

The nominal Orbit A Phase plan was to be a non-science phase, where the Flight Dynamics team learned the Bennu environment. As such, no phase plan narrative was written.

The following material are the weekly operations summaries for the Orbit A phase which ran from December 31, 2018 to February 21, 2019, the first 7 1/2 weeks of 2019.



xm1901: Orbital A

→ Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

- Week 2019-01
- Week: 12/31/2018 (DOY 365) T13:30:00 – 1/7/2019 (DOY 007) T13:30:00
- SPT: N/A
- Ops Engineer: Ed Audi
- OPSCHK: 130
- Science Activities: N/A
- Default attitude: Sun point through 1/1, Nadir Point after that
- Slew config: Default



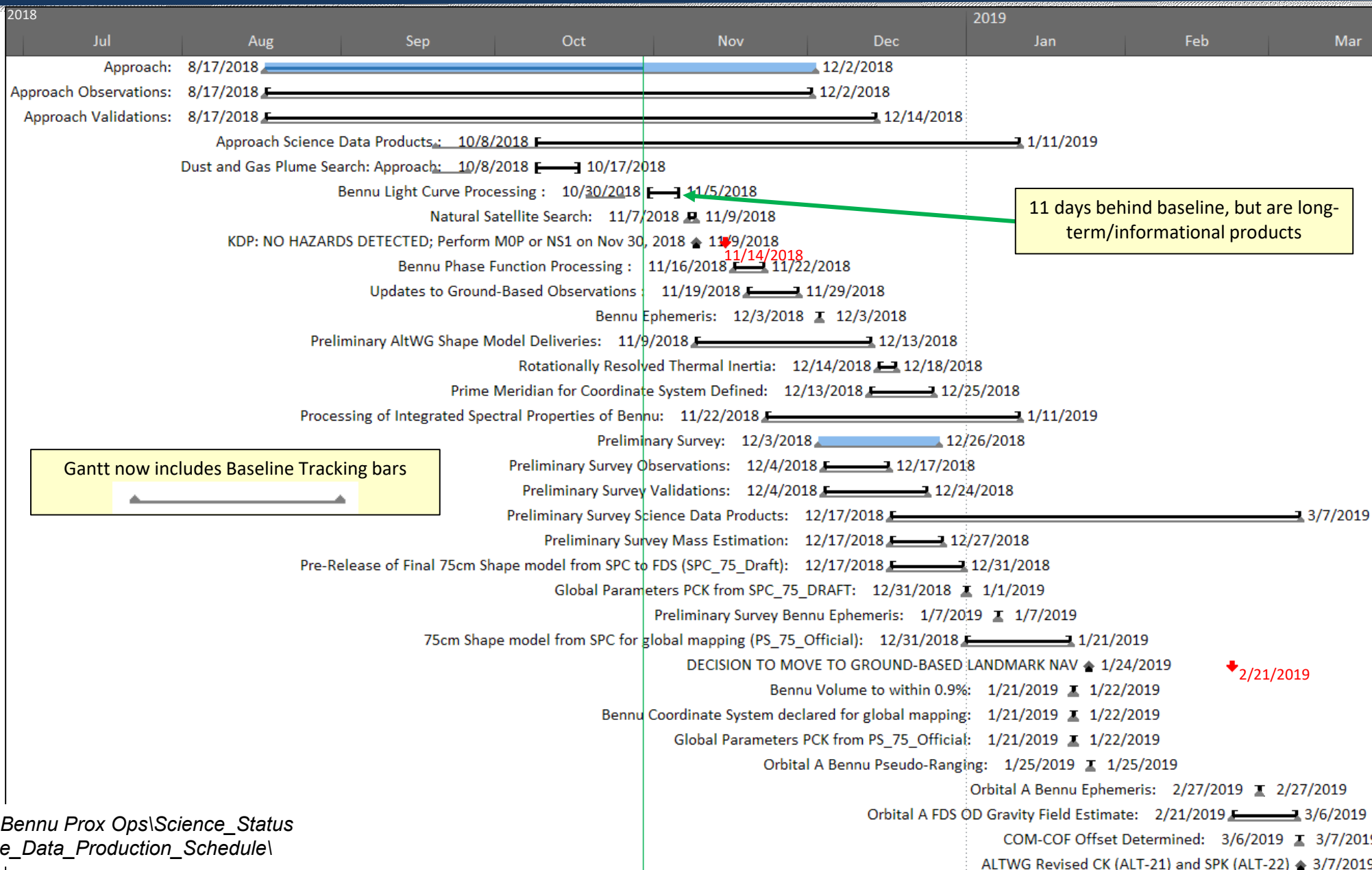
xm1901 Planning Schedule

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

Activity	Start Date	Finish Date	Status
Tactical Kickoff	11/6/18	11/6/18	
OpNav Request	11/12/18	11/12/18	
New SOCR and kernel submission deadline	11/20/18	11/20/18	
OpsEng builds J-Asteroid Plan	11/21/18	11/28/18	
Deliver OpNav Checklist to FDS	11/29/18	11/29/18	
J-Asteroid Reconciliation	11/29/18	11/29/18	
Week TCR for BG sequence and science populated	12/3/18	12/3/18	
TCR approval	12/5/18	12/5/18	
Delivery to MSA	12/19/19	12/19/18	



Data Product Completion Forecast



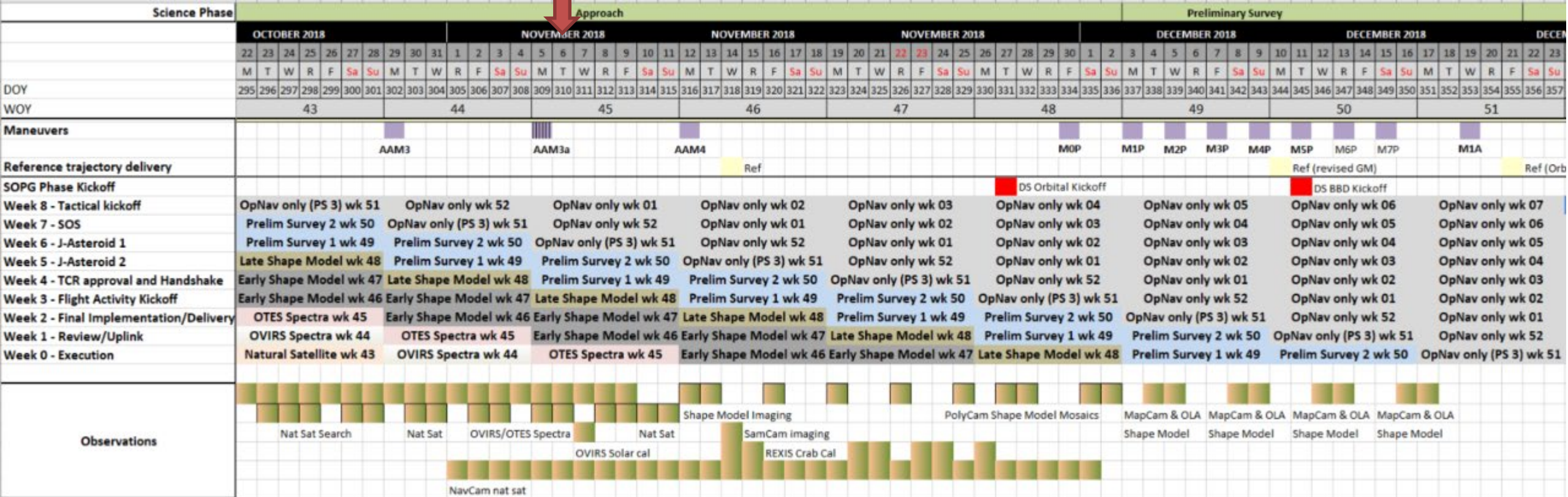
11 days behind baseline, but are long-term/informational products

Gantt now includes Baseline Tracking bars

2/21/2019



Planning Waterfall





xm1902: Orbital A

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

- Week 2019-02
- Week: 1/07/2019 (DOY 007) T13:30:00 – 1/14/2019 (DOY 014) T13:30:00
- SPT: N/A
- Ops Engineer: Andrew Gardner
- OPSCHK: 131
- Science Activities: N/A
- Default attitude: Nadir Point
- Slew config: Default



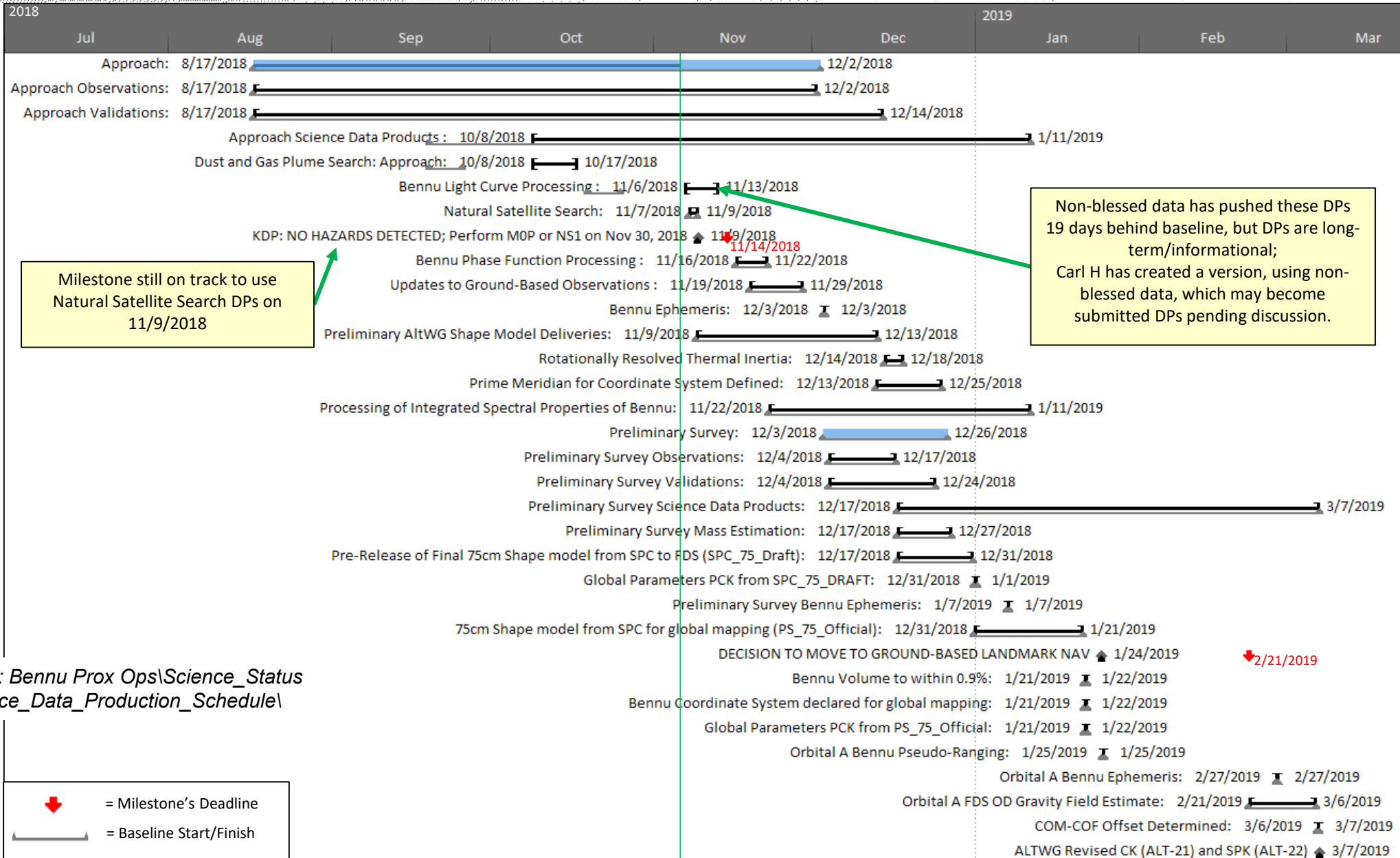
xm1902 Planning Schedule

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

Activity	Start Date	Finish Date	Status
Tactical Kickoff	11/13/18	11/13/18	
OpNav Request	11/19/18	11/19/18	
New SOCR and kernel submission deadline	11/27/18	11/27/18	
OpsEng builds J-Asteroid Plan	11/28/18	12/5/18	
Deliver OpNav Checklist to FDS	12/6/18	12/6/18	
J-Asteroid Reconciliation	12/6/18	2/6/18	
Week TCR for BG sequence and science populated	12/10/18	12/10/18	
TCR approval	12/12/18	12/12/18	
Delivery to MSA	12/26/18	12/26/18	



Data Product Completion Forecast



SDPS on ODOCS: Bennu Prox Ops\Science_Status (All Access)\Science_Data_Production_Schedule\



xm1903: Orbital A

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

- Week 2019-03
- Week: 1/14/2019 (DOY 014) T13:30:00 – 1/21/2019 (DOY 021) T13:30:00
- SPT: N/A
- Ops Engineer: Andrew Gardner
- OPSCHK: 132
- Science Activities: N/A
- Default attitude: Nadir Point
- Slew config: Default



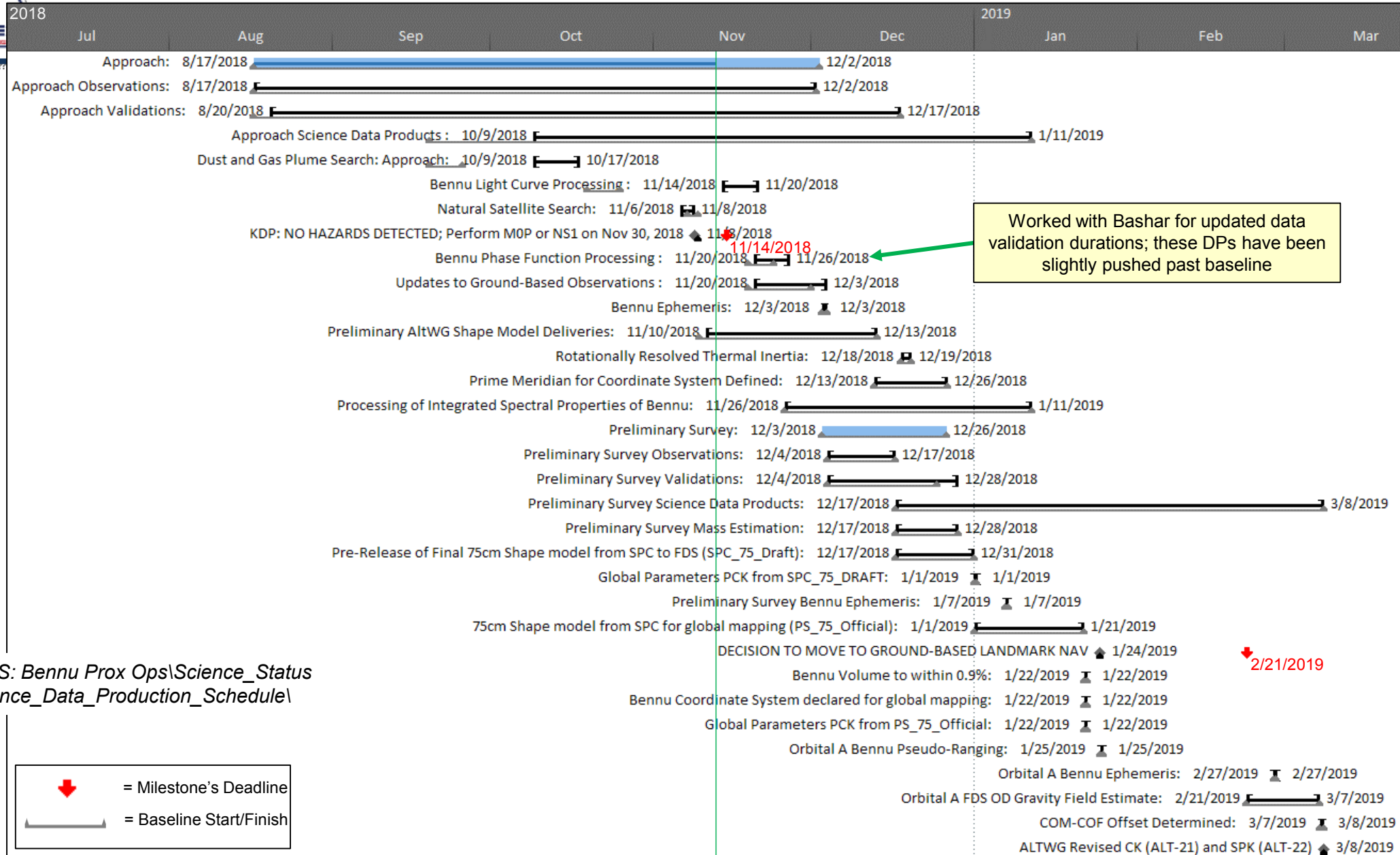
xm1903 Planning Schedule

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

Activity	Start Date	Finish Date	Status
Tactical Kickoff	11/20/18	11/20/18	
OpNav Request	11/26/18	11/26/18	
New SOCR and kernel submission deadline	12/4/18	12/4/18	
OpsEng builds J-Asteroid Plan	12/5/18	12/12/18	
Deliver OpNav Checklist to FDS	12/13/18	12/13/18	
J-Asteroid Reconciliation	12/13/18	12/13/18	
Week TCR for BG sequence and science populated	12/17/18	12/17/18	
TCR approval	12/19/18	12/19/18	
Delivery to MSA	1/2/19	1/2/19	



Data Product Completion Forecast



Worked with Bashar for updated data validation durations; these DPs have been slightly pushed past baseline

SDPS on ODOCS: Bennu Prox Ops\Science_Status (All Access)\Science_Data_Production_Schedule\

▼ = Milestone's Deadline

= Baseline Start/Finish



xm1904: Orbital A

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

- Week 2019-04
- Week: 1/21/2019 (DOY 021) T13:30:00 – 1/28/2019 (DOY 028) T13:30:00
- SPT: N/A
- Ops Engineer: Sara Knutson
- OPSCHK: 133
- Science Activities: N/A
- Default attitude: Nadir Point
- Slew config: Default



xm1904 Planning Schedule

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

Activity	Start Date	Finish Date	Status
Tactical Kickoff	11/27/18	11/27/18	
OpNav Request	12/3/18	12/3/18	
New SOCR and kernel submission deadline	12/11/18	12/11/18	
OpsEng builds J-Asteroid Plan	12/12/18	12/19/18	
Deliver OpNav Checklist to FDS	12/20/18	12/20/18	
J-Asteroid Reconciliation	12/20/18	12/20/18	
Week TCR for BG sequence and science populated	12/24/18	12/24/18	
TCR approval	12/26/18	12/26/18	
Delivery to MSA	1/9/19	1/9/19	



xm1905: Orbital A

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

- Week 2019-05
- Week: 1/28/2019 (DOY 028) T13:30:00 – 2/4/2019 (DOY 035) T13:30:00
- SPT: Carl Hergenrother/Christian d'Aubigny
- Ops Engineer: Josh Nelson
- OPSCHK: 134
- SOCRs: 108, 121, 122, 123, 124
- Default attitude: Nadir Point
- Slew config: Default

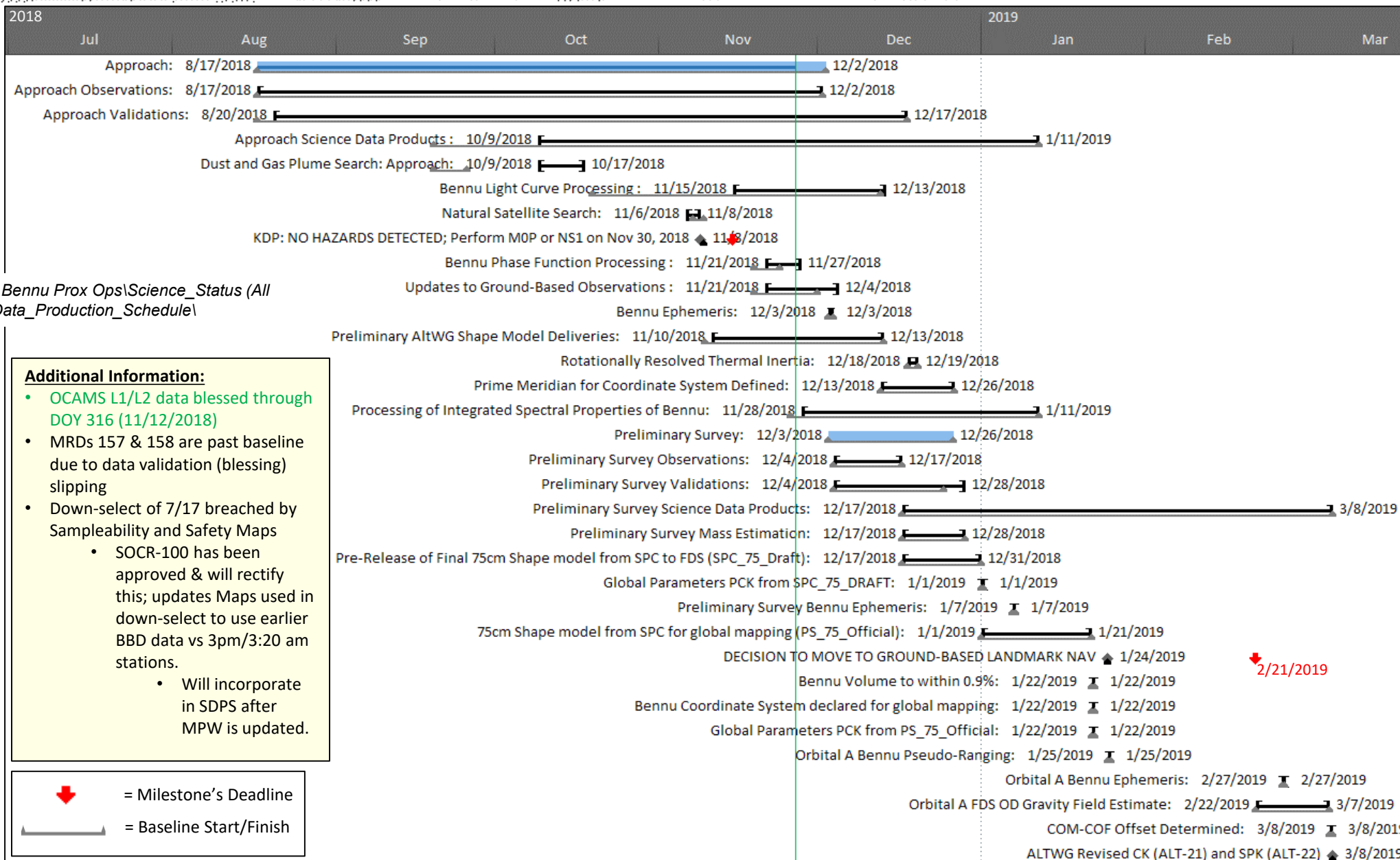


WOY 05 (L+30 Checkout and Cals) Schedule

- 11/27/2018: OCAMS / SPT / OPS tagup re: OCAMS L+30 Checkout and Cal
- 12/07/2018: L+30 Instrument Reconciliation (All products may not be done by this point)
- 12/07/2018 – 12/10/2018: WOY05 TCR Population
- 12/20/2018: WOY04 / WOY05 joint OpNav Reconciliation
- 01/03/2019: WOY05 FA Kickoff
- 01/03/2019: WOY04 / WOY05 Final OpNav Requests due from OpNav Team (**Proposed**)
- 01/07/2019: Week 05 OpNav Product Delivery to MSA
- 01/09/2019: First Product Delivery to MSA
- 01/10/2019: MSA integrate and build WOY04 and WOY05
- 01/11/2019 – 01/13/2019: WOY 04 and WOY05 SS/STL testing
- 01/14/2019 – 01/15/2019: Review of WOY04 and WOY05 SS/STL testing results
- 01/15/2019-01/16/2019: Margin for WOY05 L+30 Pass 2 updates (**only if needed**)
- 01/17/2019 – MSA WOY05 rebuild Pass 2 (**if needed**)
- 01/18/2019 – 01/20/2019: WOY05 SS/STL testing (**if needed**)
- 01/21/2019 – 01/22/2019: Review of WOY05 Pass 2 SS/STL results (**if needed**)
- 01/24/2019: Command Conference



Data Product Completion Forecast



SDPS on ODOCS: *Bennu Prox Ops\Science_Status (All Access)\Science_Data_Production_Schedule*

- Additional Information:**
- OCAMS L1/L2 data blessed through DOY 316 (11/12/2018)
 - MRDs 157 & 158 are past baseline due to data validation (blessing) slipping
 - Down-select of 7/17 breached by Sampleability and Safety Maps
 - SOCR-100 has been approved & will rectify this; updates Maps used in down-select to use earlier BBD data vs 3pm/3:20 am stations.
 - Will incorporate in SDPS after MPW is updated.

= Milestone's Deadline
 = Baseline Start/Finish



xm1906: Orbital A

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

- Week 2019-06
- Week: 2/4/2019 (DOY 035) T13:30:00 – 2/11/2019 (DOY 042) T13:30:00
- SPT: N/A
- Ops Engineer: Chris Haberle
- OPSCHK: 135
- Science Activities: N/A
- Default attitude: Nadir Point
- Slew config: Default



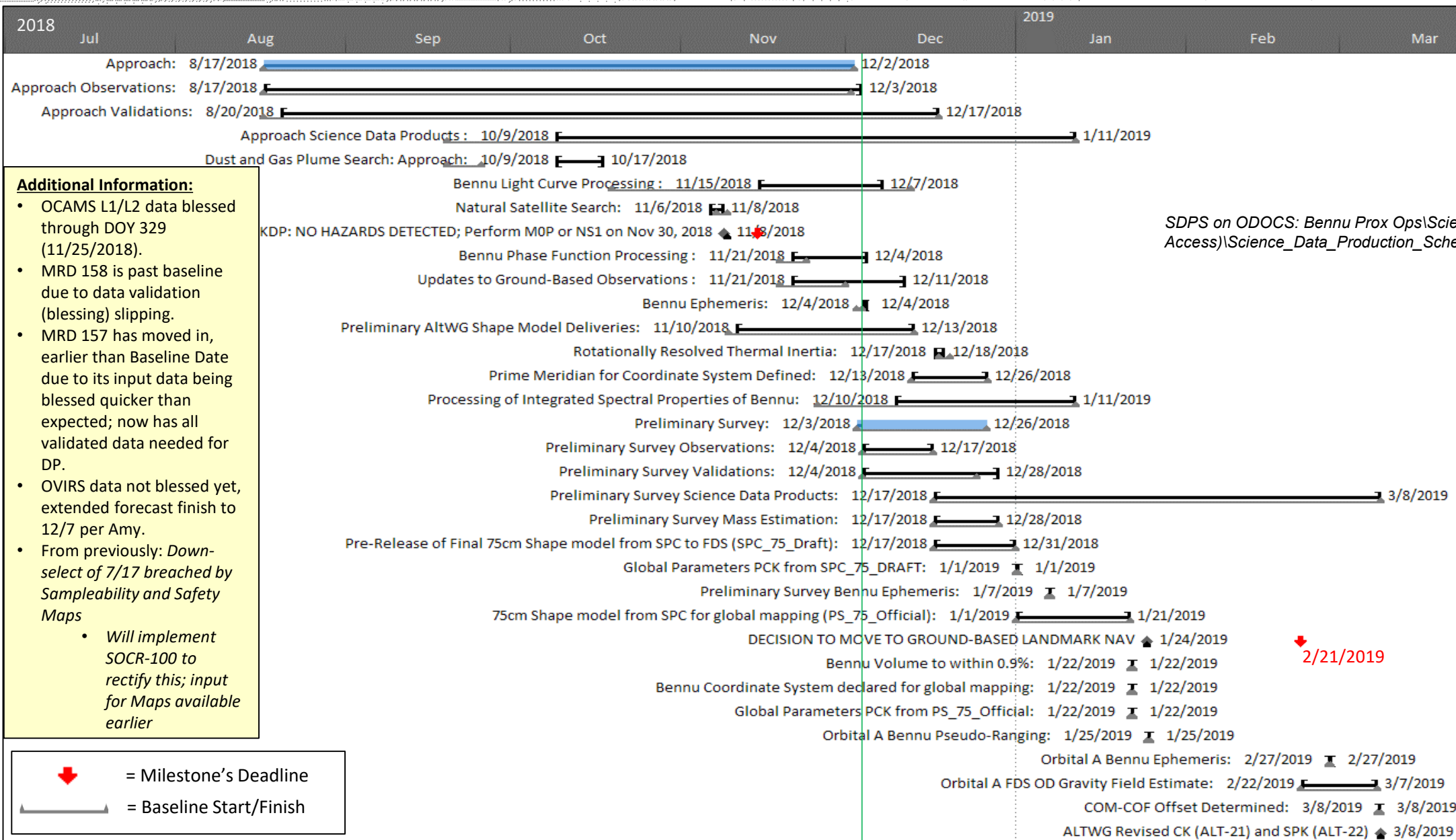
xm1906 Planning Schedule

Week 8 – Tactical Kickoff
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Final Implementation/Delivery
Week 1 - Review/Uplink
Week 0 - Execution

Activity	Start Date	Finish Date	Status
Tactical Kickoff	12/11/18	12/11/18	
OpNav Request	12/17/18	12/17/18	
New SOCR and kernel submission deadline	12/25/18	12/25/18	
OpsEng builds J-Asteroid Plan	12/26/18	1/2/19	
Deliver OpNav Checklist to FDS	1/3/19	1/3/19	
J-Asteroid Reconciliation	1/3/19	1/3/19	
Week TCR for BG sequence and science populated	1/7/19	1/7/19	
TCR approval	1/9/19	1/9/19	
Delivery to MSA	1/23/19	1/23/19	



Data Product Completion Forecast



SDPS on ODOCS: Bennu Prox Ops\Science_Status (All Access)\Science_Data_Production_Schedule\

↓ 2/21/2019

- Additional Information:**
- OCAMS L1/L2 data blessed through DOY 329 (11/25/2018).
 - MRD 158 is past baseline due to data validation (blessing) slipping.
 - MRD 157 has moved in, earlier than Baseline Date due to its input data being blessed quicker than expected; now has all validated data needed for DP.
 - OVIRS data not blessed yet, extended forecast finish to 12/7 per Amy.
 - From previously: *Down-select of 7/17 breached by Sampleability and Safety Maps*
 - Will implement SOCR-100 to rectify this; input for Maps available earlier

↓ = Milestone's Deadline
 ┌───┐ = Baseline Start/Finish



xm1907: Orbital A

Week 8 - Tactical kickoff
Week 7 - SOS
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 3 - Flight Activity Kickoff
Week 2 - Review/Uplink
Week 1 - Execution



- Week 2019-07
- Week: 2/11/2019 (DOY 042) T13:30:00 – 2/18/2019 (DOY 049) T13:30:00
- SPT: N/A
- Ops Engineer: David Dean
- OPSCHK: 136
- Science Activities: 142, 122, 129
- Default attitude: Nadir Point
- Slew config: Default

- In addition to continuing 2x1 OpNav mosaics on a two hour cadence and continuing to execute sets of NavCam images in nadir point between the mosaics, SOCR-142 adds OLA linear scans.
- REXIS L+30 also added



xm1908: Baseball Diamond Orbital Imaging

Week 8 - Tactical kickoff
Week 7 - SOS
Week 6 - J-Asteroid 1
Week 5 - J-Asteroid 2
Week 4 - TCR approval and Handshake
Week 2 – Final Implementation/Delivery
Week 0 - Execution

- Week 2019-08
- Week: 2/18/2019 (DOY 049) T13:30:00 – 2/25/2019 (DOY 056) T13:30:00
- SPT: Tammy Becker
- Ops Engineer: Zoe Zeszut
- WGs and Instruments: OCAMS, OTES, OLA, AltWG, SAWG, TAWG, IPWG, RDWG
- SOS: 127, 143
- OPSCHK: 250
- Science Activities:
 - 2/18/2019 (DOY 49) – MapCam Pt and Stare (nadir) every 24 minutes
 - 2/19/2019 (DOY 50) – MapCam Pt and Stare (nadir) every 24 minutes
 - 2/20/2019 (DOY 51) – MapCam Pt and Stare (nadir) every 24 minutes
 - 2/21/2019 (DOY 52) – MapCam Pt and Stare (nadir) every 24 minutes
 - 2/22/2019 (DOY 53) – MapCam Pt and Stare every 10 minutes (plus OTES, PolyCam, OLA)
 - 2/23/2019 (DOY 54) – MapCam Pt and Stare every 10 minutes (plus OTES, PolyCam, OLA)
 - 2/24/2019 (DOY 55) – MapCam Pt and Stare every 10 minutes (plus OTES, PolyCam, OLA)
- Default attitude: Nadir Point
- Slew config: Default
- Using Nominal OD86 for planning