

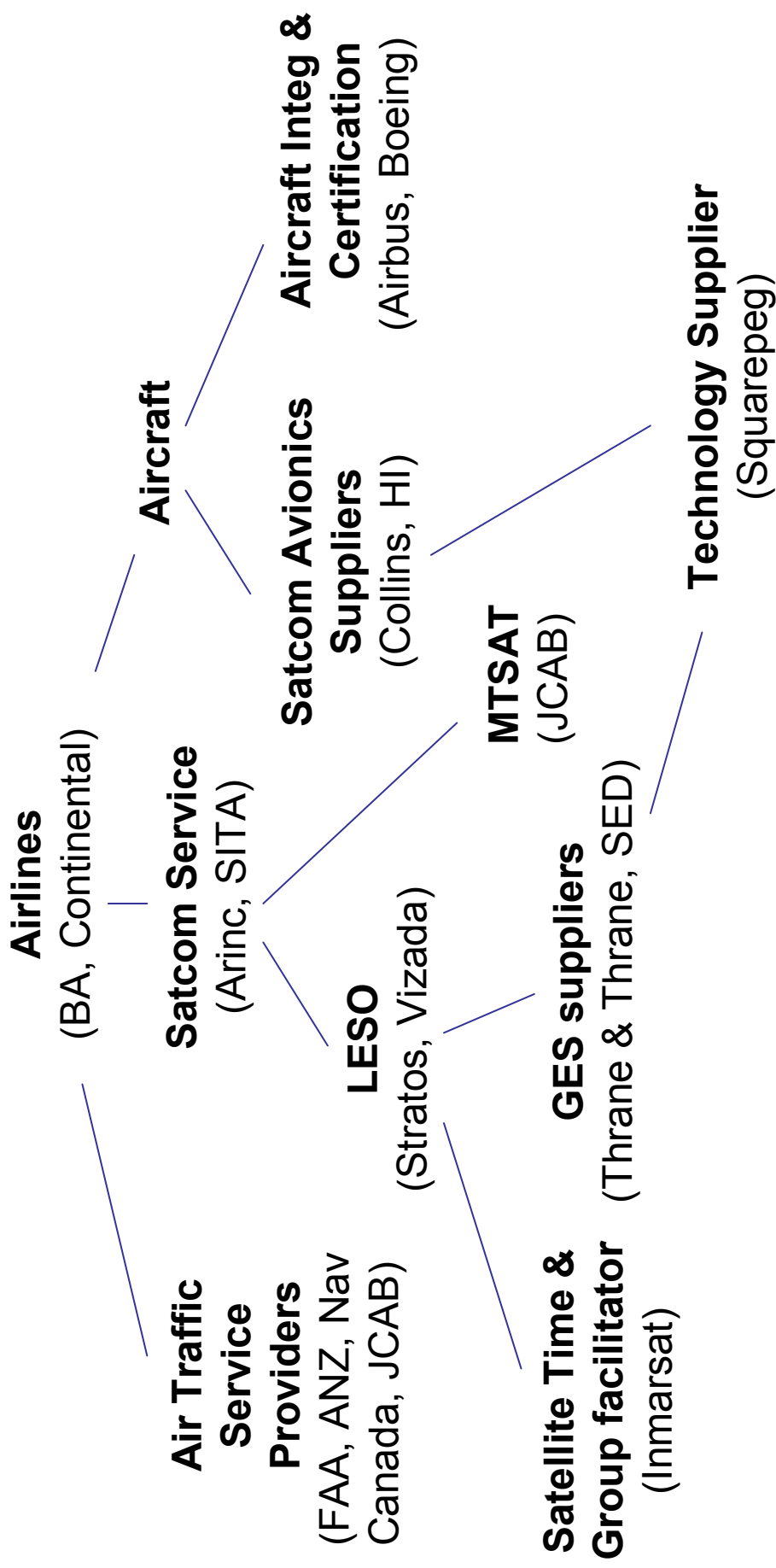
Summary of FANS Satcom Improvement Team Activities

March 2009

On behalf of the FANS Satcom Improvement Team

FANS Satcom Service

Supply Chain and Members of FSIT



Status

- The activities to *investigate, identify, and propose solutions* are essentially complete.
- ‘Supplier contribution’ changes have been completed, giving improvements to performance
- Suppliers view the changes to meet the 30/30nm operational requirements as beyond the original system design requirements, so further change is required
- Costings for ‘30/30’ solution generated to extent possible by all stakeholders.
- Some mechanism of funding from the *users* or others will be required to pay for upgrades from the *suppliers*

What are the comms target requirements for RCP240 (towards 30/30)?

(Updated post FIG/18 meeting)

- **Latency** (comms path ATC HMI-aircraft HMI & aircraft HMI-ATC HMI) – 95%, 120s
 - Mostly being met now (99.9%ile, 150s – challenging)
- **Availability** - 0.999 to 0.9999
 - More reliable ground network needed to get to 0.9999
- **Length of outages** – to be less than 10 mins since otherwise air space has to be reorganised
 - 10 min based around 14min ADS reporting time
 - ‘Log-on storms’ mean this is unattainable without new log on protocol

Further Medium and Long Term improvements

Monitoring:

- Expand use of Inmarsat Signal Unit (SU) analysis tools to DPs/ SPs
 - Demos of data capture, analysis and graphical plotting tools given to DPs and SPs ✓
 - Internal approval for necessary development work ✓
 - Commercial offering defined ✓

Proposed Enhanced Air Interface evaluated:

- **Log-on algorithm (included in proposed CP96)** key features:
 - AES able to log on to any R-Ch that the GES has
 - System table broadcasts R-Ch frequencies and bit rate and corresponding P-Channel frequencies and bit rate
 - Flight ID not sent – hence log on is 1 SU/aircraft rather than 2
- **Potential Datalink enhancement evaluated** key features:
 - Use ACARS ‘no-comm’ indicator to trigger SDU log-on to alternate GES **(not taken up as potential change – see next slide)**

ACARS no-comm

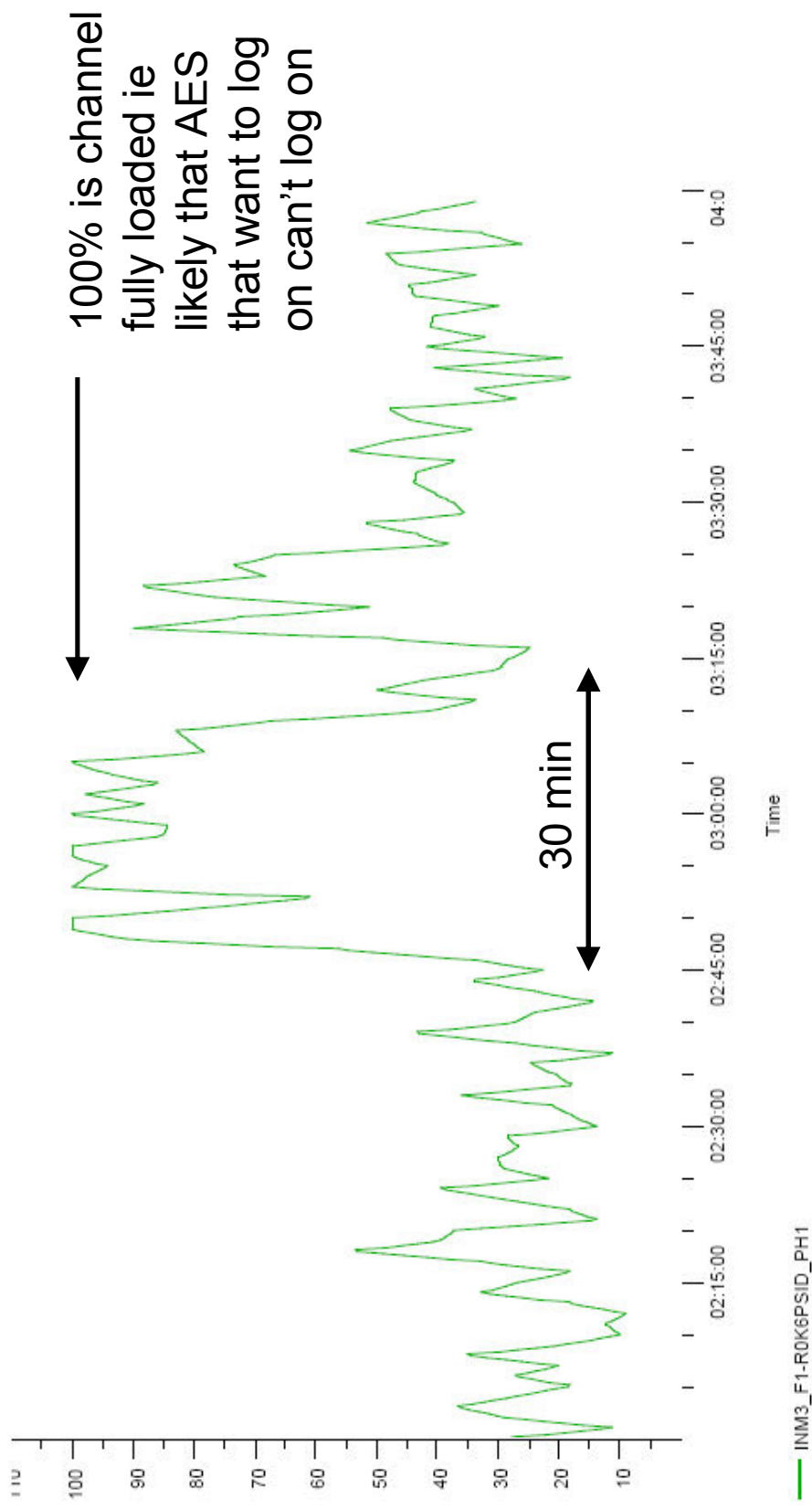
- Currently when for example there is a terrestrial comms outage, the SDU stays logged on the GES (rather than trying another satellite/GES) even though the ACARS is in 'no comm' state.
- SITA proposed that the SDU uses the 'no comm' indication from the ACARS as a prompt for the SDU to try another satellite/GES.
- This idea was reviewed by the stakeholder group but was not taken up. (It was considered that there might be a need to shorten the trigger timer – which was outside this groups' remit - requiring a wider industry review of the potential consequences of the change before the idea could be ratified)

Understanding the Changes for 30/30nm Ops

- The changes are targeted to provide;
 - Better system reliability of ground network
 - Better time to restore
- The latter needs an air interface change (CP “30/30” – aka CP96) to improve the log-on protocol AND to be fielded in most aircraft

Log-on Storm Perth (IOR) 9 May 2008

Psmc Occupancy



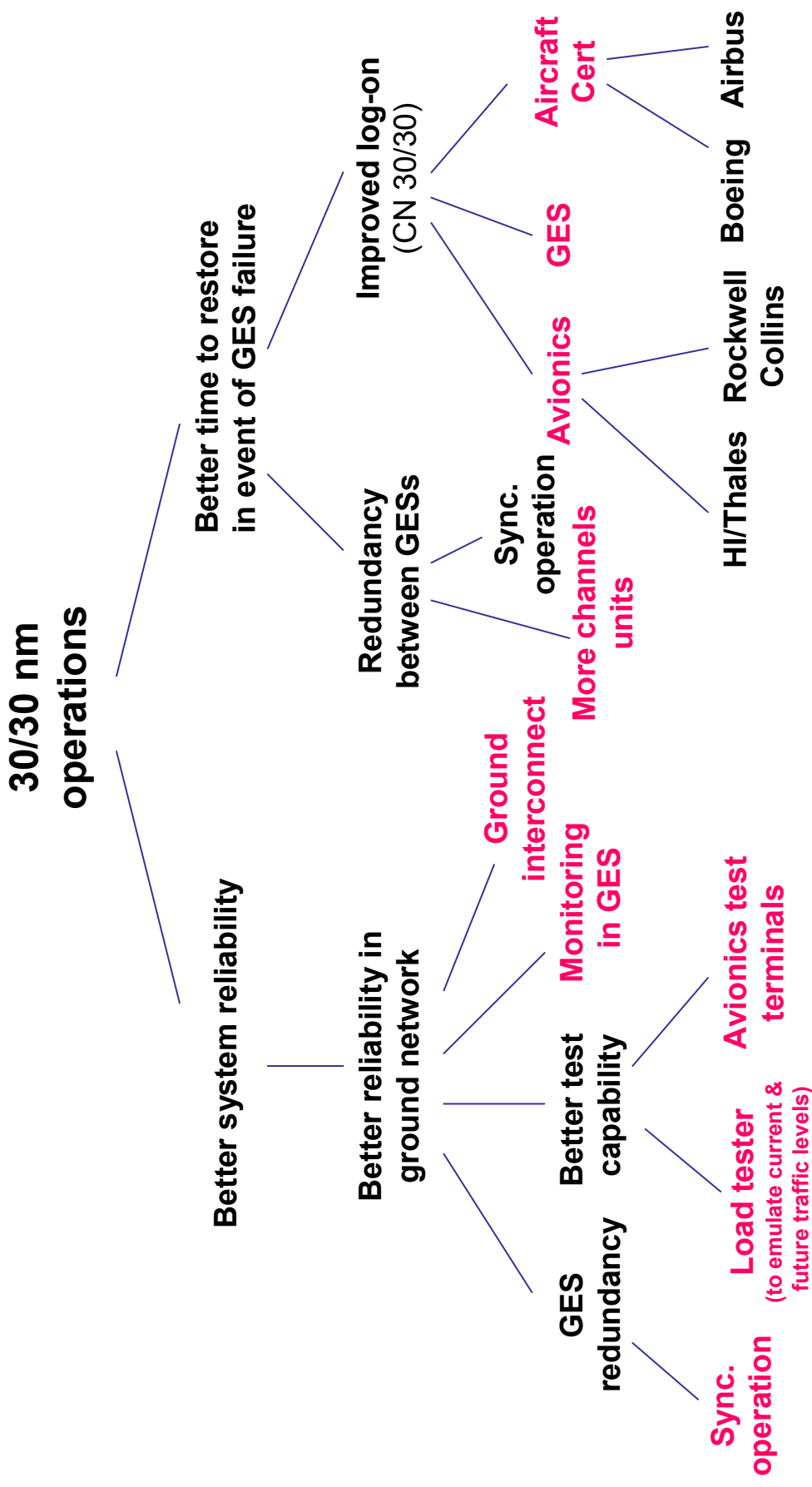
How to improve

- CP30/30 addresses this by allowing the AES to log on using the high rate channels which have an order of magnitude more capacity, and also allows more than one P channel to be used for log on. CP30/30 should deliver the capability to 'log on 1000 a/c in 5 minutes'.

	R-Ch	P-Ch
600	1	3
1200	2	6
10500	8	52

Signal Units Per Second

Change elements to achieve RCP target for 30/30nm



Costings

- On behalf of the FANS SIT, Inmarsat is assembling costs for the identified changes to
 - I3 ground network
 - Avionic changes
 - Airbus and Boeing to recertify the avionics
- Total cost is believed to be \$15-20M
- Output of this would ideally be
 - Free of Charge Service Bulletin (endorsed by Airbus and Boeing) to update avionics (SDU s/w change for 1,000 a/c able to log-on in 5 minutes)
 - Updated ground infrastructure (enhanced monitoring, enhanced load testing, full backup between GESs in ocean region)
- Airlines to contribute fitment costs

Fleet Upgrade

- To gain the benefit the vast majority of FANS aircraft would need to be updated
- The benefits being airspace changes for 30/30nm operations

FANS SIT inputs to Institutional meetings

- A paper describing the history, operational need, benefits and costs has been developed by the FAA. Presented at;
 - June NATSPG/44,
 - APANPIRG ATM/AIS/SAR Sub-Group (ATM/AIS/SAR/SG/18) Bangkok end of June, and
 - CAR/SAM Regional Planning and Implementation Group (GREPECAS) beginning July
 - (presentation by Inmarsat at Datalink Users' Forum –July)
 - Asia/Pac CNS/MET group end July
- ICAO CEANS conference (Sept) addressed satcom infrastructure and service levels
- (up-and-coming) FIT-BOB & Satellite Data Link Continuity Meeting April 22nd to 24th April 09

Next Steps for FANS SIT

- Funds still need to be found.
- FANS SIT (30/30) can then move into an implementation phase.