

SatRevolution SOWA mission

Extended EO-capable platform aimed at shared in-orbit service provision – imagery, data, services for external payloads and solutions – launches December 2021



Following a cadence of previous missions (SatRevolution SWIFT and STORK), SOWA spacecraft extends both mission capacity and mission capability with regards to innovative service provision in orbit.

SatRevolution SOWA is a 6U CubeSat with multispectral optical capability scheduled to launch December 2021. Aimed at EO-related service provision, the platform has capacity for external payloads and solutions. Whether you're looking for a simple in-orbit demonstration and verification, or you're building a complex business case for your Earth-Observation systems and services, SatRevolution SOWA is the right opportunity for you.

Your business case SatRevolution SOWA creates value in following (but not limited to) business cases:

- Image processing, value-added Earth-observation services
- Demonstration of Earth-observation-oriented technologies in real-life scenarios
- Provision of imagery, services and data
- Obtaining flight heritage for your sub-systems and componentry

Overall description and features

6U Cubesat platform based on SatRevolution Nanobus with flight heritage.

Equipped with two SatRevolution Vision 300 optical payloads, multispectral capability and additional subsystems to provide extended payload service:

- Power system with up to 75W of peak power for external payloads
- 2 x optical payloads with up to 5m GSD each
- Multispectral capability – 4 bands (B, G, R, NIR)
- Onboard image processing capability based on AI
- Advanced attitude determination and control system with up to 0.01 degrees of pointing accuracy
- Redundant UHF communication system for command telemetry
- S-band and X-band communication systems for data downlink
- Variety of payload interfaces available
- 36 months of mission lifetime
- Launch to 500+km Sun-synchronous orbit December 2021
- Range of innovative payload and data services available

External payload capacity

Current available payload slot options:

- 12x of 0,25U slots
- 6x of 0,5U slots
- 3x 1U slots
- 2x 2U slots
- 2x tuna-can external slot

Payload interfaces

Platform can accept both standard PC104 and platform proprietary design mechanical payload interfaces. Proprietary design allows for smooth payload integration process.

Interfaces available: I2C, SPI, UART, RS485, RS422, CAN, USB, Ethernet, DAC/ADC. Other interfaces are available on request.

Structure

Space-proven Nanobus structure:

- CNC manufactured of Aluminium 6061, 5083, 6082 alloy
- Hard anodized and oxidized
- Up to 2 safety deployment switches and 1 RBF pin
- Two separation springs



Power Power management system is based on complex of Energy Harvesting System; Battery Management System; Auxiliary Power System (payload power supply).

- Peak power 75W
- System redundancy, autonomous fault handling and recovery
- Battery supervisory circuit
- Hardware protection from excessive discharge
- Hardware MPPT implementation
- User programable up to 6A maximum battery pack load current
- Available power supply: 1.8V, 3.3V, 5V, 12V and unregulated battery voltage
- Up to 36V available on request
- Battery pack capacity: 54,6 Wh

On-board computing Space-proven command and data handling module with following capabilities:

- Main processor: up to 216MHz, 2MB FLASH
- Storage memory: from 1GB up to 16GB NAND FLASH
- External program memory: up to 3MB with hardware Forward Error Correction
- Payload interfaces: I2C, SPI, UART, RS485, RS422, CAN, USB, Ethernet, DAC/ADC
- Multiple temperature sensors
- Working temperatures: -30°C to 65°C
- Power supply: independent DC/DC converter
- Over-The-Air update capability

Communication Redundant low frequency communication module

- Two independent radio transceivers
- Frequency range: 400-440 MHz (optionally 120-500 MHz)
- Transmission data rate 9,6 kb/s
- RF output power: 30dBm (reconfiguration available on request)
- External program memory: up to 1MB with hardware Forward Error Correction
- Radio Sensitivity: -120dBm
- Over-The-Air update capability

S-band communication module

- S-band operational frequency 2200 – 2290 MHz, 2400-2450 MHz
- RF output power: 30dBm
- S-band transmission rate 3,5 – 10,5 Mb/s
- External program memory: up to 1MB with hardware Forward Error Correction
- Over-The-Air update capability

X-band communication module with 300 Mb/s transmission rate



Accuracy	<p>Platform is equipped with following attitude determination and control subsystems:</p> <ul style="list-style-type: none"> · Space-proven advance flight computer · 3x magnetorquers · 3x reaction wheels · 1x coarse sun-sensor · 1x fine sun-sensor · 1x magnetometer 3-axis · 1x gyroscope 3-axis · 1x GPS receiver <p>Platform accuracy: <0.01 degree of positioning accuracy; <0.01 degree of pointing accuracy</p>
Optical capabilities	<p>Platform is carrying 2 x SatRevolution Vision 300 optical payloads with additional processing capabilities.</p> <ul style="list-style-type: none"> · Sensors: 2 (Bayer; NIR) · Bands: 4 (B; G; R; NIR) · Ground Sample Distance (GSD): 5.8 m @500 km · Field of View (FoV) for a single sensor: 14.2 x 11.8 km @500 km · Angle of view (AoV) for a single sensor: 1.62° x 1.35° · Maximum image area per orbit: 7 600 km² · Daily coverage: 122 800 km² · On-board memory: 128 GB Flash · Single image resolution – 2456 x 2054 px · Focal length – 300 mm; Aperture – f/5.6 · 8, 10, 12 bit processing
Mission timeline	<ul style="list-style-type: none"> · September-December 2020 – external payload design and readiness review · January-March 2021 – external payload design finalization · April 2021 – provision of payload engineering models · May 2021 – provision of payload flight models · June-July 2021 – payload integration · August-September 2021 – satellite integration and testing campaign · October 2021 – delivery for launch · December 2021 – launch · January 2022-December 2024 – in-orbit service provision

Payload services

- Payload design review
- Platform provision
- Assembly, integration and testing
- Campaign management
- Launch event
- Platform and payload commissioning
- Payload in-orbit operations and service provision

Data services

- Imaging
- Image processing
- Data analysis
- Custom tasking

