

NextGEN

Use of Automatic Dependent Surveillance- Broadcast  
(ADS-B) Out in Support of Reduced Vertical Separation  
Minimum (RVSM) Operations  
Altimetry System Error-Reports (ASE-R)



**FAA**



Federal Aviation  
Administration

# Altimetry System Error – Report (ASE-R)

- ASE reports are an element of the global implementation of RVSM;
  - ✦ Part of the overall safety management system (SMS) to ensure RVSM safety objectives;
  - ✦ An ongoing process capturing data on a continuing basis to identify risks at their earliest stages; and
  - ✦ ICAO Regional Monitoring Agencies (RMAs) monitor and report ASE errors to FAA Flight Standards for processing and correction

AAMA    ARMA  
EURASIA RMA  
RMA

China RMA  
CARSAMMA  
MID RMA

CMA  
EUR RMA  
MAAR

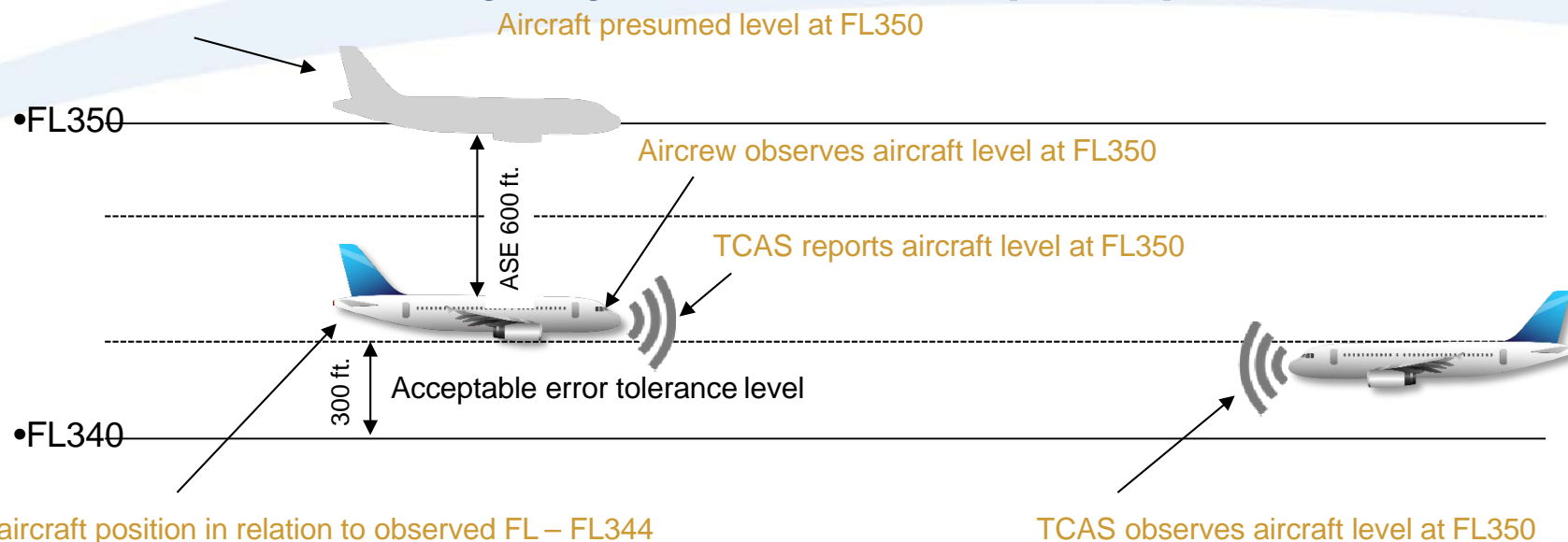
SATMA  
JAPAN



**FAA**

Next**GEN**

# Altimetry System Error (ASE) Risk



✓ Datablock indicates aircraft is level at FL350

•ASE is undetectable by aircrew, TCAS and ATC and has a marked effect on risk.

✓ ATC Observes Aircraft Level At FL350

# Altimetry System Error (ASE) Process

- Altimetry System Error (ASE) is determined by comparing the identified geometric height of the aircraft and the geometric height of the barometric pressure surface associated with the altimetry measurement.
- Automatic Dependent Surveillance- Broadcast (ADS-B) Out provides a source of aircraft position data for use in ASE calculations -
  - The quantity of data that will be provided by ADS-B provides unprecedented ability to observe ASE;
  - ASE is automatically calculated for all ADS-B Version 2 that fly within US ADS-B Rule airspace.
- ADS-B data for all flights with US airspaces is recorded automatically and is available for processing.
  - No pre-planning is needed prior to flight to collect data.

# Meteorological Data (MET) Process

- Available Meteorological (MET) data is downloaded daily from the US National Oceanic and Atmospheric Administration (NOAA) and the National Centers for Environmental Protection (NCEP) website.
  - MET data is processed by ANG-E61 software tools using accepted models to determine the true altitude of barometric pressure surfaces.
  - Additional automated processing matches a modeled pressure altitude surface with the location of an aircraft for ASE calculation.
- Mismatch of the modeled pressure surface height and the actual pressure surface height would causes error in the ASE estimate.
  - Accurate MET data is essential. ANG-E61 performs quality control for all ASE MET data.



# Process

- **ASE-R Process:** Altimetry System Error Reports will be processed in the following manner:
  - ✦ ASE-Rs are routed through the responsible Flight Standards safety office that issued the operator's letter of authorization, or nearest the primary base of operation.
  - ✦ The safety assurance office will contact the operator and provide the ASE-R for notification that the aircraft does not meet the standards for RVSM operation.
  - ✦ Operators may not file or operate as RVSM compliant until they are able to ensure meeting the RVSM performance standard. Testing or troubleshooting of an aircraft may be performed in RVSM airspace as non-RVSM capable when given specific clearance by Air Traffic Control. (See AIM 4-6-11)

# Process

- **ASE-R Process (cont):**

- ✦ Upon analysis of monitoring results, the NAARMO will release a report to operators that have been issued an ASE-R of satisfactory resolution.
- ✦ The safety assurance office may contact the Flight Standards Aircraft Maintenance Division Avionics Branch and the Flight Operations Group for additional assistance. This may require interaction with the relevant Aircraft Certification Office (ACO), Aircraft Evaluation Division (AED) and aircraft/system manufacturer.
- ✦ Operators that experience ASE issues should include any manufacturer procedures in their maintenance programs which are found to be effective in correcting ASE. Additionally, operators with reliability programs or a Continuing Analysis Surveillance System (CASS) are encouraged to use ASE-R information as a source of data collection.

# Sample Report



## Altimetry System Error Report (ASE-R)

Date: June 18, 2020  
Control Number: ASE-R 163

To: ABC Aircraft LLC  
6886 South Service Dr  
Lincoln, Arizona 90210

Prepared by: North American Approvals Registry  
and Monitoring Organization  
Federal Aviation Administration  
Atlantic City International Airport  
Atlantic City, NJ 08405

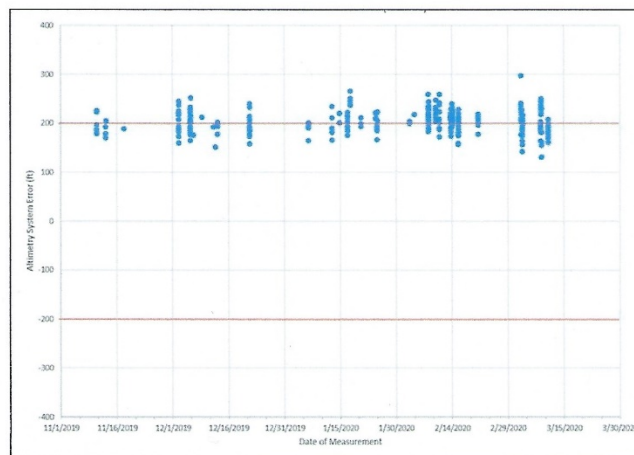
Subject: Aircraft Registration: N12345

The subject aircraft has been monitored by the FAA and was found to have deviated from established RVSM standards. The William J. Hughes FAA Technical Center Quality Control Team in conjunction with the North American Approvals Registry and Monitoring Organization (NAARMO), tasked to provide Reduced Vertical Separation Minimum (RVSM) monitoring services to other Regional Monitoring Agencies (RMA) and State Authorities, cite ASE data collected in Figure 1 as reason for safety concern.

Table 1. Aircraft Profile

Registration Number/Mode S Address:	N31234 / ABCDDD
Aircraft Type/Series/Serial Number:	HB122 / 199 / 555-123

Figure 1. Overview of ASE Performance



FAA



# Summary

- ASE is undetectable by aircrew, TCAS and ATC and has a marked effect on risk ASE as estimated with ADS-B is high.
- Automated ADS-B ASE processing is in place for ADS-B Version 2 equipped aircraft.
- Altimetry System Error (ASE) is determined by comparing the identified geometric height of the aircraft and the geometric height of the barometric pressure surface associated with the altimetry measurement.
- Operators with aircraft exceeding ASE standards will be notified by responsible Flight Standards Office.
- Operators may not file or operate as RVSM compliant until they are able to ensure meeting the RVSM performance standard. See AIM for non-RVSM procedures.