THE ANTENNA PERFORMANCE OF AMSU-B AND MHS IN FLIGHT

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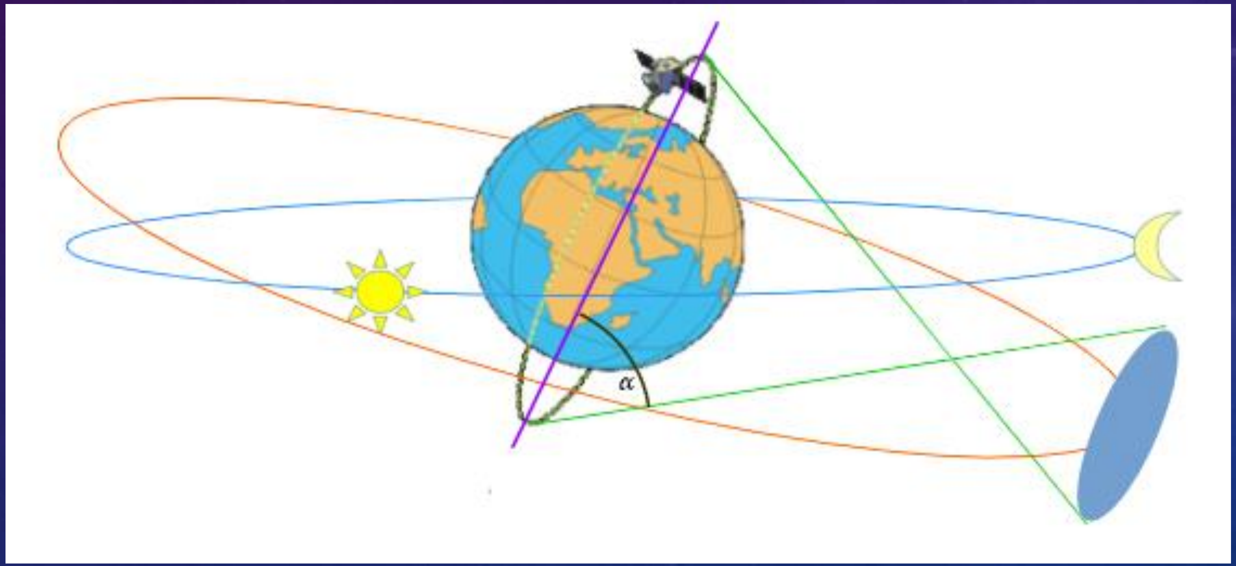
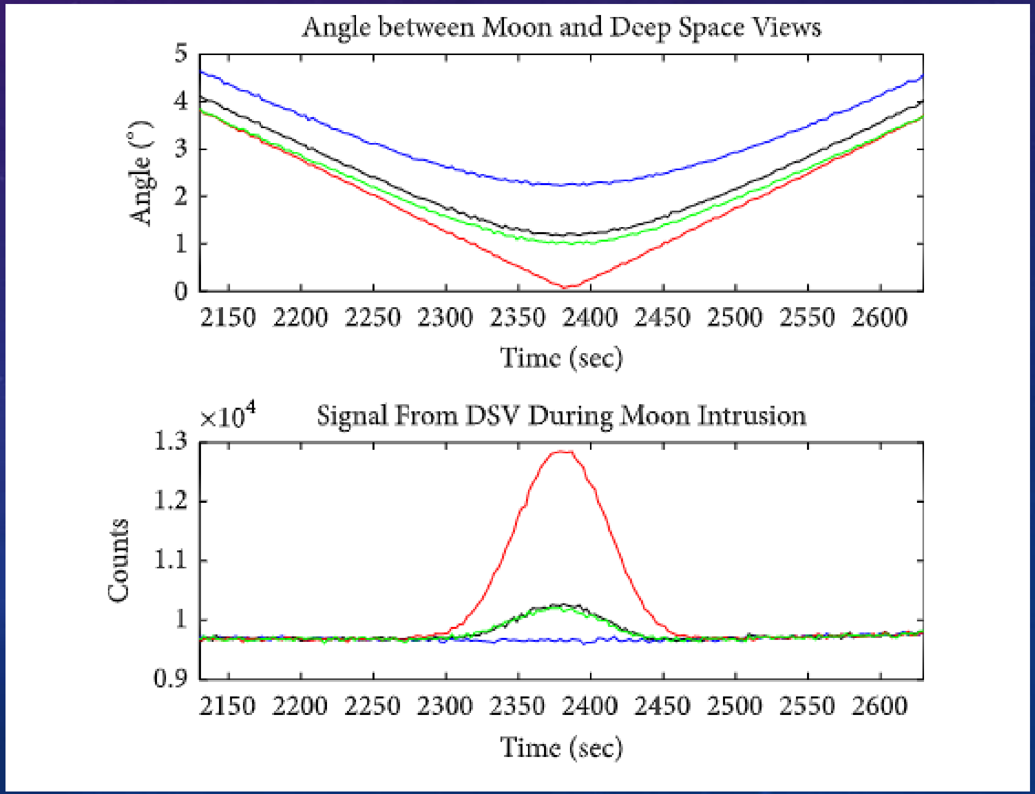
OBSERVING THE MOON WITH AMSU-B AND MHS

Position of 

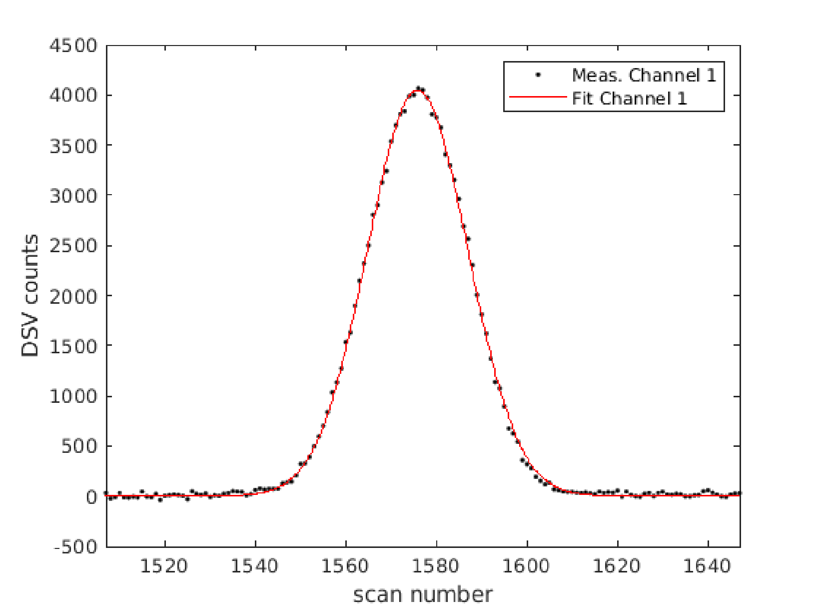


Light Curves

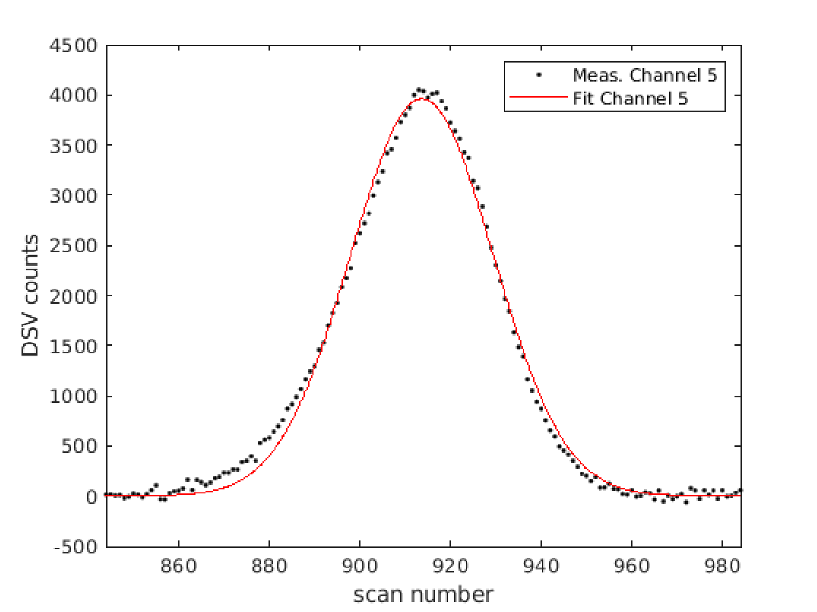


THE LIGHT CURVE OF A MOON INTRUSION WITH MHS

NOAA-18 on 1/14, 2014, 7:28



Metop-C on 11/16, 2019, 12:28

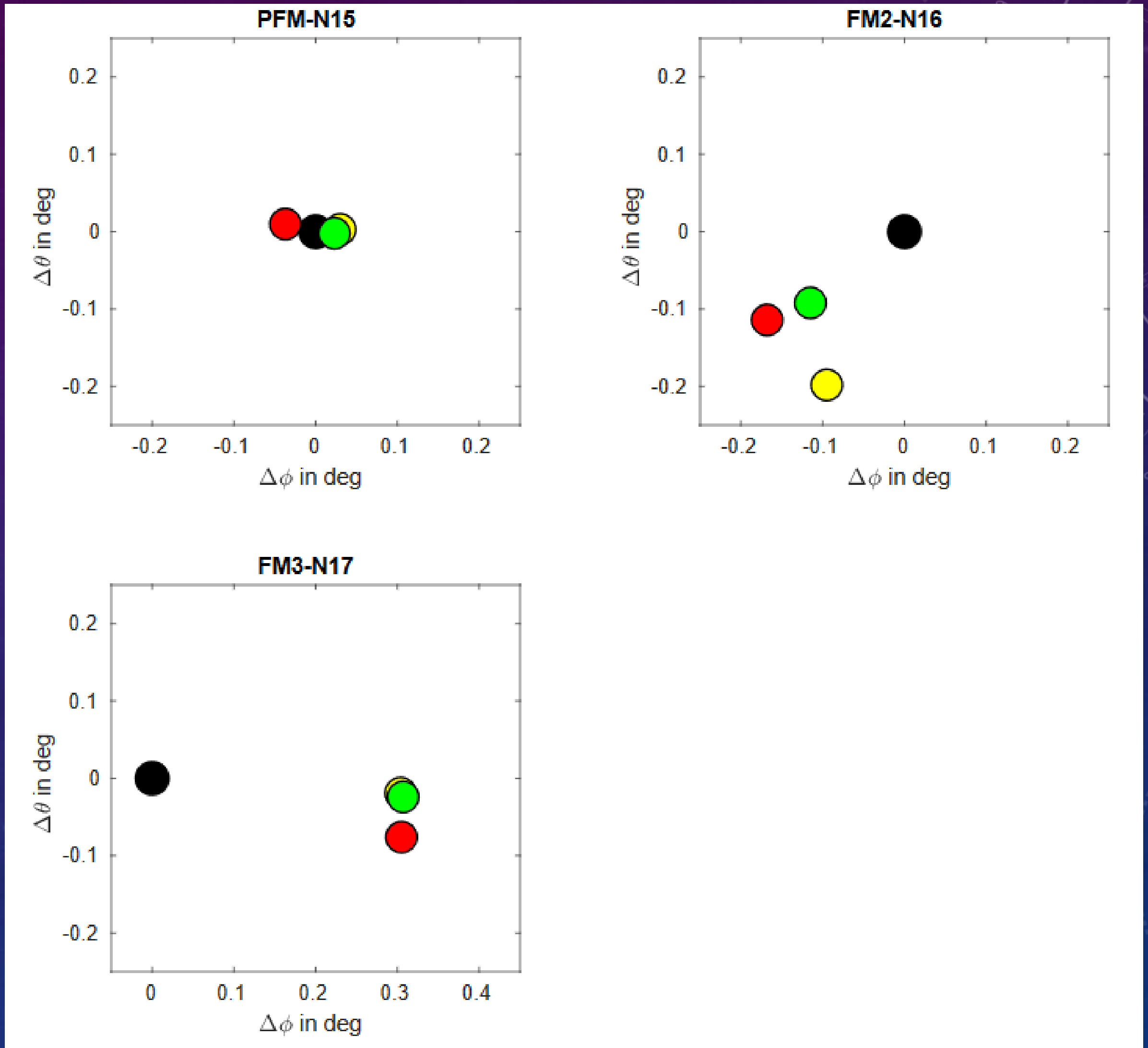


MEAN HALF POWER BEAMWIDTH AND BEAM SHAPE

- Duration of Moon intrusion → beam size
- Check with measured radiance
- In 90% FWHM from ground tests significantly smaller than in-flight
- Beam diameter for sounding channels ≥ 1.21° (except for NOAA-17 and Metop-B)
- NOAA satellites very close to axisymmetric Gaussian beam pattern (unlike MHS on Metop)

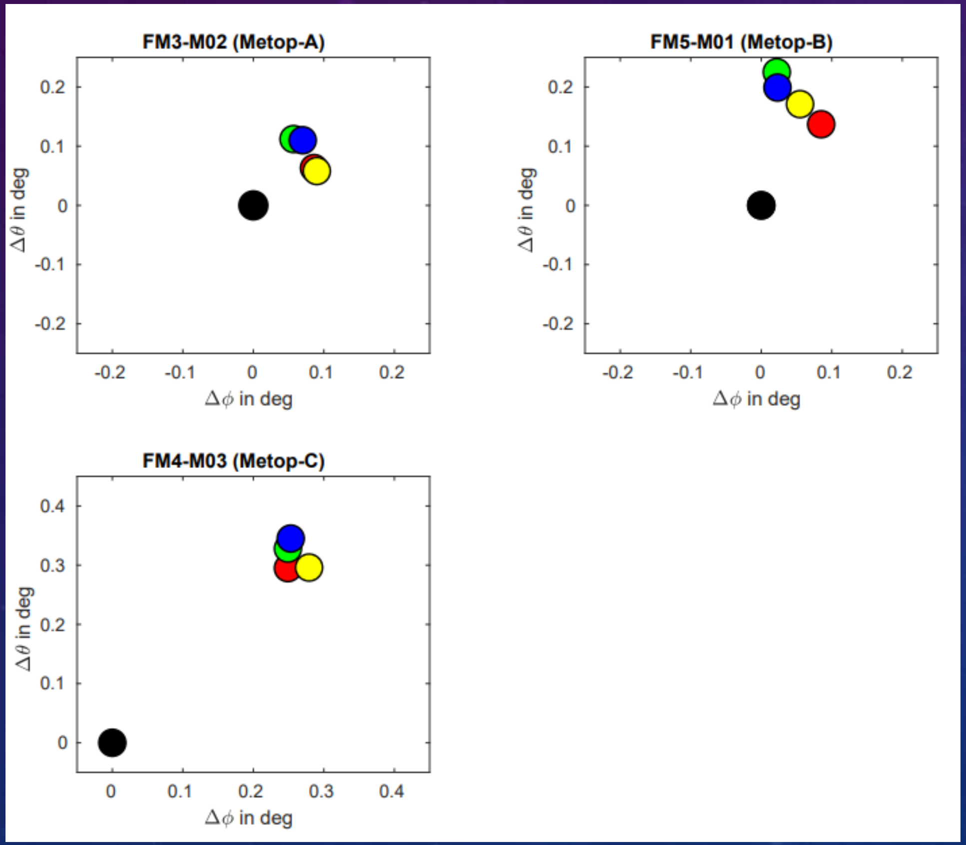
POINTING ERROR OF AMSU-B

It is possible to determine the pointing direction in both the along-track and the scan direction with high accuracy from the amplitude and the position of the peak in each pixel of the deep space view.
Channel 1: red, channel 2: yellow, other channels: green, nominal position: black

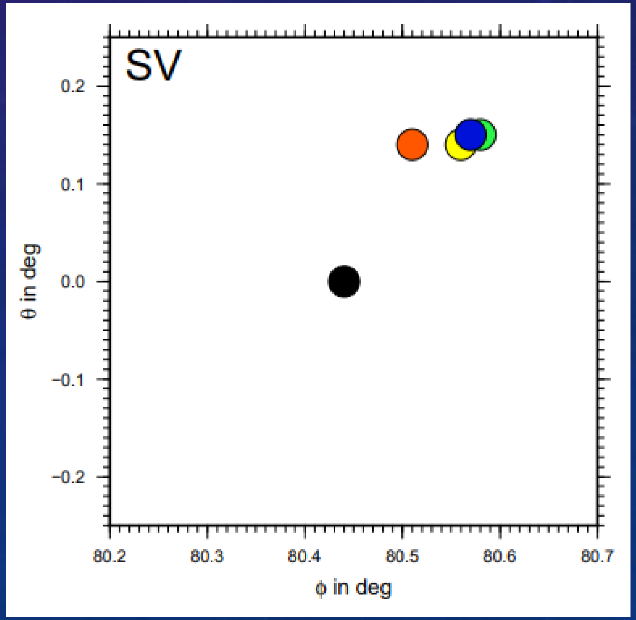


POINTING ACCURACY OF METOP-A, -B, AND -C

Pointing In-Flight



FM4_M03 Pre-Launch



POINTING DIRECTION (SYSTEMATIC MISALIGNMENT)

- The coregistration performance stays always within the specification of ±0.07° (±1 km)
- The pointing accuracy in scan direction stays always within the specification of ±0.09° (except for NOAA-16, **-17** and Metop**-C**)
- The pointing accuracy in flight direction is only achieved with NOAA-15, -17, and -18. Metop-C has largest errors.
- Worst overall pointing accuracy: Metop-C with 0.4° or 6 km (relevant to SNO prediction)

CONCLUSIONS

- Moon intrusions in the deep space view are helpful for characterising *all* channels in flight w.r.t.
  - Pointing error
  - Beamwidth
  - Anomalies of beam shape
- Check on the ground tests by Airbus DS, particularly large discrepancy found with MHS on Metop-C
- MHS on Metop-C non compliant with requirements (beamwidth sounding channels, pointing accuracy)
- SNO distance threshold of 5 km a problem for Metop-C and NOAA-17