

Meeting Report:
AEEC Datalink Users Forum – Ad Hoc
“Spectrum Utilization in a Multi-Frequency Environment”
 Continental Airlines Simulator Building
 Houston, Texas
 24-25 October 2006

Objective: Discuss resolution options that allow aircraft operators to regain control of primary datalink service provider (DSP) usage.

Background: The evolution of datalink network expansions has brought to light that in various global regions both service providers are now using a base frequency traditionally used only by the other provider. ACARS avionics tune to a frequency, not a service provider. Therefore this sharing of frequencies impairs an airline’s ability to manage their primary DSP usage...and the associated costs. The datalink service providers, avionics vendors, and airlines all have somewhat different views on the history behind how the industry got into this mess. Consequently they all have slightly differing ideas about how to resolve the problem. At the June 14-15 AEEC Datalink User Forum in Brussels, this topic was discussed vehemently resulting in a request for an Ad Hoc meeting. The scope of this meeting was expanded to include three separate issues which impair an airline’s ability to manage their primary DSP usage.

Issues: A) Shared DSP Base Frequencies
 Addressing the global usage of the 131.725, 131.550, and 131.450 base frequencies was the primary focus of this meeting. This is basically a DSP issue with regard to frequency allocation and use, although it could be mitigated better with more sophisticated geographic filtering in the ACARS avionics.

DSP	BASE FREQ	STATIONS	COUNTRIES	
SITA	131.725	371	129	SITA’s Main Base Frequency
ARINC	131.725	9	2	AEROTHAI (Korea/Taiwan)
ARINC	131.550	447	34	ARINC’s Main Base Frequency
SITA	131.550	143	29	DECEA-Brazil, Australia/New Zealand, Asia/Pacific, Korea/Taiwan, Russia, Salvador (frequency license)
AVICOM	131.450	47	1	AVICOM-Japan’s Main Base Frequency
ARINC	131.450	110	11	AEROTHAI, ADCC-China, Salvador
SITA	131.450	0	0	(None)

B) VDLM2 Media/DSP Connection Priorities
 Addressing the shortcomings of the current VDL connection logic was the secondary focus of this meeting. This is basically an Avionics Vendor issue with regard to onboard VDL avionics design and industry specification issue.

C) Dual DSP Received Messages (Frequency Intermodulation)
 Addressing the consequences of Frequency Intermodulation was an auxiliary focus for this meeting. This is basically a DSP issue with regard to VHF ground station reception of transmissions broadcast over another DSP’s frequency. This issue was only briefly discussed due lack of time.

History: SITA and ARINC presentations provided comprehensive insight into how competition and market pressures have driven the DSPs to expand service world-wide in an uncoordinated and unregulated fashion over the past 20 years (see attached presentations).

Issue A

Resolution: Shared DSP Base Frequencies

HIGH LEVEL RESOLUTION:

SITA and ARINC are in general agreement that the two DSPs should swap base frequencies in regions where they are using each other's base frequency. It is in the details of *how*, *when*, and *where* that proposed resolutions become divergent.

INDUSTRY POLICY:

SITA and ARINC are in agreement that there needs to be a frequency use policy mandated by a neutral industry entity that has influence over the country states regarding frequency allocation matters. It was discussed that the IATA Ops Committee might be the most appropriate industry entity for this purpose with the AEEC DLUF likely being delegated policy oversight. It was further discussed that although no industry entity exists that has enforcement authority; formalization of a policy that is strongly endorsed by this industry entity may be enough to encourage compliance. The intent of the policy is that no DSP will request or be allocated an ACARS frequency for use as a base or alternate (autotune) frequency that is already in use by another DSP as a base or alternate (autotune) frequency. Further intent of the policy will be that all efforts will be made to remove any existing duplication of frequency usage by mutual agreement, at minimal cost to aircraft operators, within a timeframe that is acceptable to the industry (as agreed by AEEC Datalink Users Forum). Drafting the specific wording for the policy was taken as an action item from the meeting. The policy will be worded to specifically address ACARS frequencies; clearly distinguishing that VDLM2 is connection-based and uses a common DSP frequency by design.

RESOLUTION APPROACHS:

SITA's resolution proposed a phased approach to remove existing duplication of frequency usage. They stated that this was required since their ground station radios will need hardware changes to switch frequencies. Their plan calls for the addressing not only the 131.725 and 131.550 base frequencies, but also the 131.450 frequency. SITA outlined their phases as follows...

- Phase 1-China Northwards: Korea, Taiwan, Russian Far East, Mongolia and Hong Kong
- Phase 2-South East Asia
- Phase 3-Australia, New Zealand, and Pacific Islands
- Phase B-DECEA Brazil (to be handled as separate process)

SITA proposed immediately addressing Phase 1 and then addressing Phase 2 and 3 in conjunction with their currently scheduled ground station maintenance and upgrade plan. They estimated that this process would take approximately 3-5 years to address to complete. SITA was adamant that resolution should be in DSP ground network, not in reprogramming the aircraft avionics; the aircraft operators and avionics vendors concurred.

ARINC's resolution proposed a simultaneous global approach to remove existing duplication of frequency usage. ARINC was adamant that a phased approach would provide SITA with an unfair business advantage because they believe the current proposal is significantly biased towards SITA's operation. They cited lessons learned from their recent experience with large scale base frequency change in Europe (switching base frequency to 131.825 with the mandated evacuation of 136.925). ARINC advised that they learned that changing frequencies was more complicated and costly than anticipated, that unforeseen aircraft avionics issues develop which cause ancillary impact to the industry, that unexpected significant lost traffic occurs, and that industry issues are given differing resolution priorities by the various industry parties involved. They further cited that the global frequency swapping proposed will be even more complicated because the frequencies involved are currently in use by the other DSPs and involves many variables outside of the datalink industry's control. ARINC original proposal called for the addressing only the 131.725 and 131.550 base frequencies. After much discussion they agreed to look into 131.450 frequency inclusion, but would not commit citing that they only had limited influence over their ADCC-China and AeroThai partners. ARINC was further adamant that they would not agree to move forward until an industry policy is in place that, 1) identifies a neutral industry entity that has influence over the country states regarding frequency allocation matters, 2) applies to all present and future ACARS DSPs, not only ARINC and SITA, 3) includes a means to enforce, and 4) specifies the lifespan of the policy with terms for periodic re-evaluation and reassessment. They further requested that the industry provided them an assurance that aircraft operator community supports the policy and agree that benefit is worth the associated transition costs.

Both SITA and ARINC expressed concerns regarding each other's proposed approaches. ARINC voiced strong skepticism that a phased approach, tied to a scheduled ground station maintenance and upgrade plan, could be accomplished in the 3-5 years estimated. SITA countered that the 'big bang' approach would take even longer waiting for everything to be in place for a simultaneous global implementation.

TRANSITION IMPACT:

There was discussion regarding the impact to older aircraft avionics which will have to be reprogrammed to reflect the changed frequency for their primary DSP. The general feeling of the participants was that the overall industry benefit of resolving this issue should not be hindered because of legacy limitations. It was further discussed that the newer avionics with geographic filtering capability might have to be reprogrammed as well. The general feedback from the participants was that the geographical filtering currently available in the more advanced avionics was still too rudimentary to address the frequency sharing issue causing most operators to not use it. None-the-less, it was agreed that a wider base of aircraft operators should be surveyed to provide feedback on what the impact would be to the individual operators and whether they supported the frequency swapping resolution. This may lead to insight on regions where swapping may not be the best approach (i.e. Australia/New Zealand where it is likely that the majority of traffic is domestic and never operates outside of that specific frequency allocation region, so the impact of a frequency swap may not yield enough benefit to justify the cost).

DSP JUSTIFICATION:

Both DSP expressed that resolution of this issue will be very costly for them, in the millions. Both agreed that from the DSP perspective, cost justification to address this issue is only in the long term; resolution will enable aircraft operators to select a DSP for service contract exclusivity (something not globally possible in the current shared frequency environment). There appeared to be general agreement that due to the cost factors, a DSP board level directive would significantly help the two DSPs come closer on a resolution approach.

ALTERNATE RESOLUTIONS

Two alternate resolutions were discussed. One called for DSPs to automatically autotune aircraft to the other service provider's frequency for aircraft operators who have indicated a preference accordingly. The other called for DSPs to ignore aircraft at the link layer (by not uplinking ack messages) for aircraft operators who have indicated a preference accordingly. Both of these alternate resolutions are problematic and bring into play collateral issues, possibly worse than those being solved. They are at best inelegant bandages that do not truly resolve the issue, but merit consideration none-the-less.

It was also discussed that this issue might be mitigation for future avionics with more strict industry specs. To that end, the AEEC Datalink User Forum will formally request that the AEEC Datalink Systems Subcommittee consider modification of the industry specs (ARINC 618, Section 5.6) to require avionics vendors to design future ACARS avionics that tune to a service provider, not a frequency. The request will also ask the AEEC DLK SC to evaluate the ramification of requiring ACARS avionics to use the service provider identifier contained in the POA uplink squitter as the primary means for adherence of user-defined service provider preferences.

Issue B

Resolution: VDLM2 Media/DSP Connection Priorities

As the SITA and ARINC VDLM2 networks have expanded into the same regions, operational experience has brought to light a shortcoming in the VDL connection logic which impairs an airline's ability to manage service provider use.

VDLM2 avionics are currently designed and spec'd to maintain a VDL connection as the foremost priority, falling back to ACARS (POA) only when VDL is not available from any DSP. This means that datalink traffic can occur over a secondary DSP's VDL network even when the primary DSP's ACARS network is available. The avionics vendors offer different software options to permit selection of DSP preferences (or exclusions) for VDLM2, but no option exists to prioritize between VDLM2 and ACARS. The use of VDLM2 for air traffic service (CPDLC) complicates resolution of this issue.

HIGH LEVEL RESOLUTION:

There was no discussion on how existing VDLM2 avionics will address this issue. However it was discussed that mitigation for future avionics might be possible through the industry specs. To that end, the AECC Datalink User Forum will formally request that the AECC Datalink Systems Subcommittee consider modification of the industry specs to require that VDL avionics acquire and maintain VDL connections in accordance with airline specified service provider and media priorities.

Issue C

Resolution:

Dual DSP Received Messages (Frequency Intermodulation)

This issue was only briefly discussed due lack of time. However there was considerable interest voiced by the aircraft operators that this issue should be addressed.

Action Items: Several actions items were generated as a result of this meeting. They are as follows...

Action Owner	Action Item
ARINC, SITA, and AECC DLUF Co-Chairs	Draft wording for "The Policy"
AECC DLUF Co-Chairs	Draft a survey to poll aircraft operators on the impact that the proposed changes will have on their operation and whether they support these changes
AECC DLUF Secretary	Disseminate survey to AECC DLUF membership
ARINC and SITA	Reinforce survey by further dissemination to their customers with a cover letter explaining the importance of their feedback
ARINC, SITA, and AECC DLUF Co-Chairs	Draft and send an email to the AECC DLK SC Chairman (Joe Slavinsky) requesting DLK Systems Subcommittee consideration of industry specs modifications
AECC DLK SC Chairman	Raise AECC DLUF request to consider industry specs modifications

Next Meeting: There was agreement that this group should meeting again on February 5th, in order to report a status at the AECC Datalink User Forum in Annapolis the following day.

Meeting: AECC Datalink Users Forum – Ad Hoc
"Spectrum Utilization in a Multi-Frequency Environment"
Date: February 5, 2007
Time: Monday, 0900-1700
Location: ARINC Headquarters Building
Annapolis, MD

Meeting

Participants: The AEEC Datalink Users Forum co-chairs (Janet Wiesner/CO and Colin Gallant/BA) conducted the meeting, which had global representation from SITA, ARINC, Honeywell, Collins, and nine aircraft operators...

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