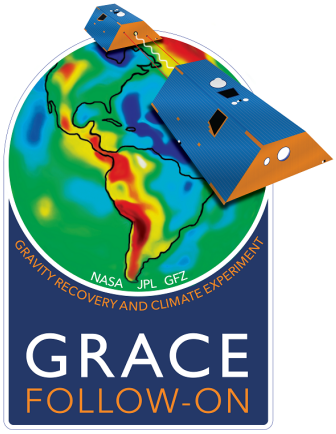

GRACE Follow-On

Science Data System

Monthly Report: Oct /Nov 2018

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GRACE-FO Science Team & Highlights:

- GRACE / GRACE-FO Science Team meeting was held at GFZ, Potsdam, 9-11. Oct., 2018.
    - More than 120 participants attended the recent Science Team Meeting at GFZ. The GRACE-FO Project team provided a mission status update from launch through the In-Orbit-Checkout (IOC) phase, as well as detailed assessments of the science instrument performance and preliminary gravity fields.
    - After launching on May-22, 2018, the early operations phases were completed within five days, and the science instruments were activated a few days later. Analysis of the initial data indicated that both the K/Ka-band Microwave Instrument and the Laser Ranging Interferometer were producing highly precise measurements of the gravity-induced change in distance between the two GRACE-FO satellites – as good as or better than the original GRACE mission. A month after launch, the GRACE-FO Science Data System produced the first preliminary gravity field map, which showed signals consistent with the last GRACE data from 06/2017.
- The next GSTM is planned for **early October, 2019, in Pasadena, CA**.

GRACE Follow-On: Mission Status and Schedule

Mission operations are currently nominal, with continuous collection of K-band ranging observations. The mission is currently in IOC, with a planned transition into Phase-E (Science Phase) on Jan-28, 2019. After a Validation & Verification phase (up to 120-days), Level-1 Science Data deliveries will commence in Spring 2019 (detailed information on data statistics, availability and links etc. will appear here in the future).

Science-relevant Mission Events / Plans:

- Microwave Instrument
    - On July 19, 2018, the Instrument Processing Unit (IPU) on the primary side of the MWI on the GRACE-FO 2 satellite powered down in response to autonomous commands from an instrument fault monitor indicating that the IPU was using less current than expected. The IPU provides various timing references for the satellite as well as onboard digital signal-processing functions for the Microwave Instrument and GPS signals. The MWI on each of the GRACE-FO satellites has a primary and a redundant side to provide backup in case of a malfunction in a subsystem on one of the sides. An anomaly response team investigated the issue, and recommended to switch to the redundant A-side of the GF2-MWI.

    - On October 22, the project completed a successful switchover to the redundant side of the GF2-MWI with the re-activation of K/Ka Band ranging between the two GRACE-FO satellites. MWI A-side operations are nominal and performing as expected.

- Flight system operations

  To achieve an optimal flight system configuration, the project has performed several AOCS tests with the goal to reduce the number of thruster firings, in particular for roll. On Nov-14/15, an optimized AOCS setting was adopted as the new baseline on both GF1 and GF2. As expected, the number of roll thruster firings was significantly reduced (-95%).

- Center-of-Mass Calibrations
    - A series of Center-of-Mass (CM) calibration maneuvers was performed on both spacecraft in October and early November to determine the offsets between the spacecraft CM and the accelerometer CM. Analysis indicate that the CM location is within the desired range and it is not necessary to adjust the location of the center of mass at this point in the mission. CM offsets for GF2 suggests that its location is acceptable, no adjustments are necessary at this time. Additional CM calibration maneuvers are planned to verify this over the next few months.

- Remaining IOC timeline / Phase-E
    - Following completion of the remaining instrument calibrations, the performance and stability of the redundant IPU will be monitored. Once the instruments' stable operation has been confirmed, the mission will be on track to enter its science operations phase (Phase-E) on Jan-28, 2019, with a data-validation period as previously planned.
    - The project plans to reacquire the Laser-Ranging-Interferometer (LRI) link as early as Dec-12, 2018; the LRI ranging had been suspended after the IPU-B shut-off on GF2 (Jul, 19, 2018).

- The project is currently assessing plans to enable GPS radio occultation measurements on both spacecraft.

GRACE Follow-On: Orbit

The GRACE Follow-On orbital parameters on Oct-31, 2018 were as follows:

Sun Beta (deg):	2
Absolute Distance (km):	205.4
Drift (km/d):	-0.11
Mean Altitude (>6378.1 km):	491.3
Decay Rate (GF1/GF2) (7d mean, m/d):	2.7 / 2.6

GRACE-FO: Science Data Processing

[Updates will appear here after Validation & Verification phase]

Calendar:

- AGU Fall Meeting 2018 (Dec 10-14, 2018; Washington D.C.)
  - Check the meeting program for GRACE Follow-On and GRACE to find relevant presentations (https://agu.confex.com/agu/fm18/)
- GRACE / GRACE-FO Science Team Meeting (Oct 8-10 (to be confirmed), 2019, Pasadena, CA)

Resources and Links:

- GRACE Follow-On mission pages: https://gracefo.jpl.nasa.gov/ and http://gfz-potsdam.de/en/grace-fo/
- The proceedings of all GRACE / GRACE-FO Science Team Meetings are available at the meeting website https://www.gstm-2018.eu .
- Searchable databases of GRACE and GRACE-FO related publications are available at
  - http://www-app2.gfz-potsdam.de/pb1/op/grace/references/sort_date.html
  - https://grace.jpl.nasa.gov/publications/
- If you are missing a publication please send an e-mail to Frank Flechtner (flechtne@gfz-potsdam.de) or via https://grace.jpl.nasa.gov/about/feedback/.