



First Meeting of AFI VSAT Networks Managers

Agenda Item : 2

Presentation of CAFSAT

(Kwa-Zulu Natal, 13-15 June 2011)

(Prepared by INSA/Presented by Secretariat)

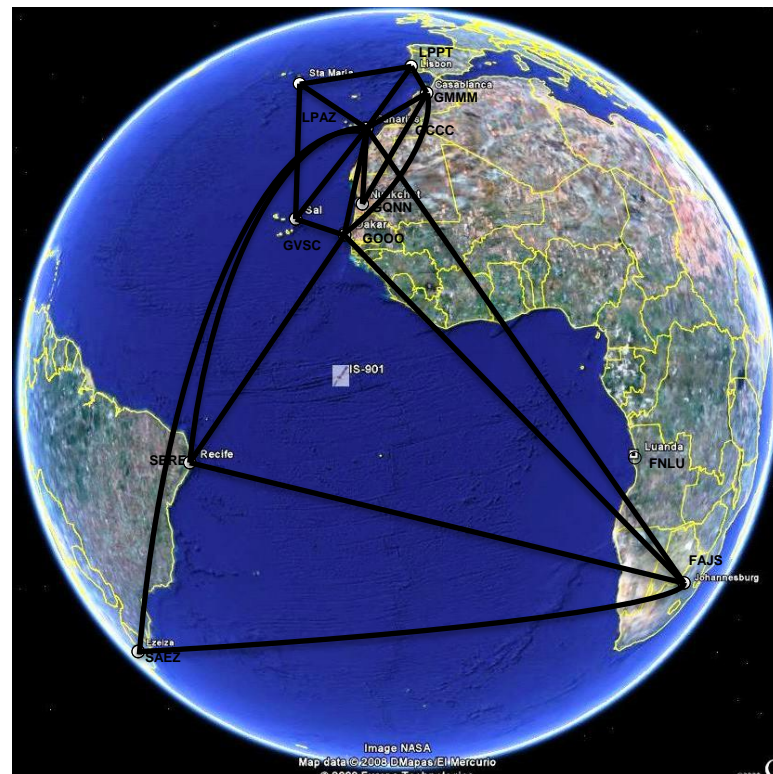
Outline

- ✈ Membership / Topology
- ✈ Technology
- ✈ System architecture
- ✈ Operational Services
- ✈ Management
- ✈ Interconnections
- ✈ Development plans
- ✈ Comments on Implementation of ALLPIRG/5 –
Conclusion 5/16

CAFSAT Topology / Membership

CAFSAT: Central Atlantic FIR's VSAT Network

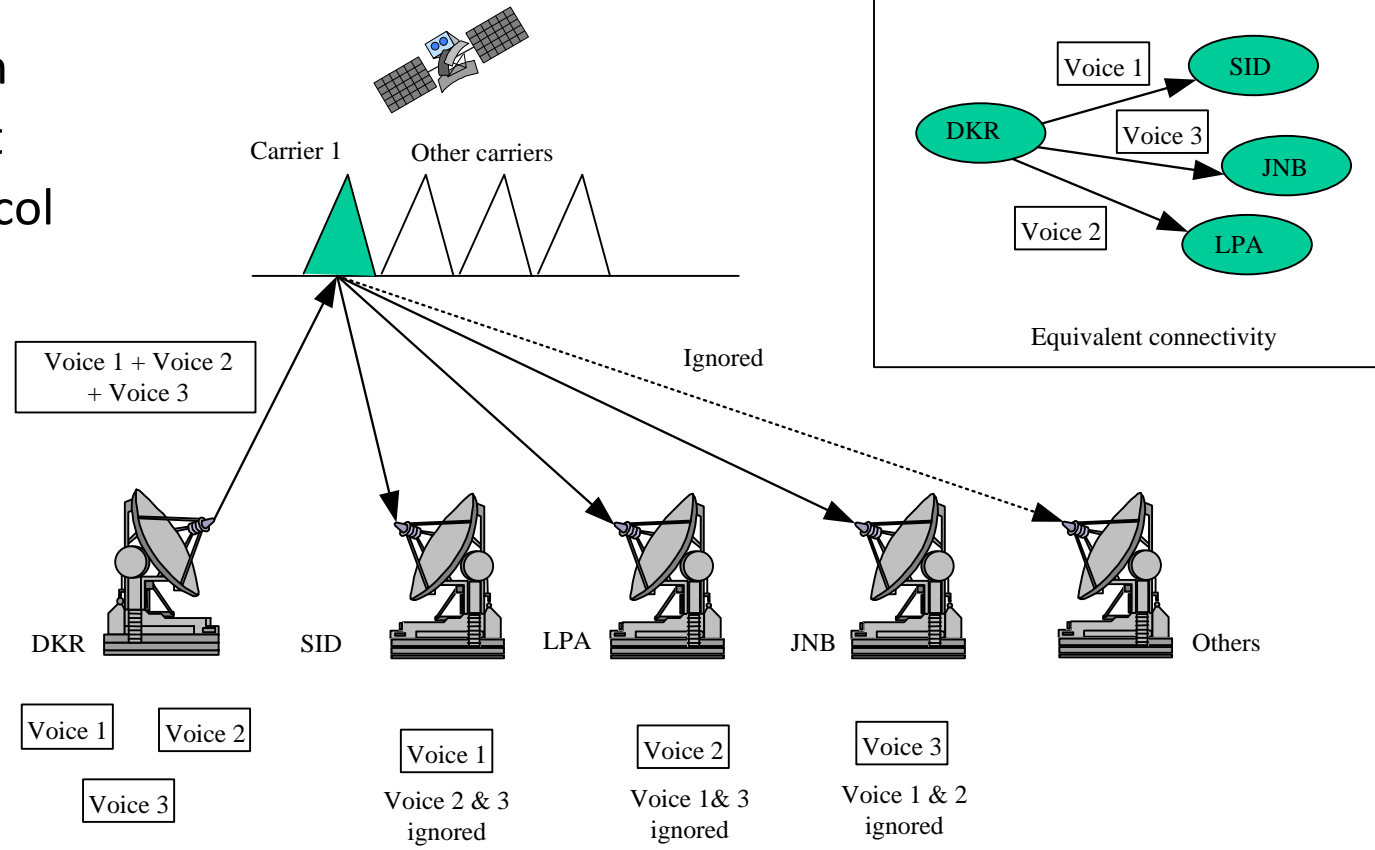
- Connecting EUR, SAM, and AFI regions
- Satellite: INTELSAT IS-901 (342° E)
- C band
- Global Beam
 - Gran Canaria (Spain)
 - Casablanca (Morocco)
 - Sal (Cape Verde)
 - Dakar (Senegal)
 - Lisbon (Portugal)
 - Sta. María (Portugal)
 - Recife (Brazil)
 - Johannesburgo (South Africa)
 - Ezeiza (Argentina)
 - Nouackchott (Mauritania)
- First node deployed: Gran Canaria (2000) – Last one: Nouackchott (2007)
- Last upgrade (baseband): Lisbon/Sta. Maria (2010)



CAFSAT Technology

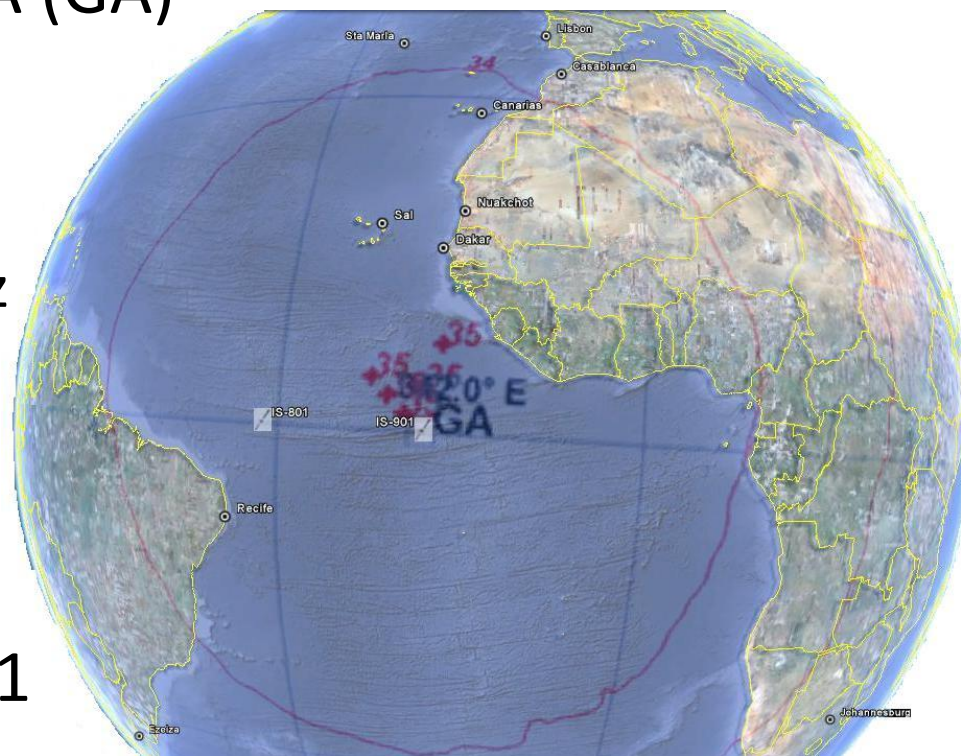
➤ Multiple Channel Per Carrier (MCPC), and Frame Relay over Satellite:

- One carrier/station
- Point to multipoint
- Frame Relay protocol
- Destination info through FR packet headers (DLCI)



CAFSAT Architecture details (I)

- ✈ Satellite: Intelsat IS-901, position 342° E
- ✈ Coverage: Global, beam A (GA)
- ✈ C-Band:
 - Uplink: 5.85 – 6.425 GHz
 - Downlink: 3.625 – 4.2 GHz
 - Circular polarization:
 - LHCP up, RHCP down
- ✈ Transponder # 36
- ✈ Earth stations standard F1



CAFSAT Architecture details (II)

✈ Satellite Access Scheme:

- FDMA: Frequency Division Multiple Access
- Intelsat Business Service (IBS) (IESS-309)
- Closed network
- Carriers multiple of 64 kbps
- QPSK FEC $\frac{1}{2}$
- Each State is owner & responsible of its carrier
- Without centralized network control or management

CAFSAT Architecture details (III)

- ✈ Network Access Scheme (bandwidth):
 - 100% availability of all circuits:
 - Bandwidth reserved in each carrier for all services operating simultaneously except for the “technical”
 - Proper rate (CIR) warranted by the multiplexers configuration
 - No congestion allowed by proper sizing of carriers
 - Permanent Virtual Circuits (PVC's) through Frame Relay protocol

CAFSAT Services

- ✈ Aeronautical Fixed Services:
 - True hot line ATS, single hop
 - AFTN
- ✈ Aeronautical mobile services
 - Hot line AMS
- ✈ Other services:
 - Radar
 - CIDIN, OLDI, AMHS trials and ADS trials through legacy data interfaces
 - “Technical” service: dialing voice circuit for the maintenance staff

CAFSAT Working arrangements

- ✈ Administrative arrangements:
 - Decided locally by each state
- ✈ Technical arrangements
 - Decided locally by each state (i.e. Stations with hot redundancy as well as stations without spares)
 - Without network policy about redundancies, spares, etc.
- ✈ Network management:
 - Decided locally by each state: each station has its own M&C software system tailored with its own requisites
 - Without a whole network M&C
- ✈ Questions involving the whole network will be addressed by the CNMC (CAFSAT Network Management Committee) from now on

CAFSAT Interconnections

- Some cases of stations acting as gateways between networks for data (double hop)
 - Dakar: stations in CAFSAT and AFISNET
 - Ezeiza: stations in CAFSAT and REDDIG
 - Recife: stations in CAFSAT and REDDIG
- Additional VSAT stations when single hop is required:
 - Point to point between Las Palmas (CAFSAT) and Nouadhibou (AFISNET)
- Proposed trials for ATS through double hop CAFSAT-REDDIG ongoing

CAFSAT Development plans

- CAFSAT Joint Technical Evaluation & Re-engineering Team (JTT), recently setup, will report in six months its report for CAFSAT modernization
- Provisional roadmap
 - Short term: base band upgrades
 - Long term: in study by JTT and CNMC
- Interoperability with other networks:
 - Complex in the short term due to incompatibility problems within Frame Relay access devices of different vendors

INSA comments on CAFSAT network

- ✈ INSA supports the idea of the implementation of an integrated IP-based network of ALLPIRG/5 Conclusion 5/16, but
- ✈ A centralized operational control is against the independence of the states, main pillar of current CAFSAT network
- ✈ Interoperability of these kind of networks has to face two main challenges:
 - Acceptable delays: means single hops for voice normally
 - Satellite coverage: interconnection of AFI with other regions will probably require more than one satellite, and then relay stations



International Civil Aviation Organization

Questions?



International Civil Aviation Organization

Thank you