

TRACKING SOLAR PANELS

Deployable Solar Array System



GOMSPACE



45W Tracking Solar Panel System

The NanoPower Tracking Solar Panels (TSP) 45W is a leading light weight Solar Array system allowing for suntracking about one axis.

The system consists of:

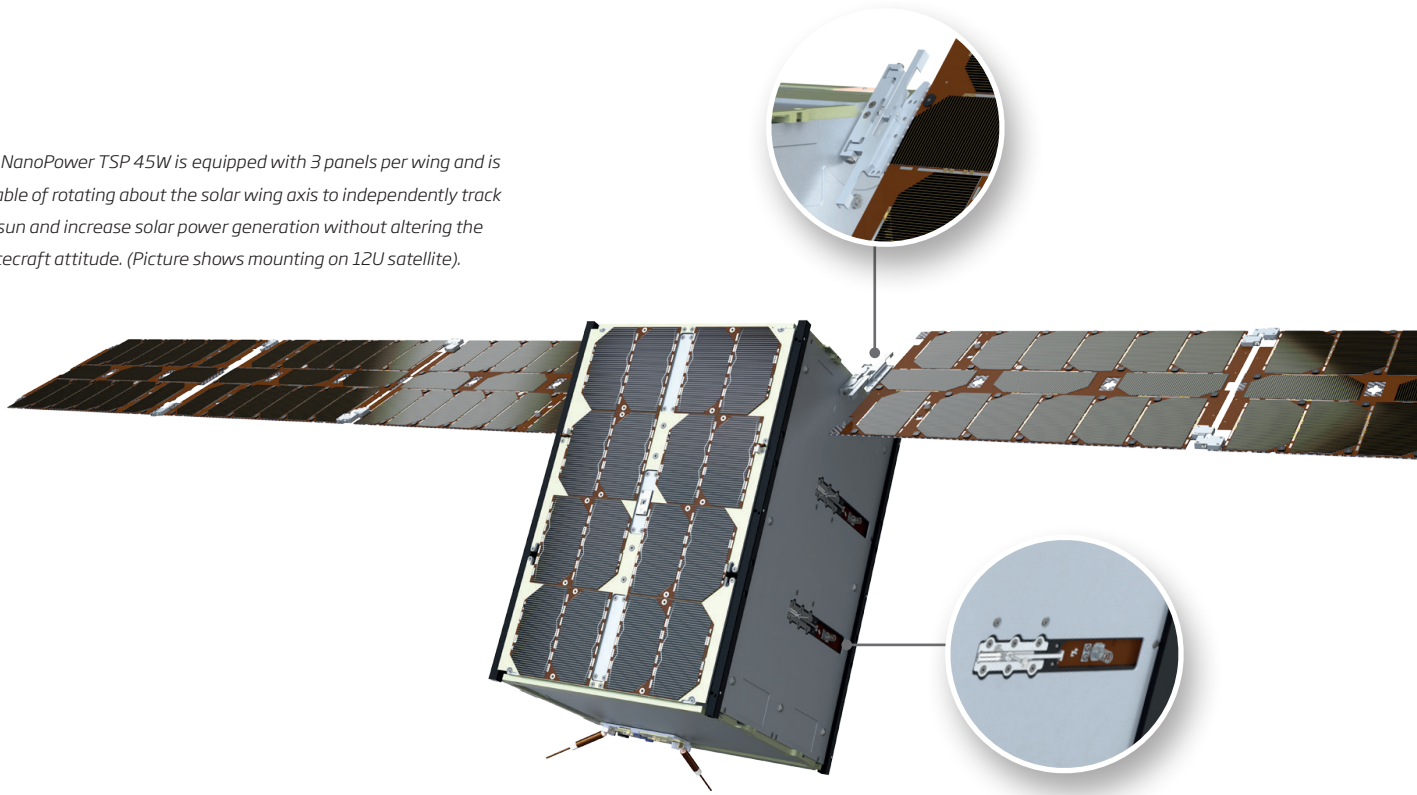
- Deployable Solar Array, which is constructed of three solar panels
- Solar Array Drive Assembly
- HDRM (Hold Down Release Mechanism)

Each Solar Array has a form factor of 2x3U which makes it integrable on the GomSpace 6U-12U structures. During launch the Solar Array is latched along one side of the satellite using the HDRM and protrudes a max of 10mm from mounting plane.

When commanded to release the Solar Array is deployed and has a span of 980mm. Total amount of power generation, using High Voltage configuration, is up to 45W. After deployment of the arrays the angle can be controlled for sun-tracking by the Solar Array Drive Assembly for maximum power generation.

Easier connectivity of power and communication through a connection-PCB which allows for customers own development of internal harness.

The NanoPower TSP 45W is equipped with 3 panels per wing and is capable of rotating about the solar wing axis to independently track the sun and increase solar power generation without altering the spacecraft attitude. (Picture shows mounting on 12U satellite).



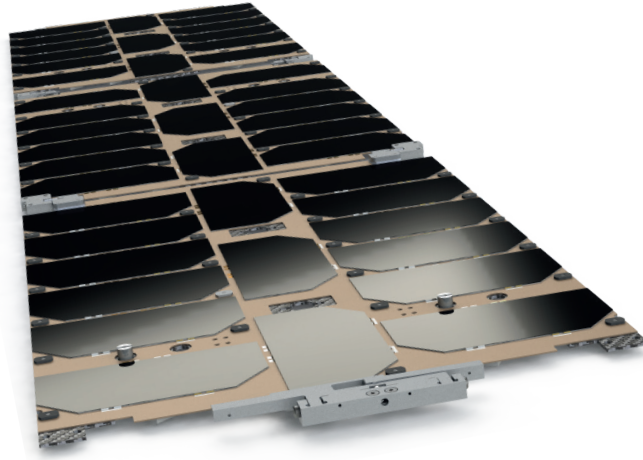
Highlighted features:

- 45W/array powergeneration
- High Voltage option
- Suntracking angular range 235 degrees
- Programmable rotational speed
- Outward pointing Solar cells for power generation when stowed.
- Easy connectivity of power and communication through connection-PCB

Mechanical features:

- Wing span 980mm
- Stowed protrusion from mounting plane < 10mm
- Weight max 965g (dependent on chosen options)

It is recommended to use two NanoPower TSPs and double the power generation and balance the satellite.



Deployable Solar Array

GomSpace deployable Solar Array consists of three panels. The Solar Array is integrable on the GomSpace 6U-12U structures.

The Deployable Solar Array is consisting of three panels, each having a 2x3U form factor which makes it integrable on the GomSpace 6U-12U structures. When stowed the solar array protrudes 10mm from the rails of the structure.

The design consists of a carbon fibre support structure for the slim design and a low mass while maintaining a stiff and strong construction. The wing span of a single deployed wing is 980mm when mounted on a GomSpace structure. A wing stows against the side of the satellite structure during launch and is deployed in

orbit. The wing is latched using the Hold Down Release Mechanisms (HDRM) which secures the wing during launch and releases it when commanded. All parts of the HDRM system is also directly integrable on the GomSpace structure.



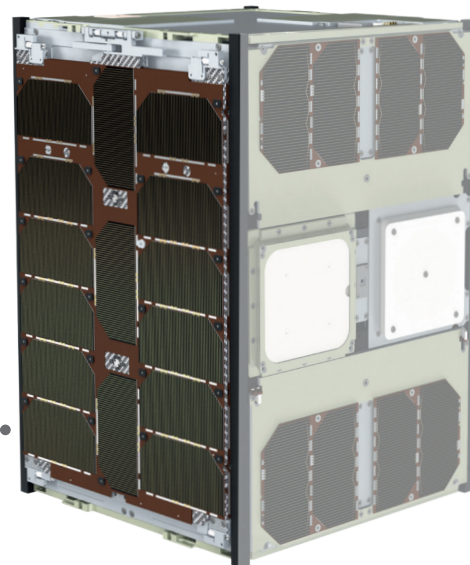
*Hold Down Release
Mechanisms (HDRM)*

Technical Information

| DEPLOYABLE SOLAR ARRAY - KEY FEATURES: | |
|--|--|
| Functionality | <ul style="list-style-type: none">• 15 cells/panel arranged as:<ul style="list-style-type: none">- Two strings of 0.5A@16.8V and 0.5A@19.2V, respectively.- High Voltage configuration (1 x 16.8V 0.5A + 1 19.2V 0.5A)• Bypass diode on each cell• ~1W/cell power production at solar flux of 1367W/m² (BOL)• Total power production ~45W/array• Temperature sensor on first panel• Hold Down Release Mechanisms (HDRM) |
| Interfaces | <ul style="list-style-type: none">• Harwin Gecko connectors for power and data• I2C for sensor communication• Pads for release detection available• Interlocking panels in stowed configuration |
| Mass and Dimensions | <ul style="list-style-type: none">• Stowed volume: 330 mm x 208 mm x 9 mm• Deployed length: 930 mm (from rail)• Total mass: 750 g• Deployed mass (i.e., the array): 650 g |

While stowed the wing has outwards pointing cells for power production. Each panel holds 15 triple junction solar cells allowing a power production up to 45W per wing.

*The Deployable Solar Array protrudes <10mm from the mounting plane of the structure when stowed.
(Picture shows mounting on 12U satellite).*





Solar Array Drive Assembly

GomSpace Solar Array Drive Assembly is a compact and durable mechanism designed for tracking solar arrays about one axis for optimal power input.

The GomSpace Solar Array Drive Assembly of the NanoPower product family is a Solar Array Drive Assembly mechanism. It consists of a motor, drivetrain, and motor driver in an integrated casing. At the output shaft the Solar Array Drive Assembly delivers a slow rotational speed at a torque of at least 58Nmm.

The Solar Array Drive Assembly has a nominal range of motion of 235° from the reference position. The output shaft angle is set according to an angle externally referenced by the AOCS-unit.

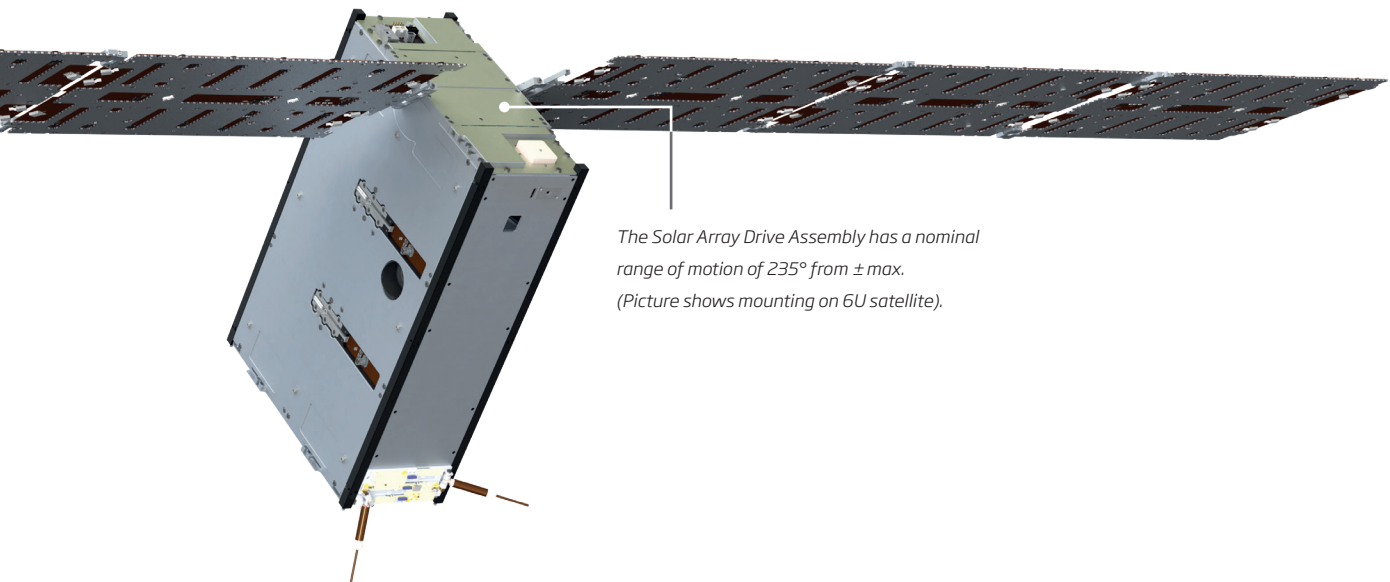
The drive and control parameters of the unit firmware is parameterized, and can be adjusted to various mission needs.

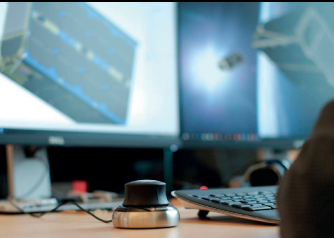
The Solar Array Drive Assembly is designed for optimal output torque and zero backlash and highly durable drivetrain. It may be integrated at either the +Z or -Z face of the GomSpace 6U or 12U structure.

Technical Information

SOLAR ARRAY DRIVE ASSEMBLY - KEY FEATURES:

| | |
|---------------------|--|
| Functionality | <ul style="list-style-type: none">• Motor with driver for solar array positioning• Angular range of motion of minimum 235 degree ($\pm 117.5^\circ$)• Built-in physical end-stop• Positioned by external device such as an AOCS unit• Internal angle encoder and end-stop switch for position verification and run-time calibration• Memory of position recall in case of power failure and adjustable drive settings• Highly parameterized firmware settings• Possibility for critical mode with fall-back position when external position command is missing• Built-in motor temperature sensor |
| Interfaces | <ul style="list-style-type: none">• CAN and I2C control interface. GOSH (UART) interface for test and debug• Sensor interface (GSSB compatible)• Temperature sensors for Motor and MCU• Current sensors on external interfaces• Power Interface 5V normal operation. Functional range 4.75-5.5 V• Connection through Gecko connectors |
| Compatibility | <ul style="list-style-type: none">• Integrable on GomSpace Structures, 6U and larger |
| Mass and dimensions | <ul style="list-style-type: none">• L x W x T: 98mm x 54.1mm x 10mm• Mass: 80g |





With 15 years of experience in the market and a track record of multiple successful missions accomplished, GomSpace have developed profound knowledge and competencies within Radio Technology, Nanosatellite Platforms, Project Management and Innovation.

GOMSPACE

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