

# SOLAR ARRAYS

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**Product Information**

# SOLAR ARRAYS

Solar arrays from SpaceTech provide smart designs for reliable and efficient power generation for small to multi kilowatt S/C size satellites.

SpaceTech has substantial experience in the design, development, and testing of solar arrays. Our expertise covers mechanisms and body-mounted solar arrays as well as deployable systems. This allows for flexible and highly cost optimised solutions well suited to our customers needs.

SpaceTech's unique photovoltaic design is the most efficient possible with the exceptionally high cell fill ratio (up to 85 %, depending on satellite specific panel design).

The deployment mechanisms are designed for reliability and low maintenance. At our facilities, we are able to simulate the stringent mechanical and thermal test environments required by ESA and the prime contractors.

With our own automated CFRP panel production, PVA placement and testing process of our solar arrays you benefit from significant cost reductions compared to the classical approach.

STI's heritage in designing and producing solar arrays for space programmes reaches back to the year 2005.

Since then, SpaceTech has been providing solar arrays to system integrators all over the world - for end customers including ESA and EU, US agencies and other national agencies as well as commercial satellite operators.

SpaceTech solar arrays are used for all kinds of space applications with a focus on Earth Observation, Science and Telecommunications missions. STI solar arrays are manufactured using latest technology robotic production and test facilities with a capacity exceeding 10 m<sup>2</sup> of solar array area per day.

As of today the SpaceTech track record shows:

SpaceTech solar arrays in orbit:

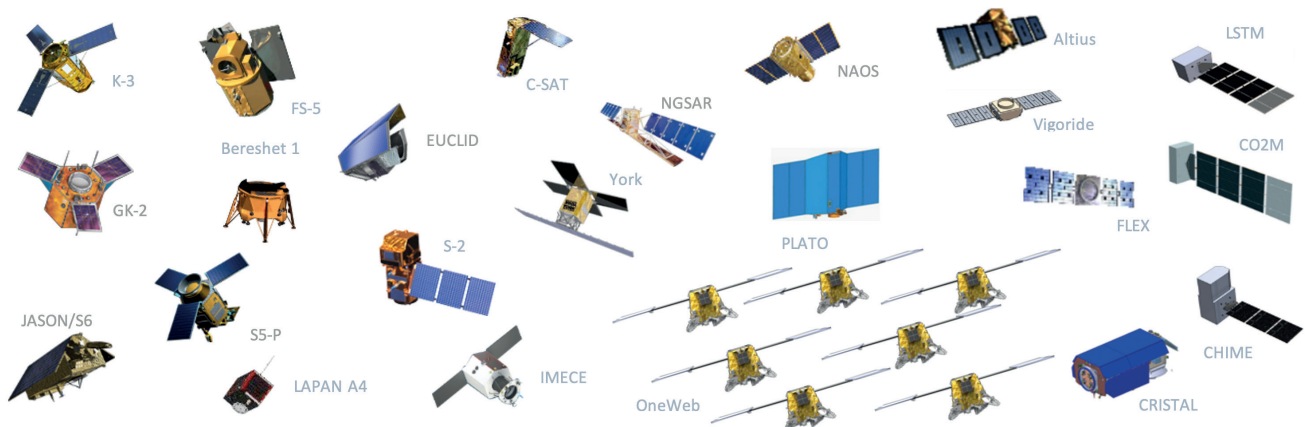
**56**

SpaceTech solar arrays delivered S/C in preparation for launch:

**116**

SpaceTech solar arrays in development/production:

**102**



SpaceTech solar array heritage



## Typical solar array figures

Basic design characteristics:

- Standard STI multi deployable solar array wing design to minimize qualification effort
- STI double-tape-spring based controlled, unsynchronized, qualified deployment design
- STI qualified hold-down and release mechanisms with non-explosive actuators
- Solar Array design with high performance GaAs 3-junction solar cells in combination with state-of-the-art CFRP substrate technology.
- Use of the highly automated STI/CST solar array production line, allowing cost-optimized production for one-off programs as well as series

### Mechanical

|                    |   |
|--------------------|---|
| Mass               | From 3 to 6 km/m <sup>2</sup> depending on the influence of the deployment mechanisms   |
| Stowed stiffness   | > 50 Hz out-of-plane,<br>> 120 Hz in-plane  |
| Deployed stiffness | Above 1 Hz for multi deployable wing panels<br>10 Hz out of plane for single deployable |

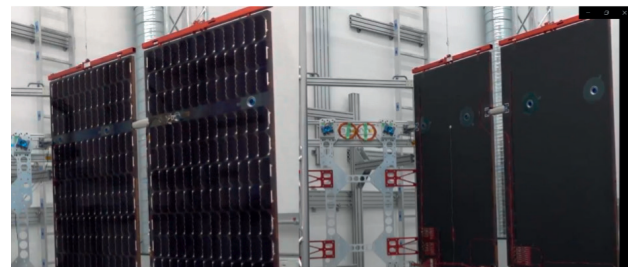
### Electrical

|                    |  |
|--------------------|--|
| Power EOL          | up to 5 kW                                   |
| Interface          | on demand                                    |
| Bleed resistor     | 10 / 20 k $\Omega$                           |
| Thermistor         | PT 1000                                      |
| Magnetic moment    | Easy to compensate with a clean layout       |
| Reliability        | > 0.9999                                     |
| Power-area density | 280 W/m <sup>2</sup> to 320 W/m <sup>2</sup> |

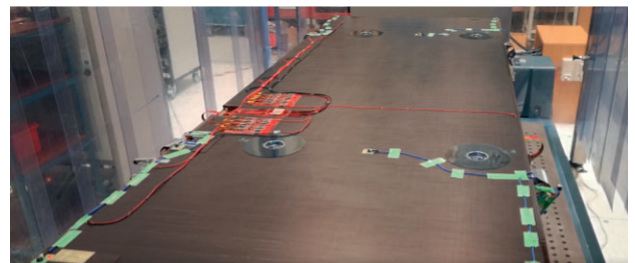
### Environmental

|                            |   |
|----------------------------|---|
| Operating temp. range      | mission specific  |
| Acoustic vibration         | 148 dB  |
| Vibration (Qual.)          | 20 g (3 axes)   |
| Lifetime + ATOX resistance | Different solution available for harsh ionizing radiation and atomic oxygen reach environment |
| Storage                    | unlimited in N <sub>2</sub>   |

Thanks to STI's profound spacecraft power system knowledge, collaborative engineering activities are offered to establish a solid basis for an optimized solar array design and S/C interface approach.



Deployment test on NAOS solar array



Acoustic test for PLATO

## Unique features of our solar arrays

- High design flexibility, mission specific adaptations
- High cell fill ratio of up to 85 %
- Automated, highly cost optimized production

Are you interested in our existing components or in need of a new development? Please contact us!



SpaceTech (STI) is a privately owned company and independent from large aerospace companies. Located in Immenstaad, Germany, on the shore of Lake Constance, we are ideally situated in the centre of a high tech area together with several other aerospace companies and have access to a strong network of experienced suppliers. Founded in 2004, STI has developed into an established and well recognized medium size enterprise in the space industry.

STI offers a wide spectrum of products and services for space missions, from challenging prototypes for institutional science and earth observation missions to low cost series production for mega constellations. Our main capability is the design, development and manufacturing of innovative, high quality space equipment. Our products in particular include:

- Small satellite system design, production, integration
- Solar arrays, satellite structures, deployment mechanisms, electronics, and cold gas propulsion systems
- Laser-optical instruments and components, ICARUS systems

Key to STI's success is our profound knowledge of satellite system and subsystem design which allows us to find smart solutions for each customer and mission from a holistic point of view. SpaceTech systems and equipment operate flawlessly on more than 300 satellites in orbit. We are known in the space industry for our straight forward and pragmatic approach, tailored processes and safe in-orbit function. The momentum as a young and dynamic space enterprise with innovative ideas is a perfect match for many of the new space challenges. This is why SpaceTech attracts highly qualified personnel, many with long standing and exceptional experience in the space business but also young and highly motivated engineers and scientists. And this is why we can deliver you the best solution for your needs.

When can we launch your space vision?



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