

## **Altimetry System Error (ASE) Workshop**

**13-15 September 2016**

### **Executive Summary**

The Federal Aviation Administration's (FAA) Separation Standards Analysis Branch, ANG-E61 and Eurocontrol hosted an Altimetry System Error (ASE) Workshop at the William J. Hughes Technical Center September 13-15, 2016. The effort was conducted under USA/EUROPE via a Memorandum of Cooperation FAA-Eurocontrol Cooperative Research Agreement Action Plan 03 (AP03): Air Traffic Modeling Separation Standards. The workshop was attended by Airlines including United, Southwest; aircraft manufacturers including Airbus, Boeing, and Embraer, and sensor manufacturers including Thales, UTAS, Honeywell, Curtis Wright Defense Systems, and Aeromech. Other government attendees included FAA Flight Standards, members of the US Navy RVSM team, and representatives from the South African and Afghanistan CAAs. Topics addressed included Regional Monitoring Agency (RMA) functions assigned to the FAA (ANG-E61), ASE monitoring and large ASE cases, details of the European Monitoring Agency (EUR RMA) recent monitoring and issues, aircraft and maintenance design by manufacturers, and detailed sensor design and failure mode analysis.

The workshop began with presentations provided by members of the Separation Standards Analysis Branch. The presentations provided an in-depth view of the technical and analytical work performed by the Branch with respect to monitoring, tracking and reporting ASE performance of aircraft Groups and individual airframes. The presentations touched on the Branch's roles and responsibilities as mandated by International Civil Aviation Organization (ICAO) and FAA requirements, monitoring systems developed and maintained by the Branch, data processing and quality control measures, ASE performance monitoring and tracking, large ASE reporting processes and resolution collaboration with Flight Standards Service (AFS), operators and manufacturers.

The workshop continued with presentations of several large ASE case studies. The purpose of the presentations was to inform participants of contributing factors to large ASE performance, detail the large ASE detection process for each case, solicit feedback of possible solutions for unresolved cases, stimulate conversation between operators, manufacturers, service providers and regulatory authorities, provide experiences gained from resolution collaboration with relevant parties and share lessons learned. Each case presented included figures of plotted data illustrating airframe ASE performance, details of causal factors, resolution strategies and, if resolved, figures showing improved performance.

Following review of large ASE cases, operators, manufacturers, and technical service providers had an opportunity to present on a variety of topics relevant to ASE performance. Topics presented by industry included troubleshooting poor ASE performance, the effect of implementing multiple modifications to a single airframe, long-term stability of aircraft components and systems that affect ASE performance, systematic altitude error and static error correction (SSEC) and random altitude error and estimation.

The workshop concluded with a series of breakout sessions. Each breakout session, ASE Quality Analysis, Pressure Surface Determination, ASE Data Elements, and Maintenance and Procedure Refinements, was designed to address target areas of interest of all participants. The intent of each workshop was to address each subject area at a more refined level and to engage participants in a working group type of environment. Each participant had an opportunity to participate in two of the four breakout sessions.

This first workshop held in North America was very successful in providing information to the community of interest, particularly in getting direct participation by US industry. All participants

expressed a desire for FAA to host a follow-on workshop within approximately one year.