



# Altimetry System Error

- What is the Altimetry System Error (ASE) ?
- It is the difference between the altitude indicated by the altimeter display, assuming a correct altimeter barometric setting, and the pressure altitude corresponding to the undisturbed ambient pressure. (ICAO doc 9574)
- More simply, ASE is the difference between the altitude that the pilot, ground controller and aircraft systems believe the aircraft to be at and the actual altitude.

# Altimetry System Error

## The Altimetry System Error :

- Undetectable by collision avoidance system
- Undetectable by flight crew
- Undetectable by Air Traffic Control
  
- Therefore it is called ..... !

# Altimetry System Error

## The Invisible Risk !

# Altimetry System Error – Status

What is the status of aircraft ASE ?

1- ASE **Compliant** for RVSM Height Monitoring:

The RVSM approved aircraft considered to be compliant for RVSM height monitoring when the ASE is less than 180 ft. (160 – 179 ft considered as above normal)

2- ASE **Aberrant** for RVSM Height Monitoring:

Those aircraft which exhibit measured height-keeping performance that is significantly different from the core height-keeping performance measured for the whole population of aircraft operating in RVSM airspace. (ASE between 180 ft. and 245 ft.)

# Altimetry System Error – Status



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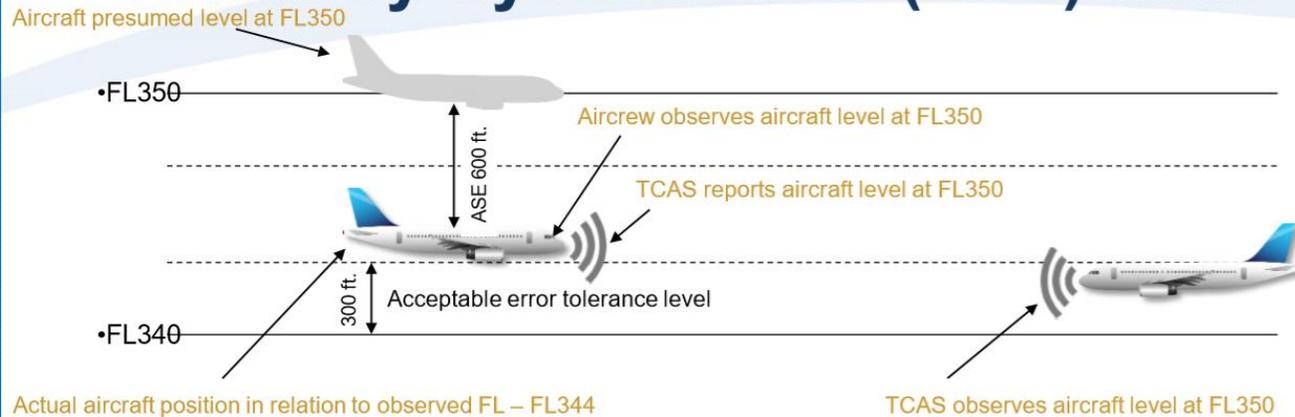
What is the status of aircraft ASE ?

1- ASE **Non-Compliant** for RVSM Height Monitoring:

The RVSM approved aircraft considered to be non-compliant for RVSM height monitoring when the ASE is more than 245 ft.

# Altimetry System Error

## 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

# Elements of Total Vertical Error

- **Total Vertical Error**

- Where an aircraft is in reference to the pressure altitude of the assigned flight level

- **Displayed Altitude**

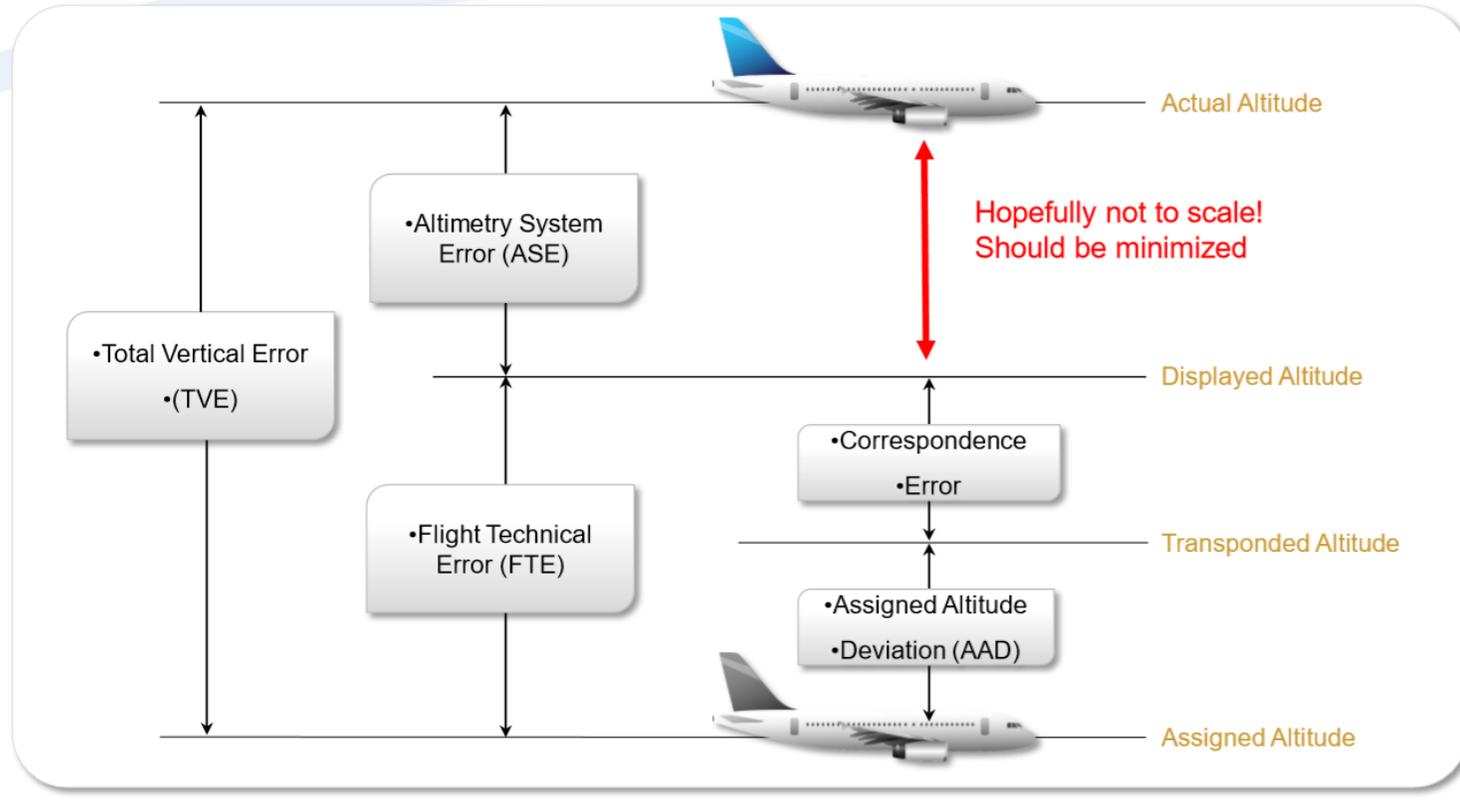
- What the aircrew sees on the altimeter
- Transponded Altitude
- Displayed altitude is what TCAS and ATC see.

- **Altimetry System Error**

- Instrumentation error of the static source aircraft reference system is not typically seen unless using special instrumentation

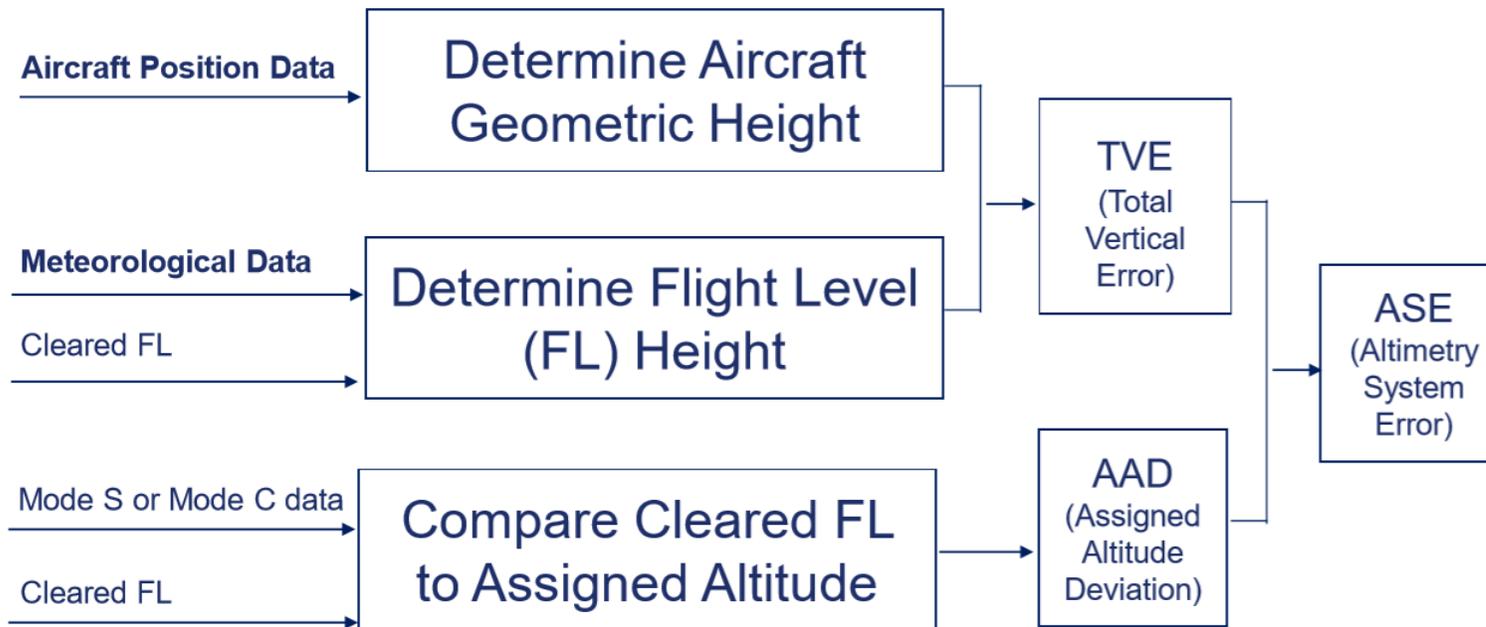
# Elements of Total Vertical Error

## Elements of Vertical Error



# Calculation Process

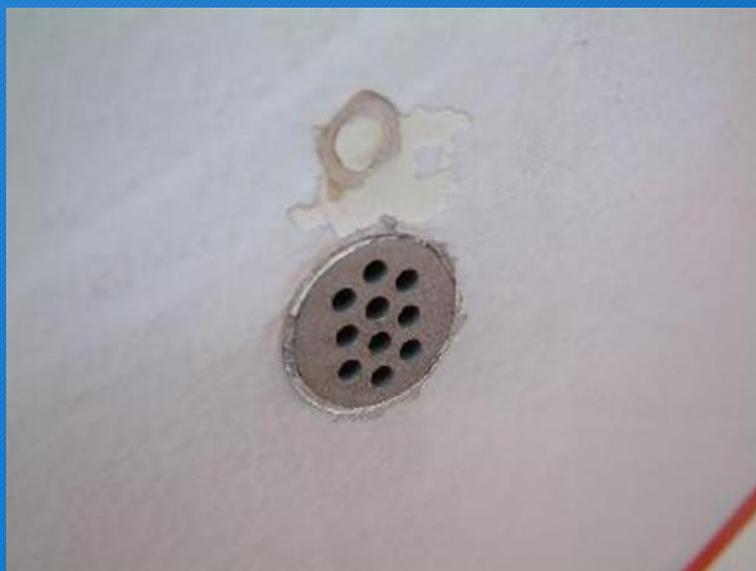
## Altimetry System Error Calculation Process



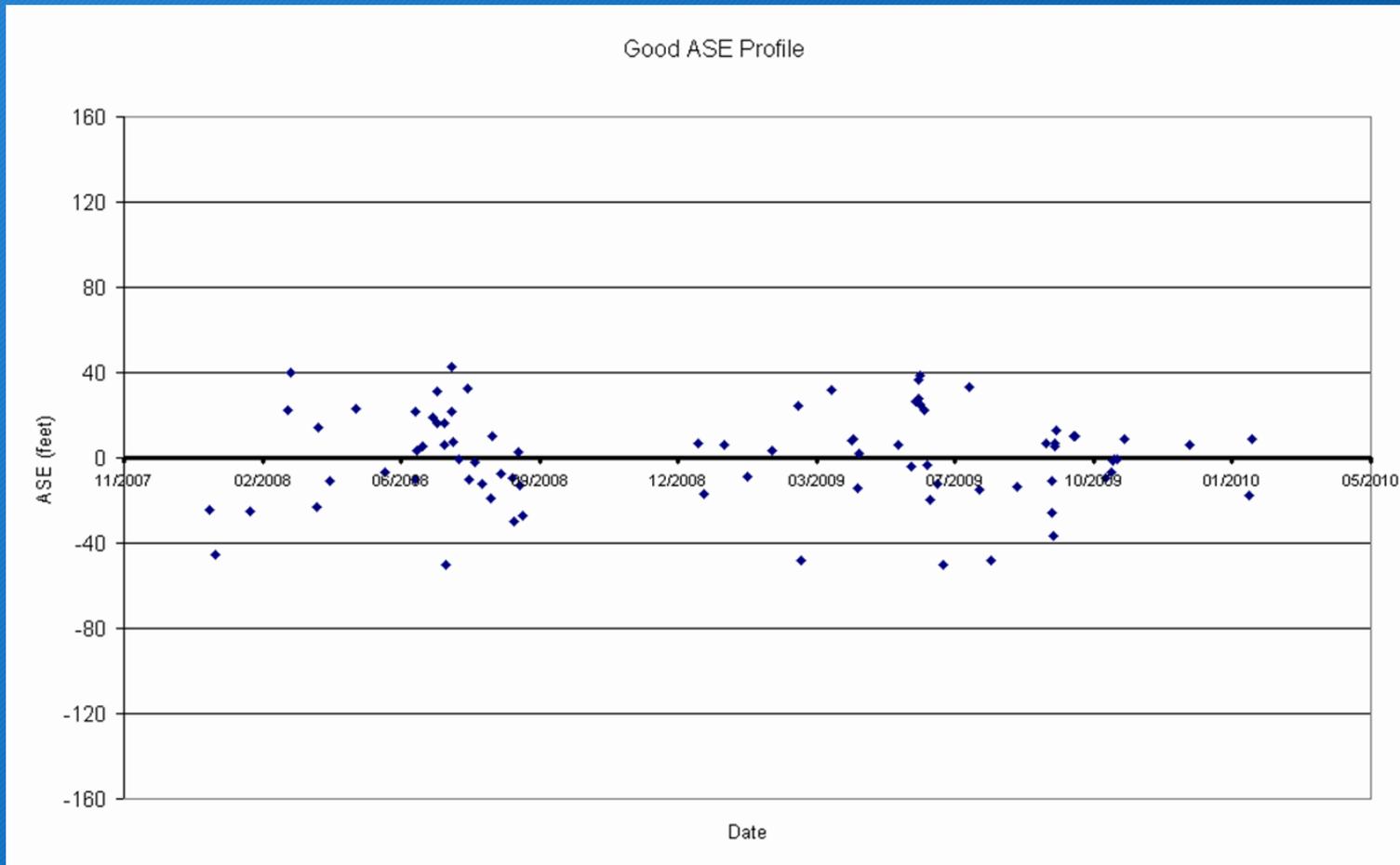
# Causes of Altimetry System Error

- Damage to static ports and pitot tubes
- Pressure leaks in pitot/static pipes
- Air Data Computers out of tolerance
- Poor paint finish in static port sensitive areas
- Adequacy of RVSM inspection procedures
- Component life span
- Pressure variation caused by skin waviness effects

# Examples of Pitot-Static System Damage Contributing to ASE

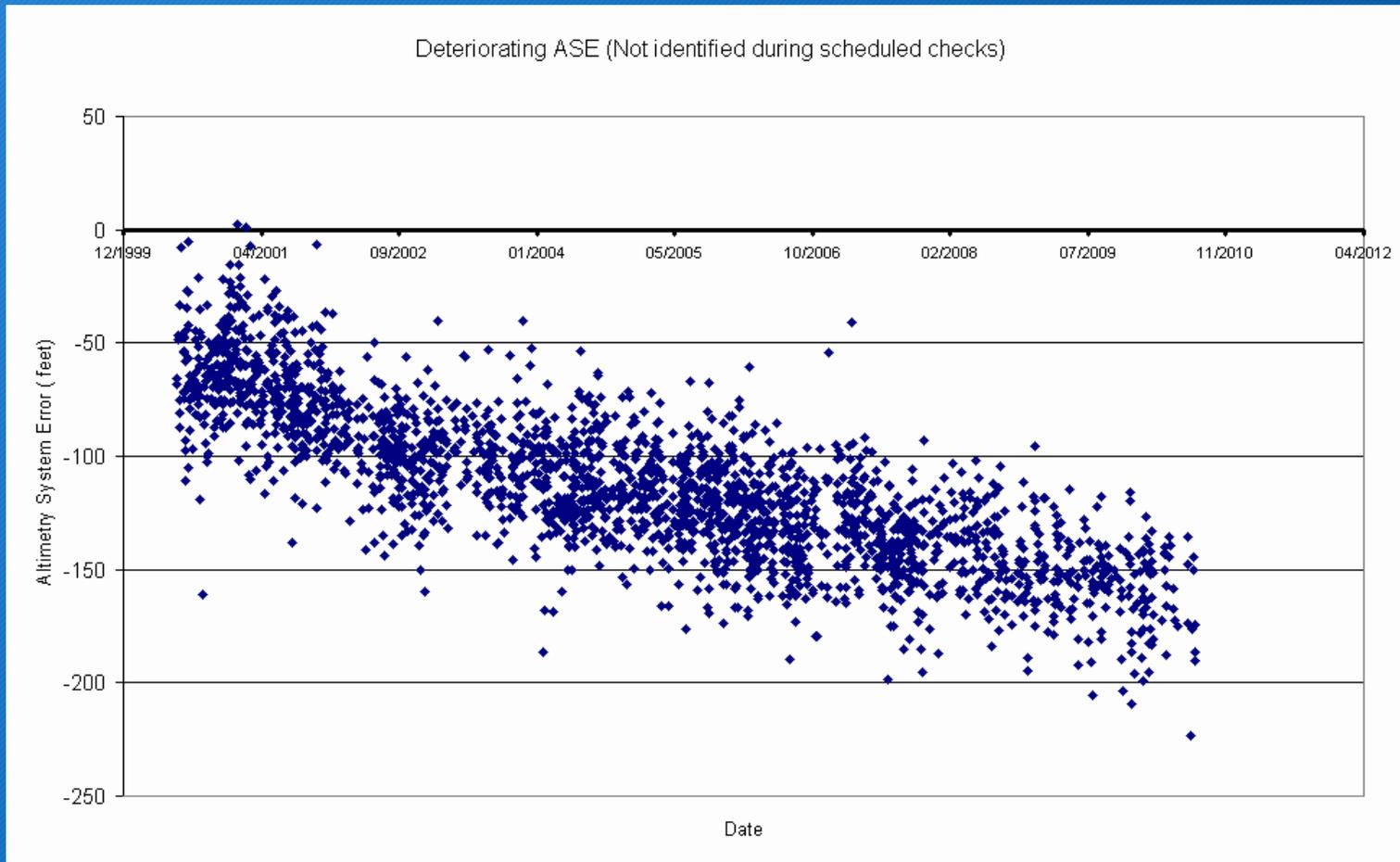


# Example of Good Altimetry System Error



*The graph illustrates an aircraft ASE profile that has a low ASE (between +40 and -50 feet)*

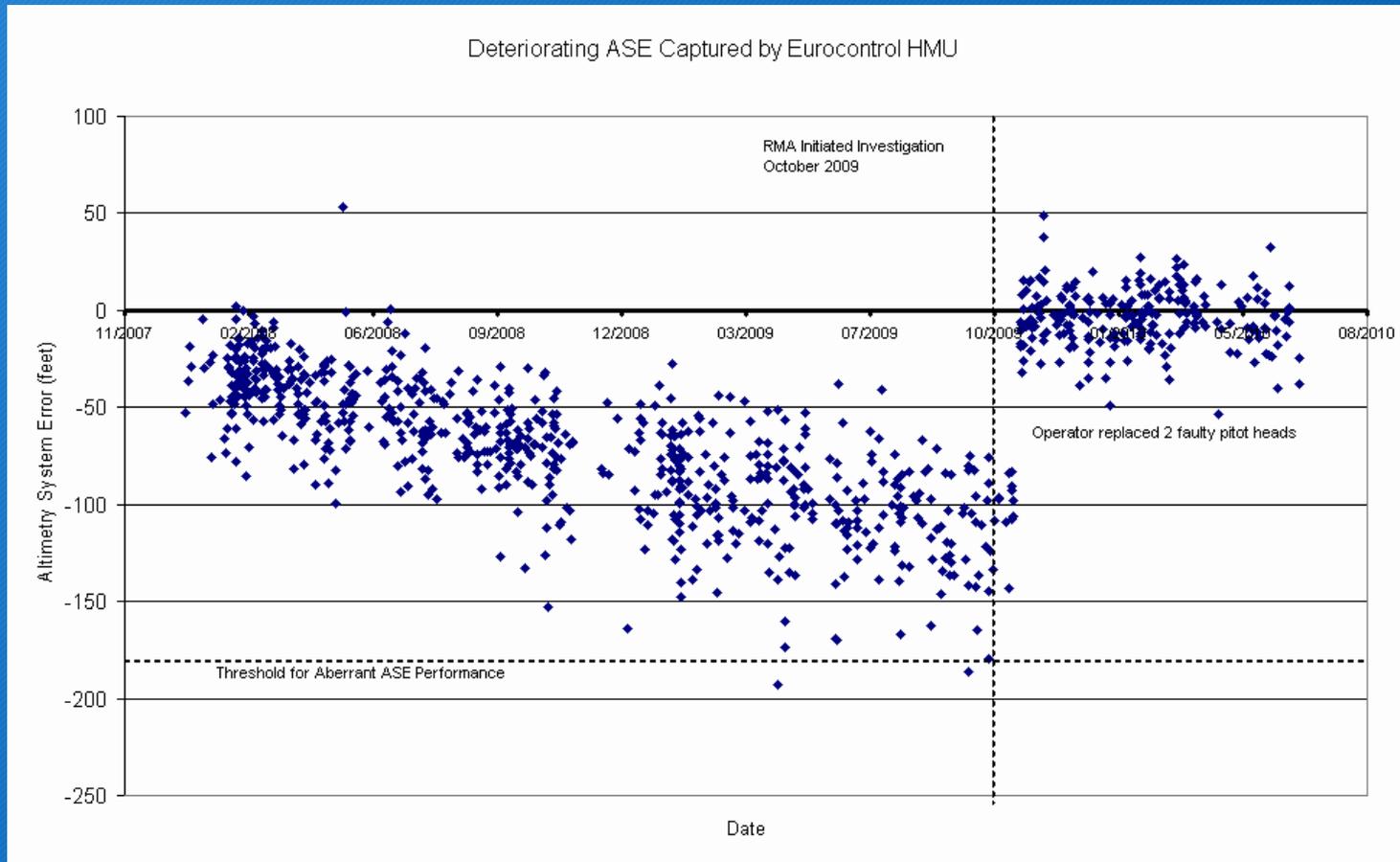
# Example of Deteriorating Altimetry System Error



*This graph shows the long term ASE curve for an individual aircraft where deteriorating ASE has not been identified during scheduled checks*

*The ASE curve was showing an increase of ASE from approximately **-50 feet** to over **-220 feet***

# Example of Deteriorating Altimetry System Error



*This graph illustrates when aircraft came to the attention of an RMA and took action. Improvement in performance after the operator changed faulty pitot heads is clear to see.*

Thank you



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Questions?