CROSS CALIBRATION BETWEEN CRIS AND HIRS WITH THE MOON

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CRIS OBSERVATIONS OF MOON: YONG CHEN

MODEL OF MOON: THOMAS MÜLLER

HIRS OBSERVATIONS OF MOON: CONSTANZE SEIBERT

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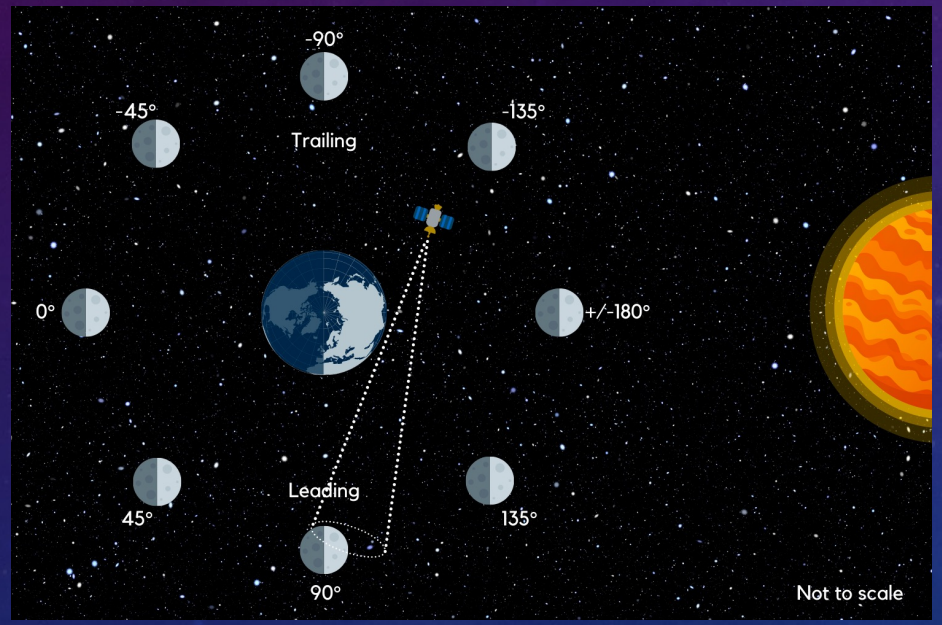
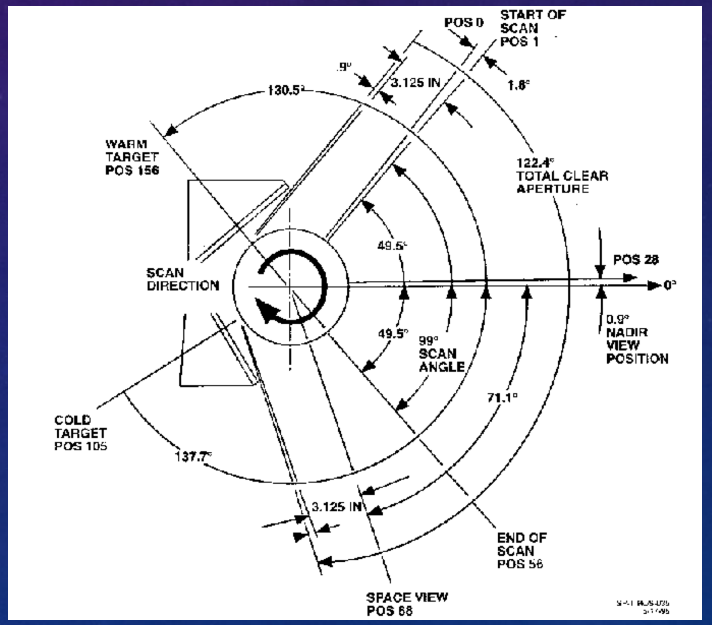
HIGH-RESOLUTION INFRA RED SOUNDER IN SUN SYNCHRONOUS ORBIT

DSV Points Away From the Sun



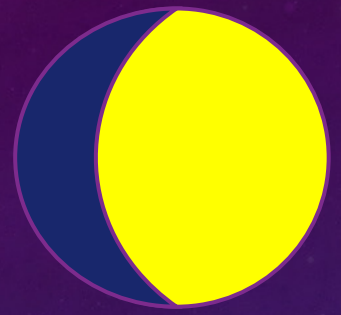
Jin (2019)

Scan Angles for HIRS Instruments



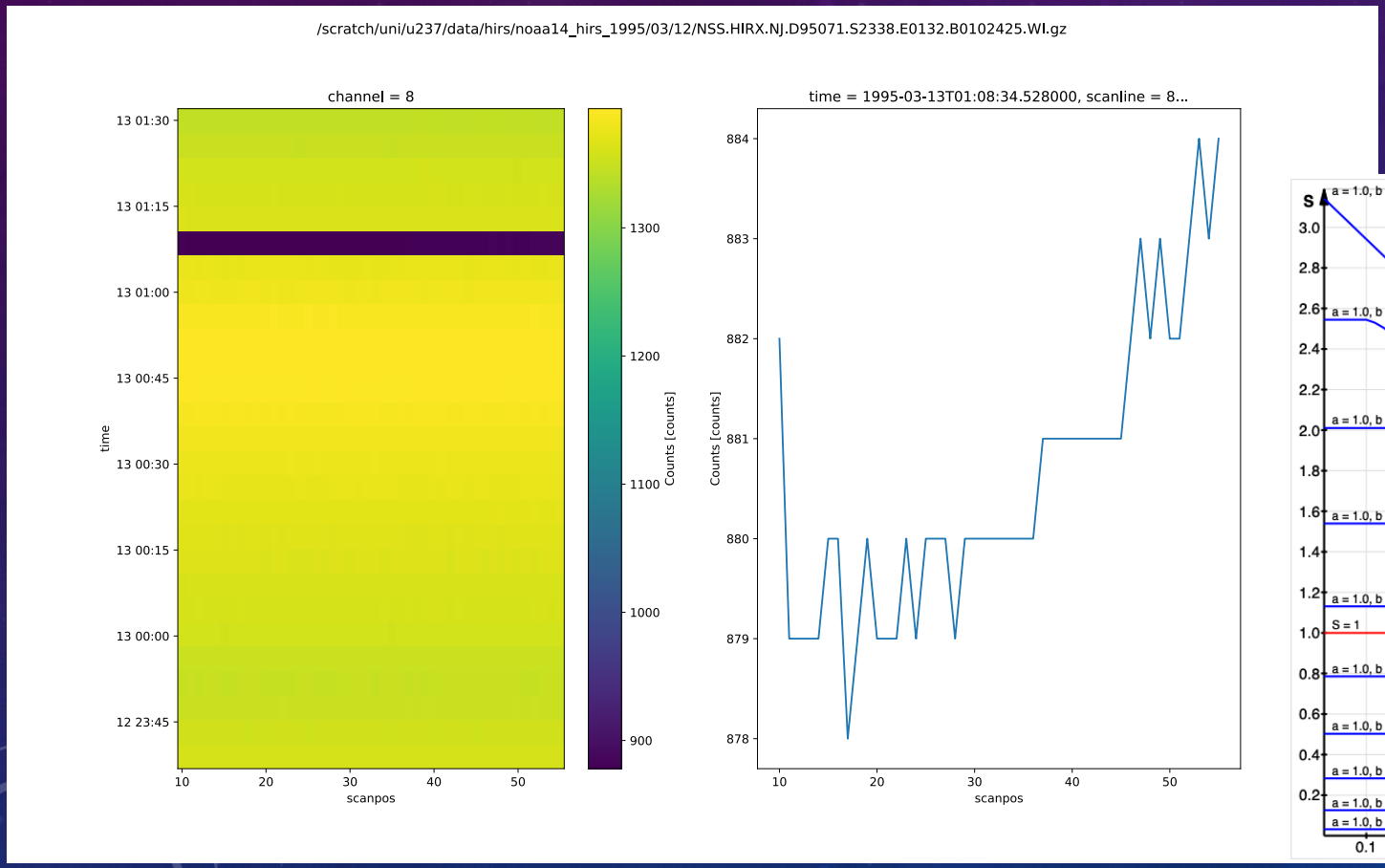
KLM User Guide (2014)

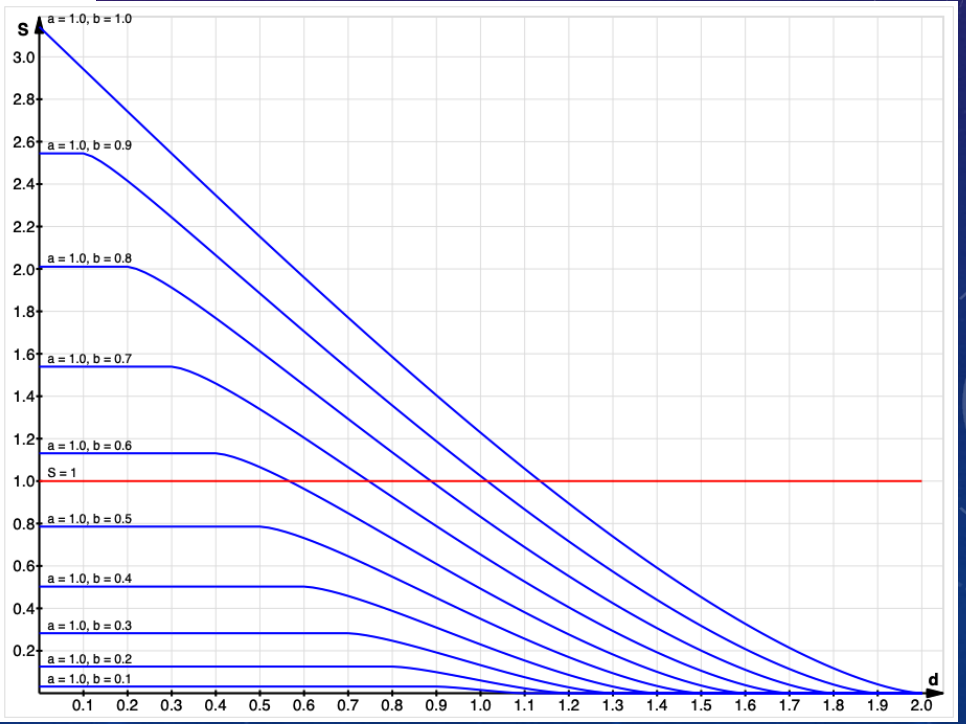
MOON IN FOV OF HIRS DURING DEEP SPACE CALIBRATION



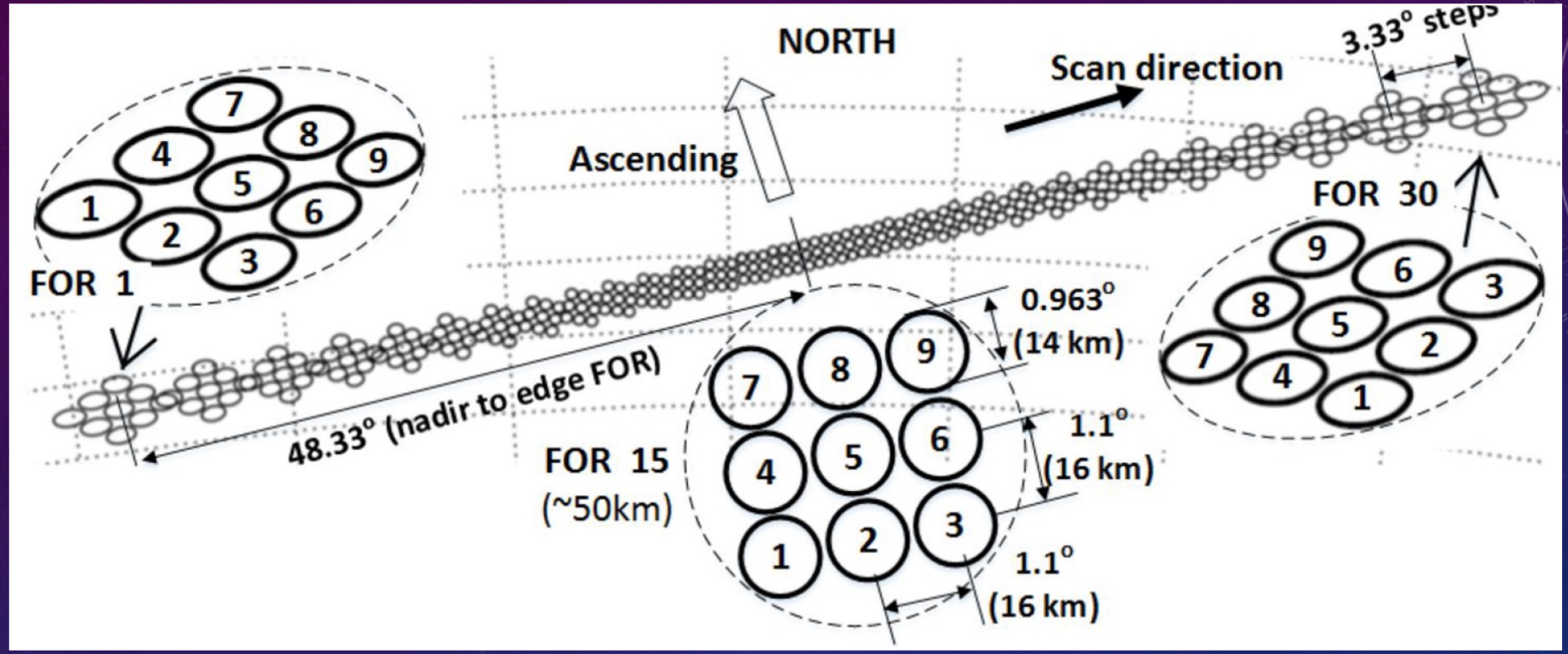
Moon

HIRS/4 FOV





CROSS-TRACK INFRARED SOUNDER SCAN PATTERNS

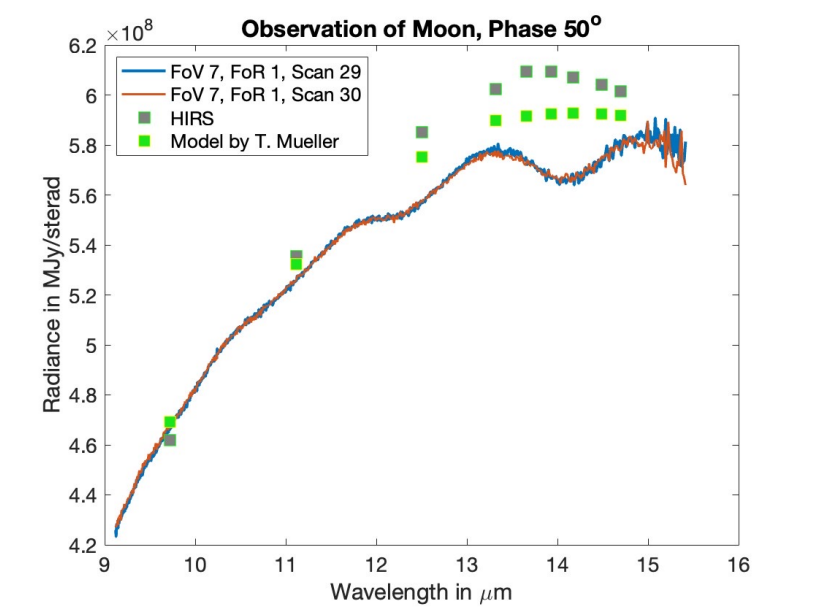


- In the focal plane there are 9 FOVs with 2 sweep directions.
- The 9 FOVs form one FOR.
- FOR 1 to FOR 76.
- 3 x 3 14 km (0.96°) IFOV, sampling distance: 16 km.
- 90 S-NPP CrIS lunar events between April 2012 and October 2022

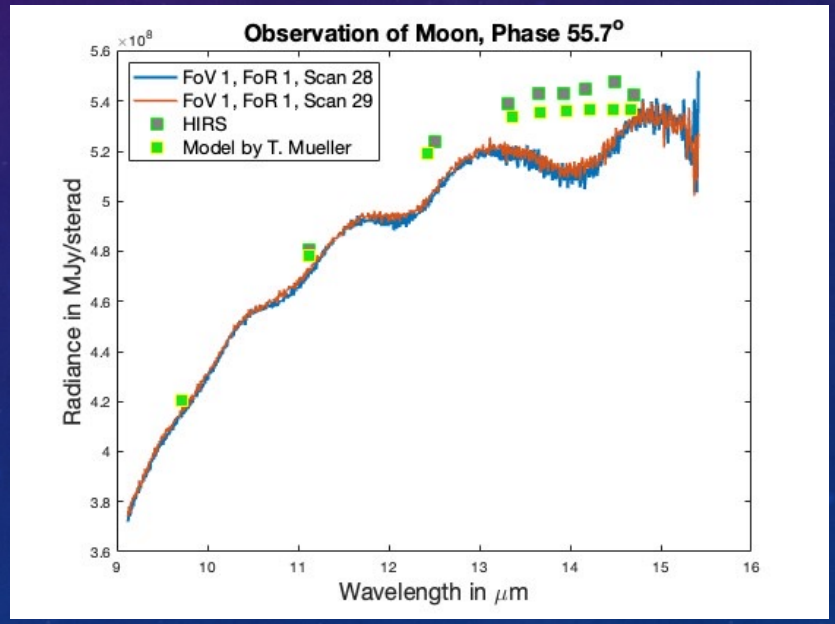
From Yong Han et al. (2014)

COMPARISON OF CRIS, HIRS, AND A MODEL (LWIR)

1/27/18 (CrIS), 4/11/95 and 3/12/95 (HIRS/2)



2/25/18 (CrIS), 3/17/89 and 4/14/00 (HIRS/2)



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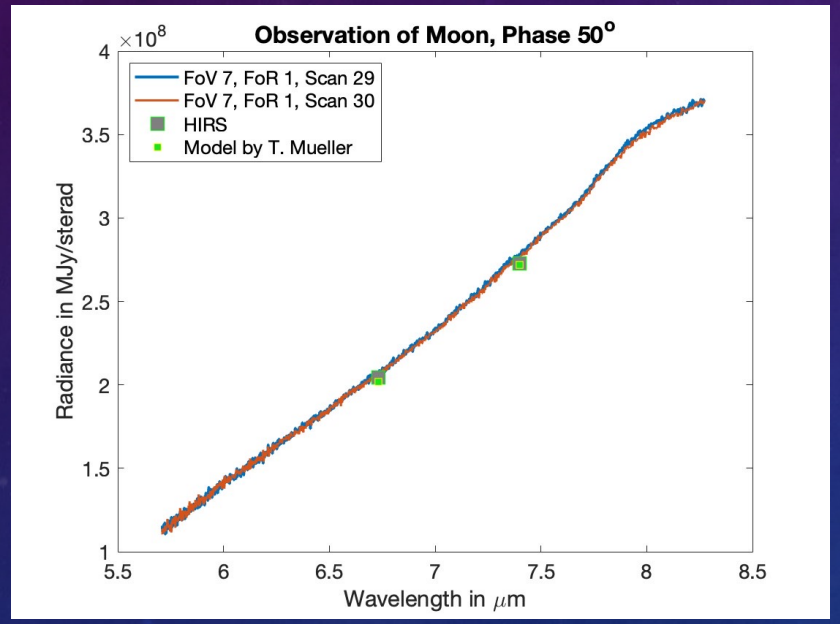
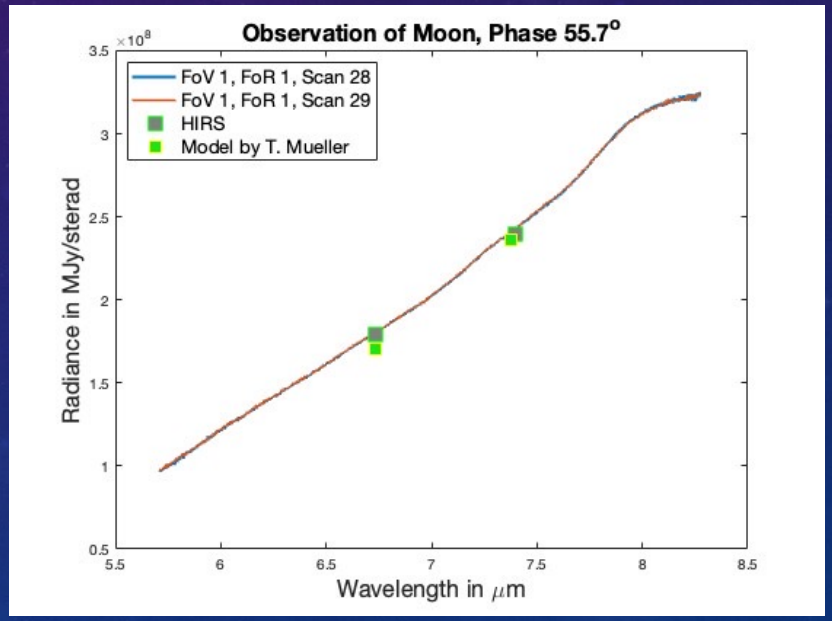
COMPARISON OF CRIS, HIRS, AND A MODEL (MWIR)

1/27/18 (CrIS), 4/11/95 and 3/12/95 (HIRS/2)



2/25/18 (CrIS), 3/17/89 and 4/14/00 (HIRS/2)



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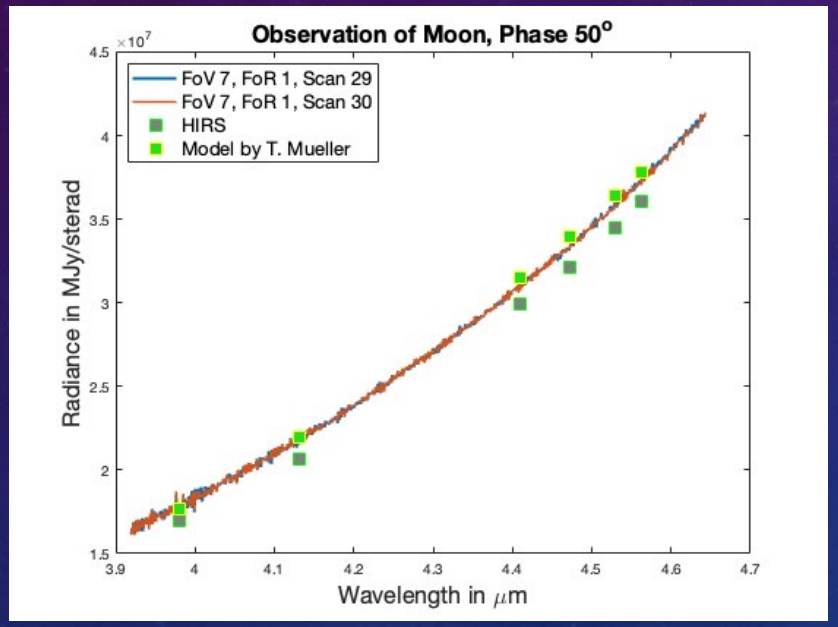
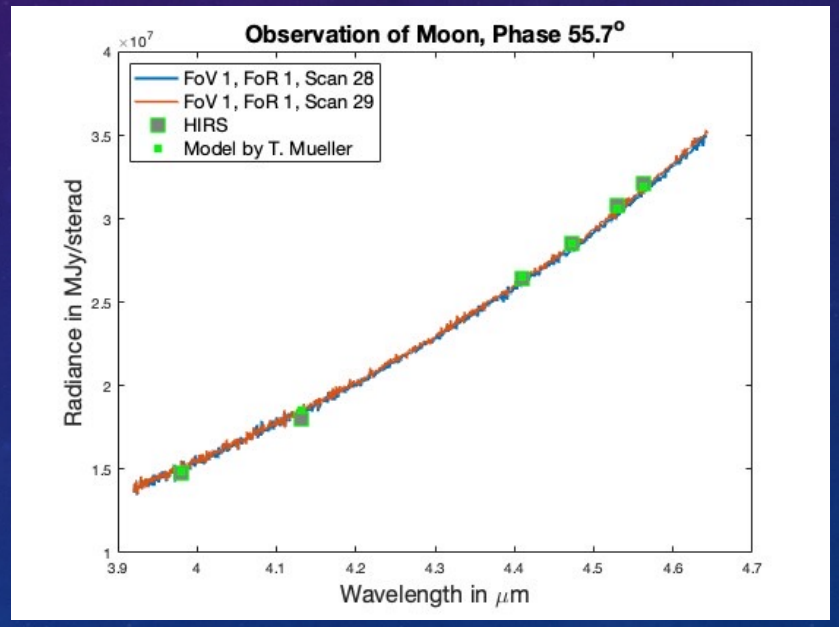
COMPARISON OF CRIS, HIRS, AND A MODEL (SWIR)

1/27/18 (CrIS), 4/11/95 and 3/12/95 (HIRS/2)



2/25/18 (CrIS), 3/17/89 and 4/14/00 (HIRS/2)



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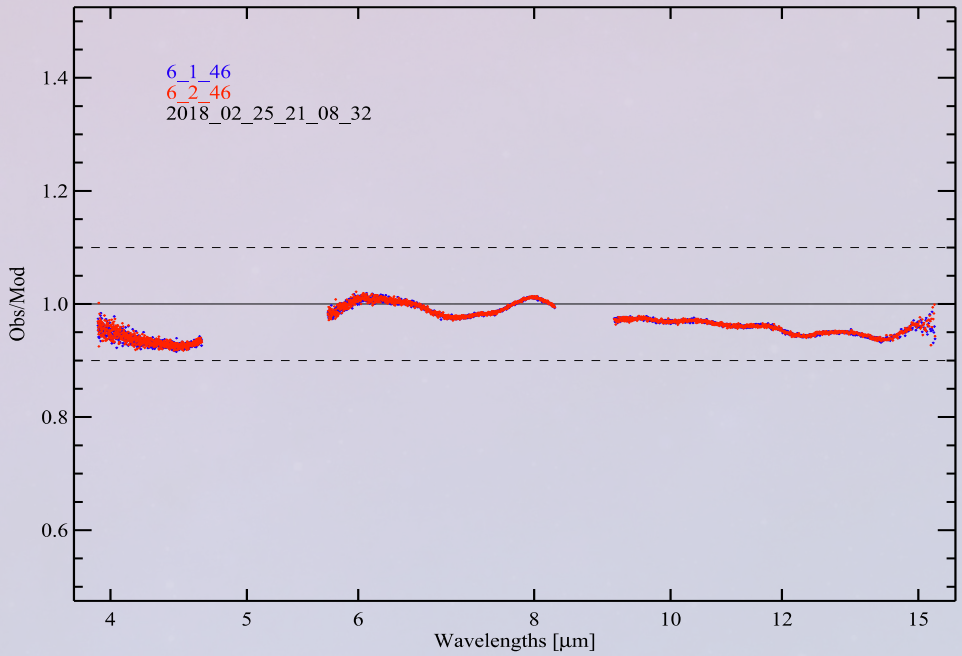
BY THE WAY… ARE THERE UNIDENTIFIED FEATURES IN THE LUNAR SPECTRUM?

- Christiansen feature near 8 μm?
- Broad feature near 6 μm real?
- Comparison with IASI could clarify situation
- Pierangelo at GRWG/GDWG Web Meeting 2020-03-19



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SUMMARY AND PERSPECTIVES

- Radiance difference CrIS – HIRS (SWIR): 0.9±1.3%, CrIS – model: -0.3±0.4%
- Radiance difference CrIS – HIRS (MWIR): 0.9%
- LWIR: wiggles in spectrum of Moon with CrIS
- MWIR: clarification of features near 6 and 8 μm needed – agreement with HIRS better than 1%
- SWIR: agreement with HIRS and model better than 1%
- Next steps - with model of *disk-integrated* radiance by Müller et al. (2021):
  - check stability of CrIS – need observations of the Moon far apart in time
  - inter-calibration of CrIS on different satellites
- Final goal: Provide an external calibration reference for spaceborne infrared sounding instruments

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