



CSSI, INC.

Moving Research to Reality



CSSI, INC.

RVSM →

*Altimetry System Error (ASE)
Workshop 17-19 October 2017*

*RVSM and Monitoring
2020 and Beyond – US Perspective*



Office
Locations:

CSSI, Inc. Headquarters

425 3rd St, SW | Suite 700 | Washington, DC 20024
202.600.7600 tel | 202.600.7523 fax | www.cssiinc.com

Capitol View
425 3rd St. Ste. 700
Washington, DC 20024
Tel: 202.600.7600
Fax: 202.600.7523

New Jersey
1800 New Road
Northfield, NJ 08225
Tel: 609.910.3416
Fax: 609.910.0632

South Carolina
7011 Rivers Ave.,
Ste. 103
Charleston, SC
29406
Tel: 843.735.7020
Fax: 843.735.7002

Key Acronyms and Abbreviations

- RVSM - Reduced Vertical Separation Minimum
- ICAO – International Civil Aviation Organization
- RMA – ICAO RVSM Regional Monitoring Agency
- AGHME – Aircraft Geometric Height Measure Element (US and Canadian ground-based monitoring)
- ADS-B – Automatic Dependent Surveillance - Broadcast
- GPS – Global Positioning System
- GMS – GPS-based Monitoring System
- GMU – GPS-based Monitoring Unit
- EGMU/E²GMU – Enhanced GPS-based Monitoring Unit

Overview

- RVSM Monitoring – Current
- RVSM Monitoring – Future
- International RMA Support – Current
- International RMA Support – Future
- AGHME
- ADS-B Height Monitoring Considerations
- ADS-B Height Monitoring Ground Stations
- GMS Considerations
- ASE Processing

RVSM Monitoring - Current State

- GMS
 - FAA Global Leadership
 - Maintenance
 - Training
 - Hardware/software tech refresh/development
 - Resource Intensive
 - Sponsored by FAA Tech Center
- AGHME
 - GMS ASE engine
 - Automated
 - Sponsored by FAA Tech Center
- ADS-B Height Monitoring
 - GMS ASE engine
 - Solution development continues
 - Not currently available to operators

RVSM Monitoring – Future State

- GMS
 - FAA Global Leadership
 - Tech Refresh/Development
 - Increased Automation and Outsourcing
 - Additional sponsors within FAA?
- AGHME
 - GMS ASE engine
 - Additional Automation
 - Remain cost-effective once ADS-B is primary method?
 - Additional sponsors within FAA?
- ADS-B Height Monitoring
 - Automated processing
 - Solution development complete
 - Sponsors within FAA?

International RMA Support - Current

- GMS Hardware
 - FAA Global Leadership
 - GMU Tech Refresh/Development
 - Loan/Provide
 - Sponsor: support from FAA Tech Center
- GMS Software/Data
 - Commercial GPS correction software
 - ASE Calculation
 - Meteorological Data
 - Sponsor: support from FAA Tech Center
- ADS-B Height Monitoring
 - Australia/AAMA, Japan/JASMA, Asia/MAAR, RMA China, EURASIA RMA

International RMA Support - Future

- GMS Sustainability/Commercial
 - GMU Tech Refresh/Development
 - Provide ASE
 - Sponsor?
- Commercial GMS Software/Data?
 - GPS correction software
 - ASE Calculation
 - Meteorological Data
- Hardware and software training support?
- ADS-B Height Monitoring?
 - Quality Assurance
 - Sampling
- Performance-Based Communication and Surveillance (PBCS) Monitoring?

AGHME

- Technical refresh to extend service life to sustain operations of U.S. AGHMEs beyond 2020
- Cost-effective once ADS-B becomes primary means of RVSM monitoring?
- Continued maintenance for in-service AGHMEs
- Installation of Florida AGHME
- Atlantic City AGHME site to remain operational beyond 2020
- Continued maintenance of Canadian AGHME sites
 - Ottawa, Ontario
 - Lethbridge, Alberta
- ASE processing

ADS-B Height Monitoring Considerations

- Forthcoming RVSM ADS-B Out rulemaking will require continual monitoring via ADS-B Out.
- Ownership, funding and level of effort for continual monitoring via ADS-B Out and related analysis of aircraft performance possible?
- GMS ASE engine re-engineering.
- GMS ASE engine adapted to meet ADS-B height monitoring needs.
- Quality assurance, sampling, storage and automation requirements for continual monitoring via ADS-B.
- Personnel resources to support ADS-B height monitoring data analysis.

ADS-B Height Monitoring Ground Stations

- ADS-B data collection optimized for RVSM height-monitoring
- International and domestic interest in validated ADS-B height monitoring system.
- Potential users:
 - Africa/AFIRMA
 - Middle East/MIDRMA
 - Caribbean & South America/CARSAMMA
 - Other RMAs desiring expanding ADS-B monitoring coverage
 - Aircraft manufacturers, FBOs, aircraft maintenance and management organizations.
- ASE calculation needed

ADS-B Height Monitoring Ground Stations

- Anticipated user benefits:
 - Low cost system with increased coverage for enhanced monitoring capability
 - More timely identification of aberrant and non-compliant airframes.
 - Operators equipped with ADS-B Out and compliant with Part 91 Appendix G in US will not have to prepare and submit authorization package under US FAA rule change
- Possible cost model - operators would pay nominal cost when ASE result needed for compliance.

GMS Considerations

- Sustain current GMS assets
 - GMU
 - EGMU
 - E²GMU
- Development of next-generation E³GMU adding ADS-B Out reception to airborne platform.
- Continued expansion of E²GMU assets to RMAs, aircraft manufacturers, fixed base operators and aircraft management organizations.
- Support for RMAs requiring GMS support.
- Upgraded ASE calculation software.

ASE Processing

- Upgrade ASE software
 - Modern or multiple platform
 - Modern language
 - Enhanced automation
 - Enhanced user interface
 - Enhanced documentation

Summary

- What are the considerations for maintaining and upgrading the current monitoring systems?
- What impact does height monitoring from ADS-B data have on:
 - Current monitoring systems
 - US RMA operations
 - International RMA operations
 - RMA-RMA support relationships
- Contact: Bob Miller/rmiller@cssiinc.com/202-498-0051