

Science Weekly Debrief

Approach trajectory – Mike Moreau

AAM-2A has been waived. The spacecraft's expected trajectory after AAM-3 (even in the event of a 3-sigma execution) will satisfy science requirements. At the time of AAM-3, the phase angle will be about 7 degrees, and the spacecraft will be a little closer to Bennu than expected. In early November, there is a chance that we will have very low phase angles that would preclude nadir tracking (see the slides for details). We will have a better sense of this risk after AAM-3.

Astronomy Working Group – Carl Hergenrother

The data products from the dust plume search (AP-18 and AP-19) have been blessed, following modifications noted in last week's Science Weekly meeting, as well as the addition of two images that were ready but had been inadvertently left out.

Last week, a very good fit between measured and synthetic lightcurve data was presented—but the synthetic data were for 12 September, whereas the measurements were collected on 27 September. Using synthetic data for 27 September, the fit is not as tight, but is still good. Lightcurve data from 11 and 12 October also show good agreement with predictions, although the data points bifurcate into two groups around the synthetic curve. This bifurcation is likely due to inaccuracies in the aliasing correction.

The asteroid appears brighter than expected by about 16% in alias-corrected data. This finding is tentative because we do not yet have sufficient observational coverage at low phase angles.

Based on the analyses thus far, the likelihood of Bennu surprising us in terms of its rotation state or pole orientation is dropping.

The natural satellite search is coming up next week. The data from this activity are very sensitive to false positives from hot pixels, so Carl and Bashar Rizk will be working on addressing that. Main-belt asteroids will be present in the background, but their movement is not expected to produce false positives.

PolyCam image taken today – Bashar Rizk

Bashar shared a PolyCam image from today's OpNav. Bennu is now 7 pixels across in PolyCam's view. The measured DN/s is 14% higher than expected; this finding is independent of and consistent with Carl's analysis presented previously.

The shape of the asteroid in the image roughly resembles its expected polygonal shape. Christian d'Aubigny noted that at this range, PolyCam is likely to elongate the poles, so we should resist overinterpretation of the apparent shape.

Data production rollup – Jon Cutts

Jon presented the data product completion forecast (as a Gantt chart), our MRD completion progress so far, major milestones and top maps, and completions for this status period (see the slides for details).

We have satisfied MRD-142a (Dust and Gas Plume Search: Approach) and have collected all of the observations needed for MRD-157 (Bennu Light Curve Measurement). A few items slipped past their forecasted completion date during this status period (particularly the dust plume data products, in part due to the newness of the JIRA process), but everything has now been blessed.

Action items (Jon):

- In the Gantt chart, change “measurements” to “processing” to avoid the implication that measurements extend through the ends of the date ranges indicated.
- In the MRD completion chart, remove the “all observations made” status from MRD-147 (Natural Satellite Light Curves).

Next meetings

The first Science Monthly meeting will take place next Thursday (25 October) from 10 AM to 2 PM MST, with a break for the daily downlink. Requests to be added to the agenda should be directed to Dante Lauretta and Mike Nolan. There will be an option to purchase a catered lunch (RSVP to Nancy Ramos by Tuesday 23 October).