# OBSERVING MARS FROM AREOSTATIONARY ORBIT: BENEFITS AND APPLICATIONS

A White Paper submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032

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July 15, 2020

**Table of physical parameters, observable quantities, and available instruments associated to the scientific applications**

| Application (section #) | Physical parameters | | | Observable quantities | | Instruments | | |
|---|---|---|---|---|---|---|---|---|
| | Description | Horizontal resolution | Cadence | Description | Energy/wavelength/frequency | Description | FOV or IFOV | Availability |
| 4.1 | Extent of (dust/water ice) aerosol clouds | ≤ 5 km | ≤ 30 minutes | RGB values | 400-750 nm (VIS) | Visible camera | IFOV≤ 0.3 mrad | Yes |
| 4.1 | Duration of (dust/water ice) aerosol clouds | ≤ 5 km | ≤ 30 minutes | RGB values | 400-750 nm (VIS) | Visible camera | IFOV≤ 0.3 mrad | Yes |
| 4.1 (and 5.1) | Surface temperature | ≤ 60 km | ≤ 30 minutes | Radiance | Around 7.9 μm, or around 32 μm, or beyond 50 μm (TIR) | TIR spectrometer / radiometer | IFOV≤ 3.5 mrad | Yes |
| 4.1 (and 5.1) | Vertical profile of temperature | ≤ 60 km | ≤ 30 minutes | Radiance | Around 15 μm (TIR) | TIR spectrometer / radiometer | IFOV≤ 3.5 mrad | Yes |
| 4.1 (and 5.1) | Dust column opacity | ≤ 60 km | ≤ 30 minutes | Radiance | Around 9.3 μm (TIR), or a broadband signal in NIR, or at 220 nm (UV) | TIR spectrometer / radiometer - NIR spectrometer – UV imager | IFOV≤ 3.5 mrad | TIR yes |
| 4.1 (and 5.1) | Water ice column opacity | ≤ 60 km | ≤ 30 minutes | Radiance | Around 11.8 μm (TIR), or at 1254 nm or 1500 nm (NIR), or at 320 nm (UV) | TIR spectrometer / radiometer – UV imager | IFOV≤ 3.5 mrad | TIR yes |
| 4.1 (and 5.1) | Water vapor column abundance | ≤ 60 km | ≤ 30 minutes | Radiance | Around 41 μm (TIR) or near 2602 nm (NIR) | TIR spectrometer / radiometer - NIR spectrometer | IFOV≤ 3.5 mrad | NIR Yes |
| 4.1 (and 5.1) | Carbon dioxide ice column opacity | ≤ 60 km | ≤ 30 minutes | Radiance | Around 22 μm (TIR), or at 1428 nm (NIR) | TIR spectrometer / radiometer | IFOV≤ 3.5 mrad | NIR yes |
| 4.1 (and 5.1) | Surface pressure | ≤ 60 km | ≤ 30 minutes | Radiance (I/F) | Around 2007 nm (NIR) | NIR spectrometer | IFOV≤ 3.5 mrad | Yes |
| 4.1 | Horizontal wind components | ≤ 5 km | ≤ 30 minutes | Radiance | 400-750 nm (VIS) or 200-400 nm (UV) | Visible camera | IFOV≤ 0.3 mrad | Yes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4.2 | Solar EUV spectral irradiance | N/A | 16 sec | spectral irradiance | 10-20 nm, 17-22 nm, 121.6 nm | Solar EUV monitor | FOV: -2 to +2 degrees, centered on Sun | Yes |
| 4.2 | Vector magnetic field | N/A | 16 sec | vector magnetic field | N/A | Fluxgate mag | N/A | Yes |
| 4.2 | Solar wind ion flux | N/A | 16 sec | differential energy flux (eV/cm2-s-ster-eV) | ~50 eV to 10 keV | Ion energy/ angle analyzer | FOV: Cone of half angle 30° centered on Sun | Yes |
| 4.2 | Superthermal electron flux | N/A | 16 sec | differential energy flux (eV/cm2-s-ster-eV) | ~3 eV to 10 keV | Electron energy/angle analyzer | FOV: 360° x 120° | Yes |
| 4.2 | Energetic ion flux | N/A | 20 minutes | differential energy flux (eV/cm2-s-ster-eV) | 30 keV to 5 MeV | Energetic ion/electron detector | FOV:40 x 40 deg centered on +/- Parker spiral dirs | Yes |
| 4.2 | Energetic electron flux | N/A | 20 minutes | ion energy | 30 keV to 500 keV | Energetic ion/electron detector | FOV:40 x 40 deg centered on +/- Parker spiral dirs | Yes |
| 4.3 | Kinetic surface temperature | ≤ 1 km | 3-4 hours | Brightness temperature | Around 7.9 μm, or around 32 μm, or beyond 50 μm (TIR) | TIR spectrometer / radiometer | IFOV≤ 60 μrad | No |
| 4.3 | Albedo | ≤ 1 km | 3-4 hours | Reflectance | 0.3-3 μm | Broadband Bolometer | IFOV≤ 60 μrad | No |
| 4.3 | Thermal inertia | ≤ 1 km | 3-4 hours | Brightness temperature | Around 7.9 μm, or around 32 μm, or beyond 50 μm (TIR) | TIR spectrometer / radiometer | IFOV≤ 60 μrad | No |
| 4.3 (Phobos) | Mineralogy and thermal inertia | ≤ 1 km | ≤ 10 minutes when target is in sight | Reflectance and Radiance | 0.3-4.0 μm (VIS-NIR) and 6.0-15.0 μm (TIR) | VIS-NIR spectrometer TIR spectrometer / radiometer | IFOV≤ 0.1 mrad | VIS-NIR yes |