

RTCA Special Committee 186, Working Group 5

ADS-B UAT MOPS

Meeting #5

**Action Item 4-6
Some Operational Experiences from Capstone
“Radar-Like Services”**

Presented by Carl Gleason

SUMMARY



Some Operational Experiences from Capstone “Radar-Like Services”

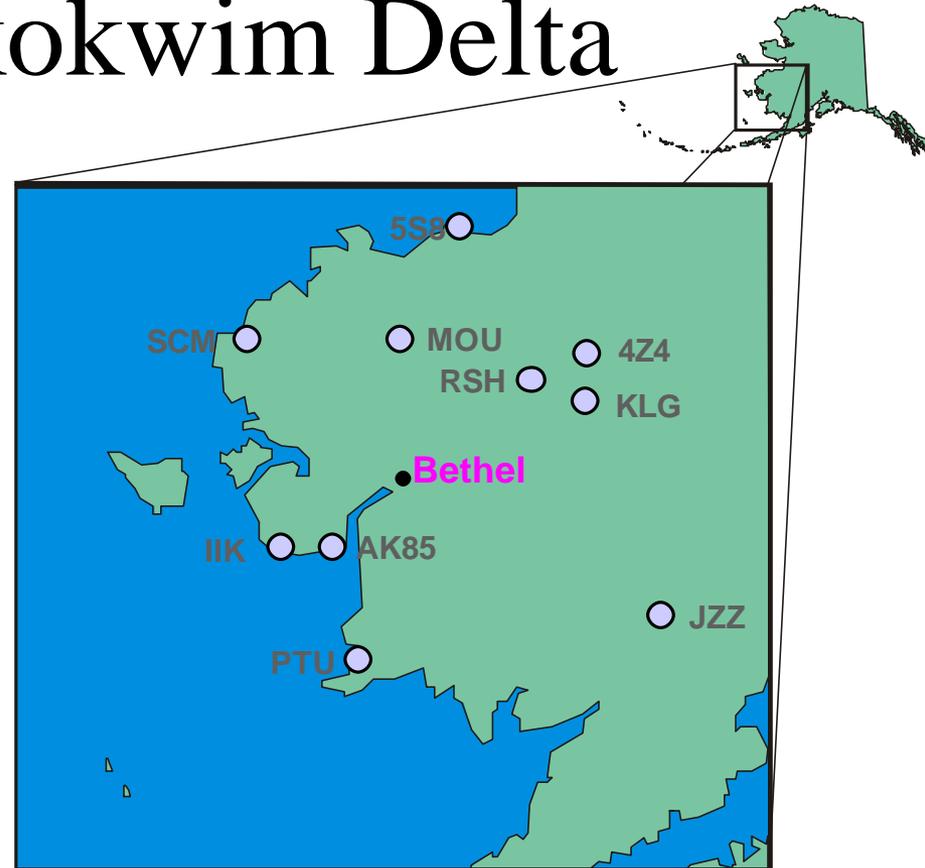
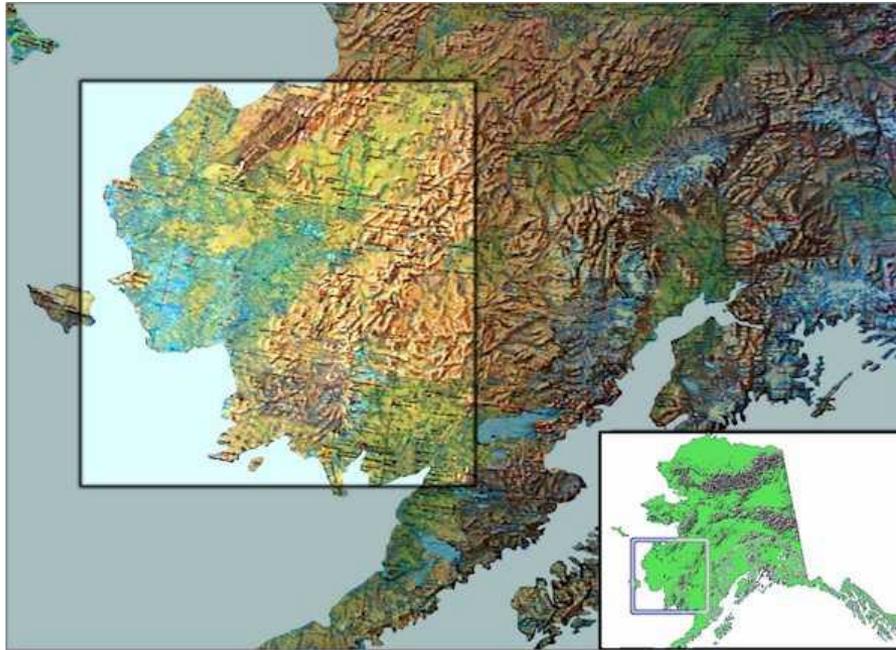
Carl Gleason

20 June 2001

Outline

- Background
- Investigation of the NUC value reported
- Importance of GBT Timing
- Anomalies in Propagation
- Integrity of Permanent Assigned ICAO
- ATC desired features
- Surveillance Load

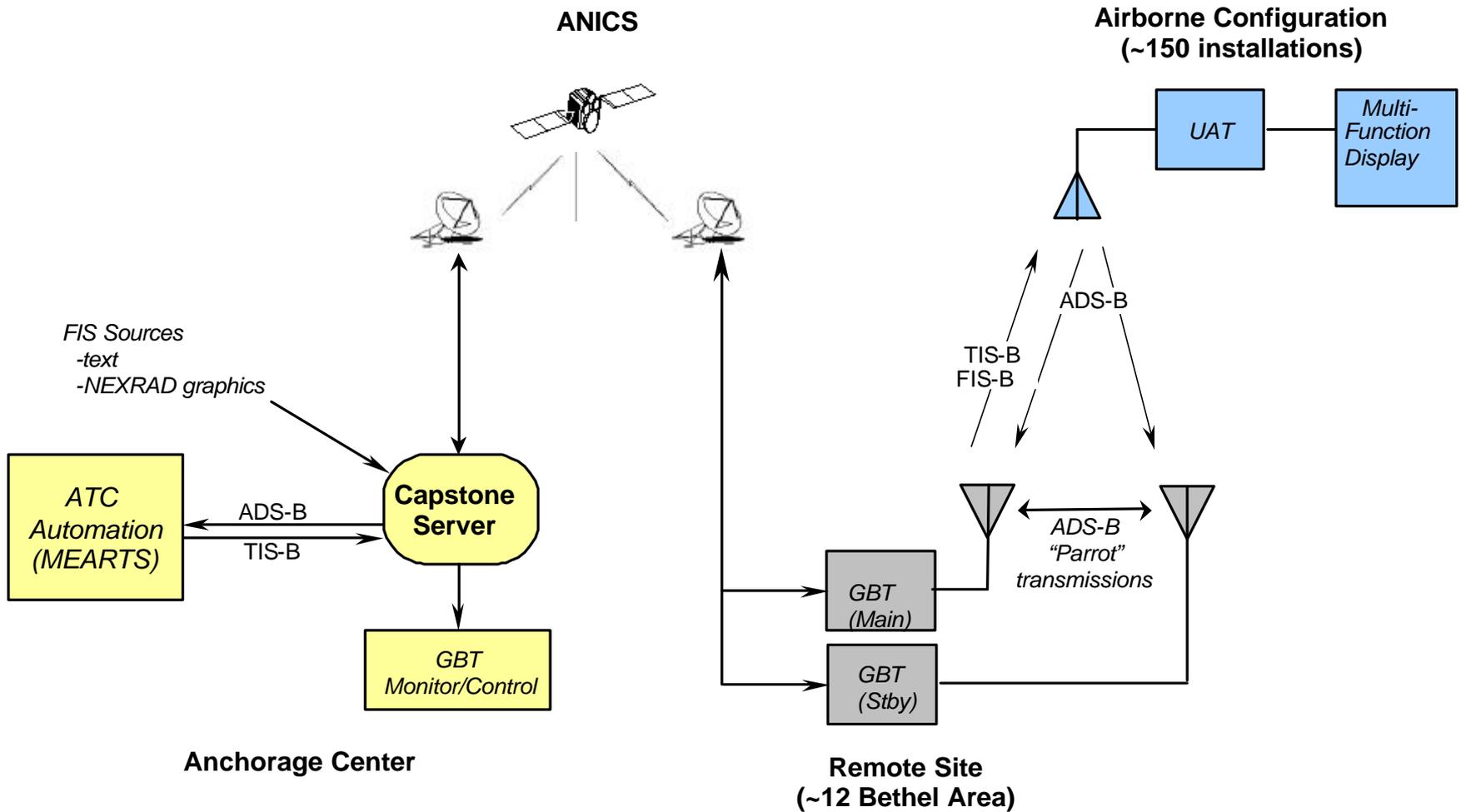
Initial Capstone Area of Interest: Yukon - Kuskokwim Delta



Typical Capstone Aircraft



Capstone Architecture



Capstone ATC Perspective

- ADS-B displayed only if radar unavailable for a given target
- ADS-B targets are updated at 6 second rate
- 5 nmi separation standard

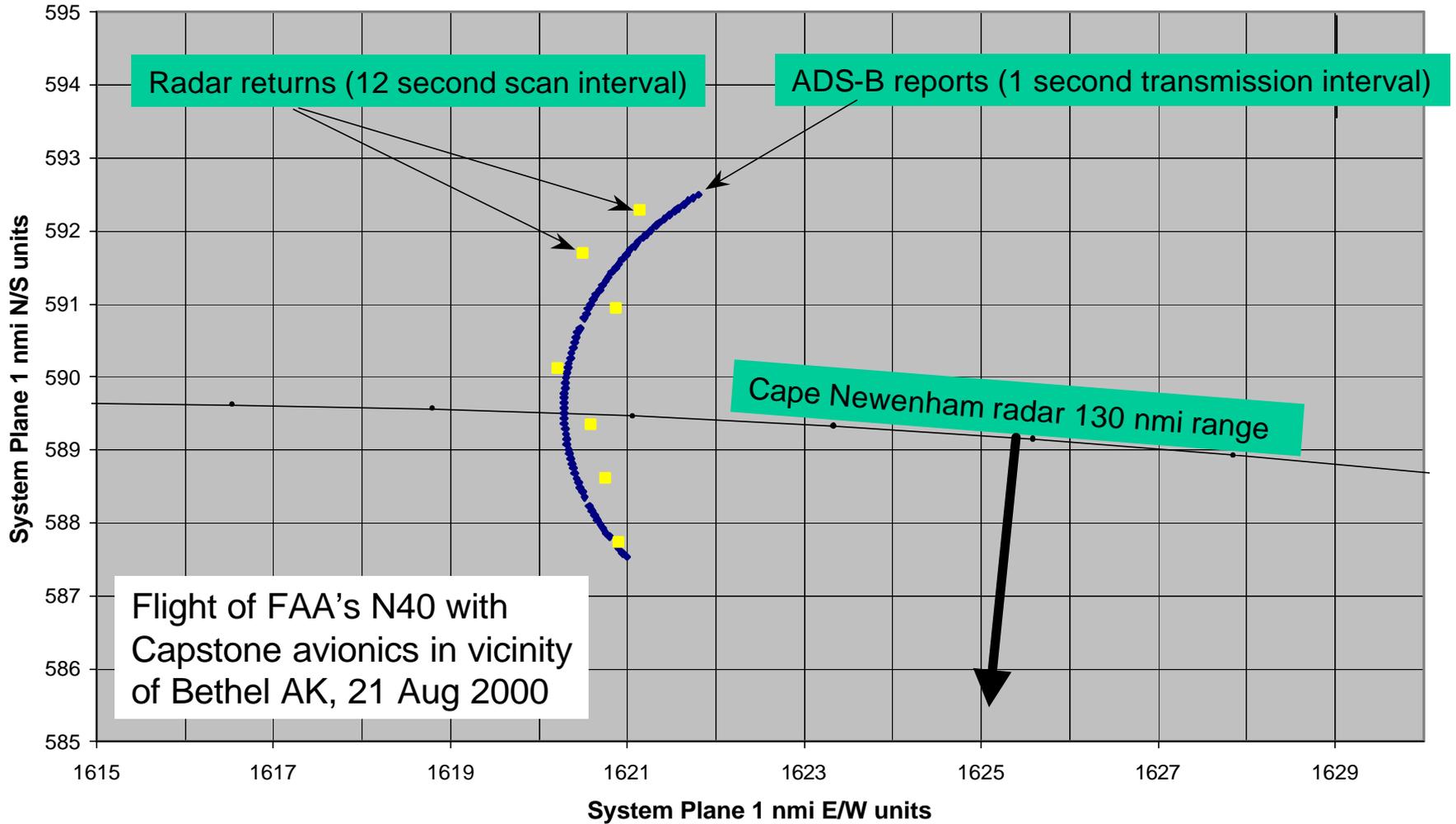


Data Block for track with RBS only
4 sec update

Data Block for track with RBS/ADS-B
6 sec update

Data Block for track with ADS-B only
6 sec update

Cape Newenham Long Range Radar/ADS-B Comparison: Turning Track



Ground Broadcast Transceiver (GBT)



Capstone Avionics



Limitations of current NUC

- Certification testing investigated the use of the reported NUC value for use in target display processing
- The rate of “NUC 0” events was high enough to be a concern if this were used to indicate ADS-B service unavailability for ATC purposes
- Other observation on NUC are being documented

Importance of GBT Timing for ADS-B

- Downlinked ADS-B messages are Time Stamped to the second at the GBT
- ATC automation uses the GBT time stamp to determine the ADS-B time of position and to measure ground network latency
- Capstone GBTs (at some sites) have experienced timing loss resulting in drift that can cause the automation system to reject the message
- Robust timing is important for GBT for ADS-B reception (in addition to uplink)

Anomalies in Propagation

- Bethel GBTs have on occasion received GBT transmissions from other GBT sites 130 nm away.
- There is very marginal line of sight. Signals tend to be received in the evening.
- Applications simply need to consider this possibility

Integrity of Permanent Assigned ICAO

- Several instances have occurred in which different Aircraft have transmitted the same ICAO address.
- This would cause problems for the automation system if either user requests service
- In the current avionics the permanent address can be modified by the pilot.
- Future equipment should not make this accessible to the pilot. front panel.

ATC Desired Features

- IDENT
- Pilot suppression of altitude??
Transponders support this

Surveillance Load

- ATC automation surveillance processing load is significantly higher with ADS-B (at 1 hz) than radar
- Recent LAN upgrade in Anchorage Center was driven by Capstone.