AERONAUTICAL SURVEILLANCE SYSTEMS PANEL (ASP)  
TSG MEETING  

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Part of ASP report on Signal Environment  

Brief Progress Report for ASP on Signal Environment  
Studies in Japan  

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SUMMARY

This paper is a brief report on the signal environment investigation in Japan.

The JWG/3 meeting in Montreal on May 2006 tasks TSG members to provide this information to draft the ASP report on its task five including the investigation on signal environment in 1030/1090 MHz channel.

References

2) S. Ozeki: "1030 MHz signal measurement in Japan", SCRSP/WG-A IP/A/1-18, presented in Rio de Janeiro, April. 2001
4) S. Ozeki: "Transponder Anomalies Observed with Airborne Waveform Measurement", SCRSP/WG-A IP/A/6-220, presented in Honolulu, October. 2003
5) S. Ozeki: "Reply failure to low power interrogations", SCRSP/WG-A IP/A/8-14, presented in Gold coast, April. 2005
6) TSG: "WG-A discussions on Reply failure to low power interrogations", SCRSP/WG-B IP/B/9-13, presented in Paris, October. 2005
7) S. Ozeki: "Impact of ATC transponder transmission to onboard GPS-L5 signal environment", SCRSP/WG-A IP/A/10-18, presented in Montreal, May. 2006
1. **Introduction**

1.1 The ANC is asking for status reports from all Panels by the end of September: a simple statement of the tasks and their status. This action was also requested to SCRSP or ASP by the President of ANC at SCRSP/JWG-3 meeting in Montreal on May 2006.

1.2 The list of tasks for SCRSP was also revised by the ANC to define the new set of tasks for ASP, Aeronautical Surveillance Panel. The list includes the new task on signal environment as follows.

| New task | 5) Investigate and report on the radio frequency (RF) pollution problem associated with the use of 1 030/1 090 MHz frequencies. | 2007 |

1.3 The investigations in this area have been reported to WGs and TSG by organizations including US FAA, DFS, UK NATS and JCAB. In 1990’s of later SICASP era, the investigations have been mainly focused onto three issues, i.e., the evaluation of ACAS interference limitation algorithm, the performance estimation of mode S extended squitter as surveillance data link, and the performance estimation of SSR in future environment with assuming the applications of squitter and mode S data link.

1.4 Authors have kept providing the information on signal environment investigation in Japan since early '90s under the coordination with SICASP/SCRSP WG activities. Early measurement for signal environment in 1090MHz band provides an experimental basis to support the statistical performance estimation with the Poisson distribution model for asynchronous interference to mode S extended squitter. Recently, the purpose of signal environment investigation in Japan covers study areas including the error source of signal environment estimation and the effect to its adjacent bands.

1.5 This paper is the response to following action item to support TSG.

**Action JWG/3-05** The old TSG will draft the September reports on items 2, 4, 5, 6 & the rest of item 7.

2. **Draft report on ACAS monitoring**

2.1 Authors suggest for including sections into the status report for ANC as follows. The following sections describe current activities for signal environment investigation in Japan.

“Japan is carrying out the flight measurement to measure the signal environment including 1030/1090 MHz band. The results have been reported to WGs and TSG with pointing out the potential error sources for signal environment estimation. For example, multipath echoes of interrogation signals are observed to increase the transponder reply in less than 10 NM from SSR. Another example is the unexpected response of ATC transponder to low power interrogation signal close to its MTL. The transponder may fail to discriminate the signal modes to reply, if the interrogation signal level is about MTL or bit less. In addition, the effect of military interrogator is not negligible for signal environment in this band by their signal count and by their mobility. Provided information will be used for the signal environment estimation and its error analysis in future.
Recently, the frequency band under measurement in Japan covers that of GPS-L5. The transmissions of onboard ATC transponder were observed in GPS-L5 band. The power level of interference to GPS signal is not negligible. On the other hand, the duty ratio of ATC transponder transmission is expected to be negligible in current Japanese environment. The future issue will be the signal environment estimation with assuming SSR mode S operational scenario in future.”

2.2 Authors also suggest that above sections may be merged into the status report with those from other countries or organizations. The sentences should be adjusted to the context of report for ANC.

3. Conclusion

3.1 TSG members are invited to note that the information in this paper will support TSG to carry out the action item on status report related to the task five including signal environment investigation in 1030/1090 MHz band.