 5 provides a good coverage into CIS countries.

2.6 The existing system is a time division multiple access (TDMA) mesh network linking several sites together. Depending on the system configuration, the hub is able to communicate with all sites simultaneously or the hub is able to communicate with all sites and all sites are able to communicate with each other simultaneously. A TDMA network is also the most bandwidth efficient network.

2.7 Due to the TDMA network configuration, issues arise when the network has to switch to a different satellite provider. The following issues may arise when this happens:

- i) Realignment of the hub's antenna and its domestic antennas have to be undertaken to point it to a different satellite;
- ii) Reconfiguration has to be made on the equipment to change the frequencies on its existing equipment in the hub and all of its domestic sites;
- iii) All engineers must be on site at the same time to realign the antennas to switch over to the new satellite and reconfigure all stations equipment and its network parameters simultaneously;
- iii) Downtime of network will occur, in terms of days and possibly weeks;
- iv) New antennas and indoor equipment may have to be purchased if they are incompatible with the satellite system; and
- v) Manpower and engineer costs will be incurred for onsite visits on such works.

2.8 Restoration of VSAT communications between Afghanistan and its neighbouring ACCs. Afghanistan can include the neighbouring ACCs into its existing network by assigning a 256kbps data channel on its existing network for each of its neighbouring ACCs. The "tail end" of its existing frequencies can be used to avoid disruption to the existing sites on the Afghanistan network. By doing this, the existing sites on the Afghanistan network will not be disrupted and at the same time, communications between Afghanistan and its neighbouring ACCs can be brought up. Restoration of the links between Afghanistan and its neighbouring ACCs can be done by upgrading the neighbouring ACCs' existing equipment to communicate with Kabul's existing equipment.

2.9 Establishment of a dedicated landline cable connection between Afghanistan and its neighbouring ACCs. Dedicated landline cable connection between Afghanistan and its neighbouring ACCs can be established as part of the solution for a back-up plan. PASCOM is able to provide this as a one stop solution to Afghanistan and its neighbouring ACCs. However, it is important to note that a dedicated VSAT system is and always has been the most reliable means of communication. As it is a point to point, or point to multi point connection, there are no points of failure compared to a landline cable connection involving many POPs in order to reach its final destination.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- i) note the information contained in this paper; and
- ii) discuss any relevant matters as appropriate.
