

**From the early days of European space exploration, Terma has been providing systems, hardware, software and services to the space sector.**

A staff of 160 is employed with space systems development and operations. They are based at Terma premises in Denmark, Germany and The Netherlands as well as numerous customer sites.

Exploiting this broad base Terma has developed specific capabilities as a supplier of:

- Complete turnkey systems
- Specialised products
- Specialist services

Terma has been active in the space industry since the beginning of the 1970's. Today, Terma has activities in all phases of a mission lifecycle - from the early feasibility studies for missions through their realisation and operation, and finally to the exploitation of the results of the mission.

Terma delivers systems and products from a broad product range, for example star trackers at the equipment level, power conditioning at the subsystem level, complete instruments and satellites at the system level.

Terma has an excellent track record of turning state-of-the-art technology into robust operational systems. Many of the projects involve mission critical systems; therefore, a sound engineering approach is essential.

The management and engineering approach is tailored to individual projects, in order to ensure that we are responsive to our customers' needs.

Terma has contributed to many European and International missions. Examples of the types of systems that Terma has provided are:

#### *Space Segment:*

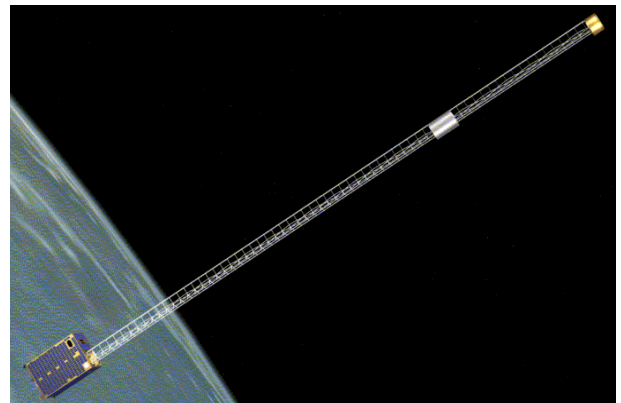
- Small Satellites and Instruments
- Star Trackers
- Power Electronics
- On-Board Software
- Electrical Ground Support Equipment

#### *Ground Segment:*

- Mission Control Systems
- Satellite Simulators
- Flight Dynamics
- Telemetry Decoders
- Data Processing and Data Management Systems

Terma has also provided specialist engineering services, including Spacecraft Flight Dynamics, Operations Engineering, AIT/AIV Engineering, specialist consultancy services and IT support.

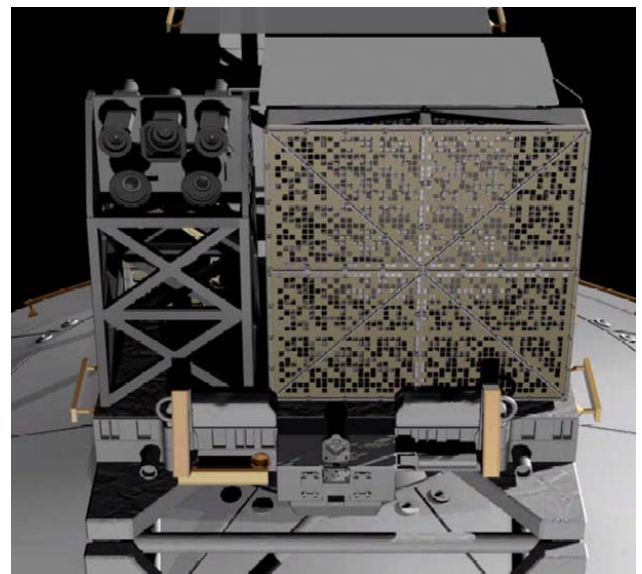
Terma clients are space agencies, spacecraft operators, prime contractors and subsystem suppliers.



*ØRSTED (Courtesy DTU Space)*



*Power Control and Distribution Unit (PCDU)*



*Atmosphere Space Interaction Monitor (ASIM)*



*ESA/ESOC Main Control Room (Courtesy ESA)*

## Specialised Products and Services

Based on experience, Terma has developed specialised platforms and products:

*Small Satellites and Instruments* – Terma has the system capability to develop and deliver small spacecraft and complex instruments for larger missions.

*Satellite Checkout* – includes products for integrated EGSE systems at all levels of Assembly, Integration and Test (AIT) - including instrument, platform, payload and satellite level. The majority of the current products are based on the ESA SCOS-2000 Command and Control kernel.

*Satellite Control and Operations Systems* – designed based on SCOS 2000 to provide the latest Spacecraft Control Infrastructure for the European Space Agency as well as commercial customers. The use of a building block approach makes this system easily configurable to a given mission.

*Simulators* – spacecraft simulators to support development of spacecraft as well as ground segment validation and operations training (using SIMULUS and Eurosim Kenels).

*Star Trackers* – focusing on fully autonomous attitude determination with high accuracy. Different versions support missions ranging from satellites with short mission life times to satellites having long life times and stringent requirements for radiation tolerance.

*Electrical Power Management* – state-of-the-art power designs covering power conditioning units with Maximum Power Point Tracking, power distribution units with solid state switches, and custom designed DC/DC converters.

*Other Electronic Units* – encompassing a line of Auxiliary Power Converters that are readily customised for particular applications accompanied by application specific enhancements for individual missions.

*On-Board Operations Support Software* – encompassing on-board software for cost efficient on-board data processing. The software architecture supports the ESA Packet Utilisation Standard including: Mission specific software, Standard application software, and Operating system plus basic services.

*Software Validation Facilities* – comprising facilities to examine software execution in its target processor environment. Include features to support debugging and analysis of software performance. Especially developed to support Independent Validation of embedded software.

*Independent Software Validation* – based on the experience the company has in mission critical software development and software validation facilities, we are also able to provide independent software validation and verification for spacecraft flight software.

*Specialist Services* – Terma provides specialist services to space agencies and prime contractors. These include Flight Dynamics Support, Operations Engineering, AIT/AIV Engineering and highly specialised engineering services.

## Space Locations



Terma A/S, Headquarters, Lystrup, Denmark



Terma A/S, Herlev, Denmark



Terma B.V.  
Leiden, The Netherlands



Terma GmbH  
Darmstadt, Germany



Terma North America Inc.  
Georgia & Virginia, USA