Report from NESC meeting on Thursday 22nd May 2025

NESC held a meeting on 22nd May on Microsoft Teams with **31** participants online.

Optical cross section of a 5 inch laser retroreflector

David Arnold presented different behaviours of corner cube reflectors. He showed a series of far field diffraction patterns for coated, uncoated and hollow cubes and included different polarisations and dihedral angle offsets. He then made comparisons of the optical responses of the hollow cubes, large 4 inch and 5 inch single cubes (such as then new lunar reflector NGLR) and the Apollo lunar arrays. The hollow cube theoretically performed very favourably, however David pointed out that no one has been able to build a stable large hollow retroreflector.

New Developments at Lishan SLR station of National Time Service Center(NTSC) A new station called Xi'an has joined the ILRS network, which is located on top of Lishan mountain in China. **Xiao Wang**, from the National Time Service Center (NTSC), described the hardware, which includes a 1.05m telescope, a 1kHz, 25ps, 532nm laser and an APD detector. The station has already observed over 100 satellites at all altitudes. The station uses an internal calibration and plans to conduct routine daytime observations.

A New Photonics Industries Laser at SGF, Herstmonceux

Matthew Wilkinson presented the newly installed Photonics Industries laser at the SGF, Herstmonceux to replace the High-Q kHz laser. It has very similar specifications of 1.5mJ at I kHz in 532nm. The pulse width is larger at about 25ps and this is apparent in calibration RMS values. The laser is much smaller on the optical bench and is comprised of the laser unit, a power supply, a control laptop and a large chiller. It initially arrived with additional pulses, which were due to internal optical damage, that meant it had to be returned to the manufacturer. It can be operated up to 5kHz with increased power output without any internal realignment. In addition, the laser can be serviced remotely. It has been operating without any problems for 2 months.

Station Best Practice

The time stations spend tracking the primary geodetic targets (LAGEOS1+2, LARES1+2, Etalon1+2) was mentioned. A slide from Van Husson showed that the tracking policies at stations seem to be quite variable. A single pass should ideally contain several normal points, spread over time. In order to calculate range bias for a station, a spread in observation elevation is also needed. Also residual clipping should be consistent.

Updates

- WESTPAC is now once again an official ILRS target. Matt Wilkinson showed that the network is observing approximately 120 passes per month. This is fewer than for Stella, which is tracked about 500 times per month.
- GMV have published the 2024 Sentinel report here, which can be downloaded here https://gmvdrive.gmv.com/index.php/s/dW3kGxJcBNBQ2dF
- The ACES experiment has been installed on the ISS and the commissioning phase has begun, <u>https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/</u> <u>ACES_finds_its_home_in_orbit</u>
- The Special Issue on SLR of the Astronomical Techniques and Instruments Journal has extended its submission deadline to 31st December 2025. This follows the ILRS Workshop in Kunming, China. <u>http://www.ati.ac.cn</u>

The presentation slides from the meeting will be available here <u>https://ilrs.gsfc.nasa.gov/network/newg/newg_activities.html</u>

The date for the next NESC meeting was set as **Thursday 10th July at 1300 UTC**

If you missed the meeting and would like to catch up, please send me an email (<u>matwi@nerc.ac.uk</u>) and I can provide the recording.