Detailed Survey: Equatorial Stations Phase is one of the major science campaigns to create the global high-level products and top maps (Safety, Sampleability and Science Value) that will inform the down-select of a primary and back-up sample site.

**DETAILED SURVEY: EQUATORIAL STATIONS**

**SCIENCE PHASE PLAN • APRIL–JUNE 2019**

OSIRIS-REx will execute a series of periodic slews between Bennu’s south and north poles and take observations from 7 stations providing 7 different sun illumination conditions. Continuous linear scans will be performed for 4.3 hours (a full Bennu rotation) during each equatorial station. During Stations 2 and 6, OSIRIS-REx will perform dust and gas plume searches. During Stations 2 and 5, OSIRIS-REx will also scan off-nadir for an additional quarter-Bennu rotation to acquire additional photometric model data. For approx. an hour after Stations 1, 4, 6 and 7, OTES will perform E-W zig-zag scans for the Thermal Emission Phase Function.

OSIRIS-REx is over-scaning by 12mrad (3 OTES FOVs) to accommodate spectrometer calibrations. MapCam is only covering the Bennu disk plus uncertainties.

View from Northern Hemisphere

Day 1
Station 1: 3:00pm LST
Extra Activities: Thermal Emission Phase Function
Instruments: MacCam, OVIRS, OTES, OLA, REXIS

Day 2
Station 2: 3:20am LST
Extra Activities: Off-Nadir Observations & Dust Plume Search
Instruments: MacCam, OVIRS, OTES, REXIS

Day 8
Station 2: 3:20am LST
Extra Activities: Off-Nadir Observations & Dust Plume Search
Instruments: MacCam, OVIRS, OTES, REXIS

Day 15
Station 3: 12:30pm LST
Instruments: MacCam, OVIRS, OTES, OLA, REXIS

Day 22
Station 4: 10:00am LST
Extra Activities: Thermal Emission Phase Function
Instruments: MacCam, OVIRS, OTES, OLA, REXIS

Day 29
Station 5: 6:00am LST
Extra Activities: Off-Nadir Observations
Instruments: MacCam, OVIRS, OTES, OLA, REXIS

Day 36
Station 6: 8:40pm LST
Extra Activities: Dust Plume Search, Thermal Emission Phase Function
Instruments: MacCam, OVIRS, OTES, REXIS

Day 43
Station 7: 6:00pm LST
Extra Activities: Thermal Emission Phase Function
Instruments: MacCam, OVIRS, OTES, OLA, REXIS

**DERIVED PRODUCTS**

- Global Safety Map
- Global Science Value Map
- Global Sampleability Map

**MAJOR DATA PRODUCTS**

- Global Temperature Maps
- Photometric Models
- Global Mineral & Chemical Maps
- Global Dust Cover Index Map
- Global Sampleability Map
- Global Delivered Maps

**GLOBAL OBSERVATIONS**

- Global Shape Models
- Global Photometric Models
- Global Mineral & Chemical Maps
- Global Dust Cover Index Map
- Global Temperature Maps
- Global Inertial Maps

**DERIVED PRODUCTS**

- Global Safety Map
- Global Science Value Map
- Global Sampleability Map

**RECON REHEARSAL TAG**

- Point-Source Properties
- Yarkovsky Effects
- Operational Environment
- Surface Characteristics
- Density and Gravity
- Sample Site

**PROGRESSION OF LEVEL-1 SCIENCE REQUIREMENTS BY PHASE**

- Global Properties
- Sample Site Completed
- Appr. Survey
- Point-Source Properties
- Yarkovsky Effects
- Operational Environment
- Surface Characteristics
- Density and Gravity
- Sample Site

**100%**

- 90%
- 80%
- 70%
- 60%
- 50%
- 40%
- 30%
- 20%
- 10%
- 0%

**Day 1**

- Station 1: 3:00pm LST
- Extra Activities: Thermal Emission Phase Function
- Instruments: MacCam, OVIRS, OTES, OLA, REXIS

**Day 8**

- Station 2: 3:20am LST
- Extra Activities: Off-Nadir Observations & Dust Plume Search
- Instruments: MacCam, OVIRS, OTES, REXIS

**Day 15**

- Station 3: 12:30pm LST
- Instruments: MacCam, OVIRS, OTES, OLA, REXIS

**Day 22**

- Station 4: 10:00am LST
- Extra Activities: Thermal Emission Phase Function
- Instruments: MacCam, OVIRS, OTES, OLA, REXIS

**Day 29**

- Station 5: 6:00am LST
- Extra Activities: Off-Nadir Observations
- Instruments: MacCam, OVIRS, OTES, OLA, REXIS

**Day 36**

- Station 6: 8:40pm LST
- Extra Activities: Dust Plume Search, Thermal Emission Phase Function
- Instruments: MacCam, OVIRS, OTES, REXIS

**Day 43**

- Station 7: 6:00pm LST
- Extra Activities: Thermal Emission Phase Function
- Instruments: MacCam, OVIRS, OTES, OLA, REXIS

**Extra Activities**

- Off-Nadir Observations & Dust Plume Search
- Thermal Emission Phase Function
- Dust Plume Search

**View from Northern Hemisphere**

STATION 2
3:00PM

STATION 1
3:00PM

STATION 3
12:30PM

STATION 4
10:00AM

STATION 5
6:00AM

STATION 6
6:00am

STATION 7
6:00PM

Day 1

Day 2

Day 8

Day 15

Day 22

Day 29

Day 36

Day 43

**DERIVED FROM DET SURVEY - EQ-SPPv5d Approved**

LAST UPDATED: 03-27-2019