Report from NESC meeting on Thursday 20th January 2022

The NESC held a meeting on Thursday 20th January on Microsoft Teams with **41** participants online.

Tropospheric biases

Krzysztof Sośnica joined us to give a presentation on range and tropospheric biases, which drew on a recently published paper titled *Tropospheric and range biases in Satellite Laser Ranging* https://link.springer.com/article/10.1007%2Fs00190-021-01554-0 by Mateusz Drożdżewski and Krzysztof Sośnica. The analysis includes an elevation dependent tropospheric bias estimation in the orbit solutions. Results from simulated data were first shown and then a 10 year average tropospheric bias for ILRS stations using LAGEOS range measurements was presented. It suggested that some stations could have significant bias in their pressure readings.

Krzysztof then presented a comparison of recorded pressure readings from SLR stations with values from the Vienna Mapping Function model. The differences contained slopes and offsets for different stations. Finally Krzysztof drew attention to some recorded humidity values presented on the ILRS website.

This fitted in with recent discussions at the NESC and gives added urgency to the travelling barometer campaign and for the adoption of best practice at stations when taking meteorological readings.

Van Husson showed findings from a survey of barometers in use at ILRS stations. It showed a large range of devices with quite similar accuracy specifications.

Space Debris Study Group

Michael Steindorfer and **Daniel Kucharski** gave an update on the activities of this ILRS Study Group. The Graz station continues laser ranging to 'un-cooperative' space debris targets as well as multi-static campaigns, daylight detections and light curve measurements. They are also developing a new telescope to see debris objects. Daniel described conventional SLR measurements to obsolete satellites carrying retro-reflectors. These uncontrolled objects are tumbling at different rates and there is interest in how they will increase or decrease their spin rates.

The NESC then discussed possible future activities and campaigns that the SDSG may organise. There are a number of stations that have the capability for space debris tracking and there are also debris targets with retro-reflectors on which enable all stations to contribute. Daniel and Michael plan to email the SG email list to begin a discussion on a future campaign.

Meteorological Measurements / Travelling Barometer

Matt Wilkinson briefly updated the NESC on the progress of the travelling barometer. A Vaisala PTU303 has been made available by the Grasse team to visit SLR stations and take meteorological readings. The team are now developing the data recording hardware and software. Following a meeting with Christian Schwatke, it was agreed that the EDC Data Center will store this data as it is collected.

OrbitNP.py 1.2

Matt Wilkinson highlighted the new release of the orbitNP.py software available through the ILRS website. He suggested that any questions or problems could be posted on the NESC forum http://sgf.rgo.ac.uk/forumNESC/index.php?topic=66.0 and welcomed any discussion. Daniel Kucharski requested information on the methodology used.

Mike Pearlman made the NESC aware that he was in discussion with the Indian Space Research Organisation who operate the IRNSS satellites and are in the process of building new SLR sites in India. A new IRNSS campaign will be discussed. Also the ELSA-D mission has requested increased SLR support over the coming weeks.

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

The date for the next NESC meeting was set as **Thursday 24th March 2022 at 1300 UTC**

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