THALES: EXPERTISE IN SPACE AMPLIFICATION AND PROPULSION SOLUTIONS
Summary

01. A trusted partner for satellite manufacturers
02. All major applications covered
03. An extensive range of products
04. Closer to our customers
05. Transformation towards the future
A trusted partner for satellite manufacturers
A trusted partner for satellite manufacturers

The majority of all satellite broadcasting and broadband data transmission goes through Thales’ tubes that are used on geostationary satellites.

Our work helps to uncover what the universe is made of through decisive programs: Perseverance Rover, BioMass, New Horizons, BepiColombo, Rosetta, Juno and more.

Satellite manufacturers and operators have always relied on Thales’ power amplification equipment and solutions to connect people, observe Earth, explore Deep Space and provide high-precision positioning systems worldwide.
A trusted partner for satellite manufacturers

N°1 Worldwide provider of amplification for space applications

1.3 Billion cumulative hours in space

21,000 Tubes in orbit

50 Specific manufacturing skills

3 Production centres in France (Thonon, Vélizy) and Germany (Ulm)
As the world’s leading supplier of Travelling Wave Tubes (TWTs), Thales has more than 60 years experience in supplying innovative solutions to this industry.

Unrivalled expertise in TWTs for satellite communications.

Our TWTs set global standards for reliability & performance in space-borne applications.

We constantly optimise the performance in terms of efficiency, operating lifetime and mass reduction.
As the N°1 satellite amplification partner in the world, we broaden our range of solutions to fit flexible satellite needs. Capitalising on our expertise in TWT, we move space amplification into SSPA technology to be used on software defined satellites.

Products designed for civil & military applications:
Communications, Broadband, Broadcast, Earth observation, Navigation systems, Deep Space missions.

The most complete range on the market from L to Q band (L, S, C, X, Ku, Ka, K & Q) with power up to 500W.
Thales is now introducing the latest innovation in electric propulsion for satellites: the HEMPT thruster family. HEMPT technology helps to improve satellite missions by offering a flexible thruster which working with Krypton as well as Xenon.

An innovation ion thruster product harnessing proven TWT technology and processes.

Compatible with several noble gases increasing flexibility for satellite providers.
Space innovations over the years

1950: Opening of Ulm site
1970: Opening of Velizy site
1990: Space TWT
1990: 100W radiation cooled TWT
2000: AEG TWTs
2010: High power Ku-band TWT
2010: High power Ka-band TWT
2021: Dual-TWT
2023: SSPA

Key developments:
- Space TWT
- High power Ku-band TWT
- High power Ka-band TWT
- Dual-TWT
- SSPA
02. Overview of major applications
Thales produces a range of tubes for various space applications:

DATA-TRANSMISSION & HDTV
Providing reliable solutions for data transmission and HDTV broadcasting

BROADBAND
Offering solutions for high throughput broadband satellites worldwide bridging the connectivity gap

MOBILE COMMUNICATIONS
Providing satellite radio and mobile communications services around the globe

DEEP SPACE
Allowing the transmission of data collected during the space exploration on Mars and other planets

EARTH OBSERVATION
Measuring key environmental parameters on Earth and ensuring the prevention of natural disasters

POSITIONING & NAVIGATION
Contributing to the operation of the several globally positioned systems
Our extensive range of products
Our product families

At Thales we have forged an unrivalled level of expertise in space amplification and are now replicated our expertise in our electric propulsion range.

Our 60 years of development has culminated in four main product groups:
Travelling Wave Tubes

Thales’ complete line of TWTs covers all bands from L-band to Q-band and power outputs of up to 500 watts in the S-Band.

Thanks to 1.3 billion hours of in-orbit service, Thales is the global #1 supplier of TWTs for satellites.
Dual-TWT

Our Dual-TWT fits the needs of the SDS satellite market. Thanks to the low weight and compact sizing, it is suited to use on active antennas.

It provides an alternative solution, bridging the gap between traditional TWTA and emerging SSPA solutions.

Dual-TWT key features:
- Easy integration
- Large Bandwidth
- Compact Sizing
- Ku & Ka band
- Cost-effectiveness
- Lightweight
SSPA

Our cutting edge SSPA product offers a space amplification technology evolution for flexible satellites to fit worldwide needs in terms of connectivity and communications.

Cutting-edge SSPA performances:

• Focus on Ku and Ka bands
• Reduced size & weight
• Flexible Spacecraft payload
• Adapted to active antennas
HEMPT family of thrusters

The HEMPT new electric satellite propulsion technology was derived from the TWT technology mastered by Thales over the past 60 years.

**EVO, the best 700W thruster compatible with both Krypton & Xenon.**

Thales has developed a small and flexible 700W thruster, EVO, adapted for high volume manufacturing. This thruster enables new capabilities for small satellite constellations.

In order to address the overall market needs, Thales is currently developing a medium class (2.5kW) highly flexible thruster for every orbit: EV1

- Ion confinement by permanent magnets
- Separated ionisation and acceleration zones
- No discharge channel erosion
- High ISP, long lifetime and high flexibility with a broad range of powers (200 – 700 W) and voltages (300 – 800 V)
- Performance stability over life
- Reduce the fuel costs by a factor 10 thanks to use of Krypton compared to Xenon
04. Thales Worldwide
Thales in Vélizy (France)

- Design and production of Traveling Wave Tubes (TWT), TWTA and SSPA
- 29,000 m² of industrial surface, including 2,600 m² of clean rooms
- ISO 9001, EN 9100, AQAP 2110, ISO 14 001, ISO 45001
- 780 employees active on January 1, 2021
- 74 patents

WORLD LEADER FOR SPACE TUBES
EUROPEAN #1 FOR TELECOM AND DEFENCE TUBES
Thales in Thonon (France)

Production of grid tubes, TWTs and various sub-assemblies for space applications

25,000 m² of industrial surface, including 240 m² of clean rooms

ISO 9001, ISO 14001, ISO 45001

270 employees active on January 1, 2021

31 patents

WORLD #1 FOR INDUSTRIAL AND BROADCAST TUBES
Thales in Ulm (Germany)

Production and design of Traveling Wave Tubes (TWT), TWTA and ion thrusters

16,000 m² of industrial surface, including 1,200 m² of clean rooms

ISO 9001, EN 9100, ISO 14 001, ISO 45001

400 employees active on January 1, 2021

65 patents
05. Transformation towards the future
Transformation towards the future

Where are we heading?

Thales uses its experience to build a future we can all trust. As part of this future we are innovating in order to meet the changing trends within our industry. To constantly transform, Thales is restructuring our international operations to best suit the requirements of our clients, employees and the market as a whole.

One of the key trends is the cost-effectiveness and compactness of the products. Our products are more compact and affordable to match the changing demands of the market.

The amplification and propulsion technology must keep up with the developments in satellite communications. We are making our products more efficient, flexible and easily-adaptable.