

Science Weekly Debrief

For slides and the WebEx recording on ODOCS, click [here](#) then follow the path: Folders \ Documents and Drawings \ OSIRIS-REx Bennu Proximity Operations \ Science Status \ Science Monthly \ 2019-08-15.

Asteroid Science workshop and STM – Mike Nolan

The first full week of November, during which the “Asteroid Science in the Age of Hayabusa2 and OSIRIS-REx” workshop will take place, should be viewed as a Science Team Meeting. There will be various science breakout sessions before and after the workshop. Analysis of Recon A data for sample site down-selection will be a focus.

See below for the workshop deadlines.

Working group & instrument team updates

- OLA – Jeff Seabrook

Jeff gave an update on efforts to globally register the OLA raster scans from Orbital B into a shape model. See the [Seabrook et al. paper](#) in Planetary and Space Science for methodological details. Almost 12,000 spots per square meter have been acquired in the polar regions, and about 1500 at the equator. RMS deviation maps indicate that registration is good overall, but registration errors are apparent at finer scales, particular at high latitudes and central longitudes (Olivier suggested that this misregistration could be due to the pole not being quite right). The OLA scans are larger than expected, introducing some curvature that could affect keypoint match accuracy at the edges of scans. Bennu is also rougher than expected, so some refinement of parameters is needed to optimize detection of keypoints.

Every Orbital B raster scan exhibits a ripple-like pattern not attributable to topography. It may be due to changes in the mirror behavior, with the patterns being related to different elevation excursions in each azimuthal line. It is thought to be a control problem, not affecting the validity of the science data.

- AWG/particle science – Carl Hergenrother

Twenty-four particles have been detected in the Orbital C data, although no ejection events have been observed so far. The orbital elevation and imaging cadence for this phase are well suited to acquiring a good particle dataset.

- AltWG – Mike Nolan

The most recent shape model delivery was expected to be a working product. However, tying the science and FDS models/coordinate systems together has been more difficult than anticipated. The uncertainty of 75 cm is too large for TAG. The teams are working hard to resolve this.

Science productivity and deliverables

- Publications status – Cat Wolner

OREx abstracts submitted to the AGU Fall Meeting 2019 are archived on the [Science Team Wiki](#) and on ODOCS (04.0 Science and Technology \ Science Team Meetings-OPEN TO ALL (US and NON-US) \ AGU2019 \ Abstracts). The submission period has opened for the [particle special collection](#).

Papers recently added to the publication plan include:

- DellaGiustina et al., Exogenic pyroxene discovery on Bennu
- Bottke et al., Meteoroid impacts as a mechanism for the particle ejection events
- Melikyan et al., Meteoroid flux from Bennu
- Rizk et al., The frequency of putative fallback particles within Bennu's fields of brecciated boulders
- Swenson et al., Architecture and Operations of the OSIRIS-REx Independent Navigation Team
- Adam et al., OSIRIS-REx Optical Navigation Image Planning Concept of Operations
- McCarthy et al., OSIRIS-REx Optical Navigation Operational Tools and Data Management

Recently submitted papers include:

- Golish et al., OCAMS Ground and In-Flight Calibration of the OSIRIS-REx Camera Suite, to Space Science Reviews
- Liounis et al., Autonomous Detection of Particles and Tracks in Optical Images, to Earth and Space Science
- Six FDS manuscripts to the Astrodynamics Specialist Conference, 11–15 August, Portland, ME (proceedings anticipated to be published in September)

See the slides on ODOCS and/or the publication plan for details.

Upcoming deadlines

Asteroid Science in the Age of Hayabusa2 and OSIRIS-REx—

Abstracts due to Sci Exec (pubs@orex.lpl.arizona.edu): 23 August

Abstracts due to workshop: 6 September

Upcoming meetings

The next Science Weekly will be Thursday 22 August.

Science Objective Summary

Each day of the week (DOY 224–230), NavCam will collect pairs of nadir long-exposure images every ~12.5 minutes. These observations support the goal of characterizing and monitoring particles in the Bennu environment.