

Tesat Spacecom

Dr. Michael Martin

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About Tesat Spacecom

Location	Backnang, Germany
Core Business	Spacecom Satellite Payload Equipment & Subsystems
Employees	1200
Turnover 2013	338 Mio Euro
Equip. Capacity	up to 1500 / year
Programs	up to 75 / year



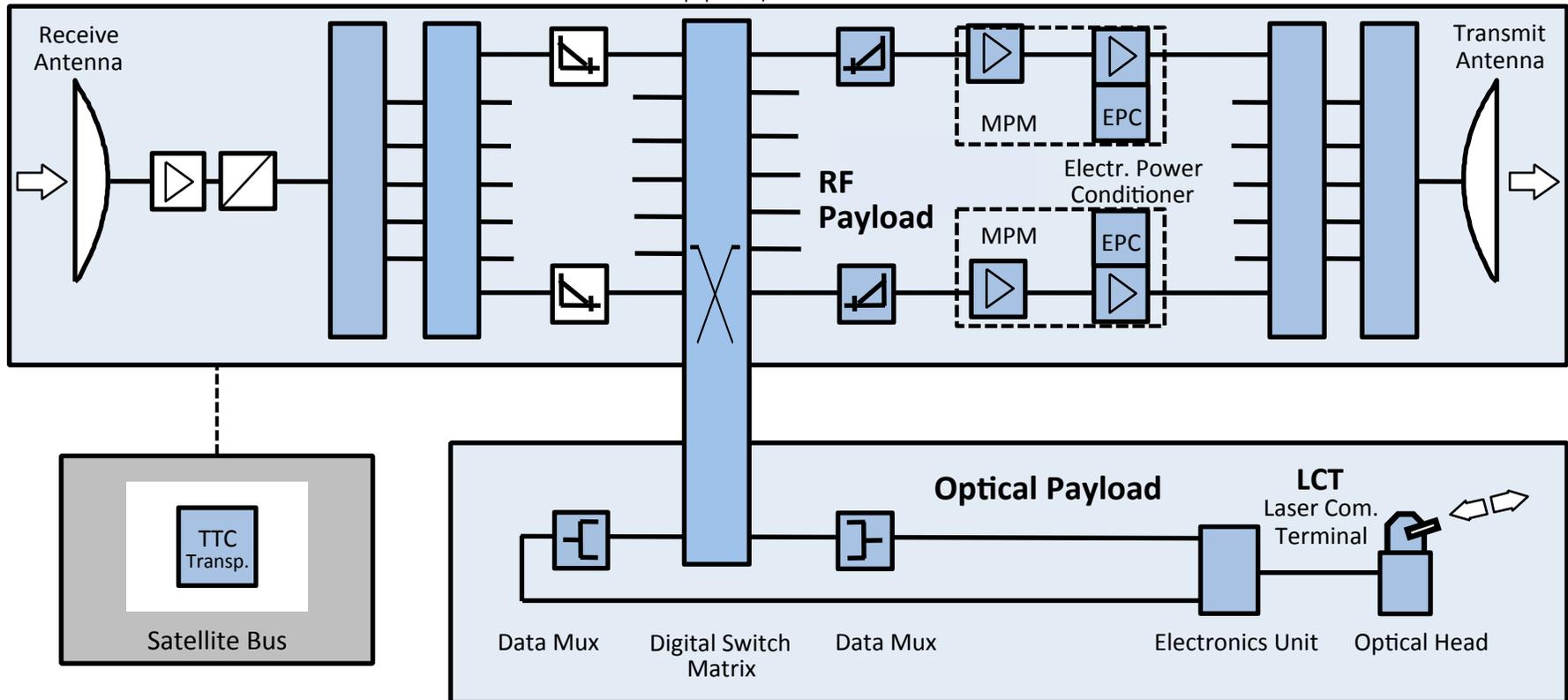
- Hidden Champion with world market share up to 50%
- More than half of all telecommunication satellites in orbit have Tesat equipment onboard
- 100% independent acting subsidiary of Airbus Group (ex-EADS)
- Customers: Satellite manufactures world wide

- 15% Physicists in the company:
Project management, development, mechanical & thermal analysis,
parts agent business as well as head of groups and departments

Block diagram of a satellite payload

ANT RX RCV/CONV IMUX SWA DEMOD DSM MOD L/CAMP TWTA/SSPA SWA OMUX ANT TX

Receiver/ Converter Input- Multiplexer Switch Assembly Demo- dulator Digital Switch Matrix (Switching Equipment) Modu- lator Channel Amplifier Power Amplifier (Travelling Wave Tube / Solid State Amplifier) Switch Assembly Output Multiplexer



Tesat Equipment Products

Tesat Payload Products

Customers



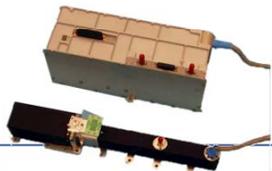
Tesat Amplifier Products

- Tesat is global market leader with approx. 50 percent market share
- Outstanding production capacity (e.g. with robotIC assembly) with highest quality
- High testing automation und comprehensive testing facilities (e.g. 33 vacuum chambers)
- Lifetime in orbit of over 18 years
- ESA qualified PCB manufacturer/ESA qualified hybrid manufacturer

Product Scope
✓ EPC/TWTA
✓ Channel Amplifier
✓ MPM
✓ SSPA
✓ RADAR TWTA _s

New developments:

- Flex MPM (transmission power set in space via telecommand)
- FDOC (Flex MPM with optical telemetries and telecommand interface)



MPM (EPC + LCAMP)



DUAL TWTA



EPC



L-Band SSPA

Tesat Passive Microwave Products

- High production capacity
- Delivery of high performance products in time with outstanding quality
- Development of innovative filter concepts to support the customer in providing best satellite performance
- Comprehensive testing facilities (e.g. 4 big & 10 small TV chambers)

New Developments:

- Portfolio completion till C-Band
- Dielectric IMUX technology in Ka-Band
- Aluminium technology for high performance OMUXes and filters to replace the commonly used invar technology in Ku- and Ka-Bands

Product Scope
✓ Invar OMUX (X/Ku/Ka)
✓ Invar IMUX (Ka)
✓ Alu OMUX (Ku/Ka)
✓ Dielectric IMUX (X/Ku/Ka)
✓ OMUX Assemblies (X/Ku/Ka)
✓ RF Waveguide (WG) Switches
✓ RF Loads
✓ RF Diplexers
✓ RF Circulators
✓ WG Assemblies (X/Ku/Ka)



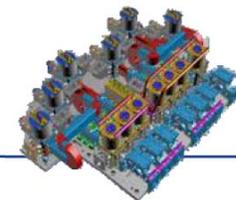
Switches



OMUX



IMUX



Output Switch Matrix Assemblies

Tesat Laser Products

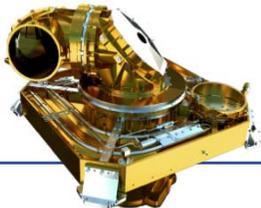
- Worldwide unique laser communication terminals: Tesat is technology leader (LEO-LEO/LEO-GEO)
 - first verification of a LEO-LEO datalink with lasers of more than 5500 km
- Transfer rate is 5.6 Gbit/s

New Developments:

- Commercial breakthrough of laser communication with European Data Relay System (EDRS) Frame

Product Scope

- ✓ Laser Communication Terminals for LEO-GEO
- ✓ Ultra stable, tunable Seeder
- ✓ Laser sources for coherent and incoherent Doppler LIDAR missions
- ✓ Frequency stable laser sources for on-board metrology and external frequency stabilization
- ✓ Single frequency, Q-switched lasers
- ✓ High power, CW, single frequency & frequency modulated laser systems



Design Model of a Laser Terminal



Intersatellite Links



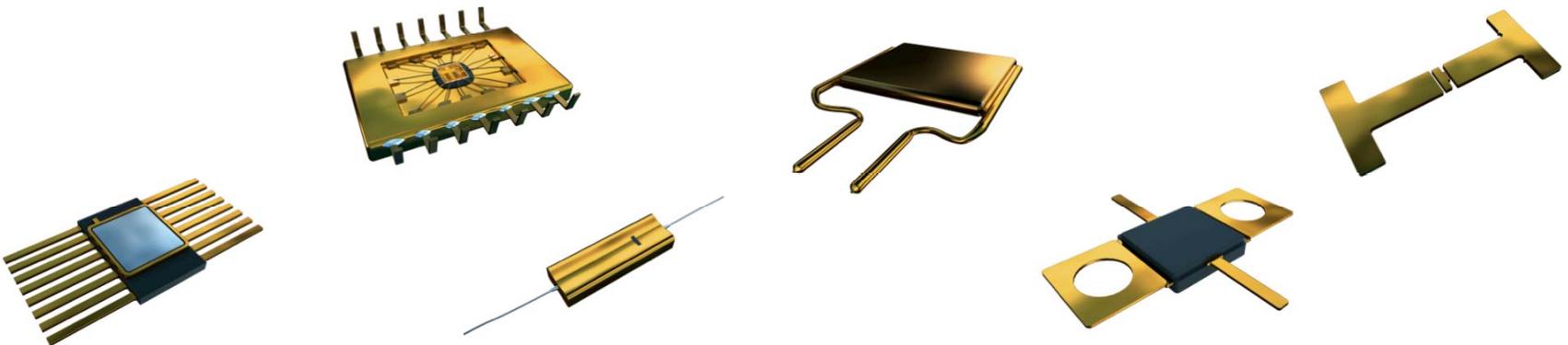
ALADIN / ATLID Reference Laser



GIFTS Reference Laser

Tesat Parts Agency

- Offering of procurement and engineering services for EEE parts in space applications
- Largest procurement agent in Europe
- Service operating since 1972, many CPPA programmes awarded and procurement of more than 500,000 parts each year
- Strong team of parts engineers being well acquainted with the technical problems that arise from procurement up to equipment manufacture
- Supply parts to more than 65 different customers in more than 20 countries in Europe or the rest of the world
- Available facilities for inspection, DPA, failure analysis, long term storage and all other infrastructure for major EEE parts procurement



Personal History – Previous Task

- Profession: Diplom Physiker
- 2003-2004: Diploma thesis at Institute for Astronomy & Astrophysics Tübingen (IAAT) „Eigenschaften von Detektoren für den schnellen Auslesekanal auf XEUS“
- 2004-2009 PHD-Thesis at IAAT „Development of high throughput X-Ray instrumentation for fast timing studies“
- 2010 -2011 Project manager for Waveguide Switches at Tesat-Spacecom
- 2011- 2013 **Lean Coach / Internal Consultant** at Tesat-Spacecom
- 2014- today Head of Waveguide Switches and Components Group



Lean Coach main tasks

- Transform Tesat, together with the executives and managers, into a lean business
- Prepare, conduct and follow up improvement workshops
- Develop and conduct qualification trainings for employees and managers
- Communicate results and methods to internal & external
- ...

What's the appeal of the job:

- Learn something new every day – no grind
- Work on all company levels (employee – executive)
- Work on a broad range of different topics & tasks
- Very broad knowledge about the company
- Actively drive the change

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- 2014- today **Head of Waveguide Switches** and Components Group



What's the appeal of the job:

- Switches & Components are “mass products” (~1000pcs/y) → industrialization necessary for cost efficient production
- New group concept – combine all different jobs need for project execution in one group (Electrical & Mechanical Engineering, Project Mgmt, Configuration Mgmt)
- Make transfer from project to product philosophy

A personal view on things

- What expert knowledge could I transfer from my PhD towards my jobs in industry:
 - None!

- But the how I work could be transferred:
 - It's all about methods and approaches
 - Structured approach
 - Familiarization & understanding of (complex) topics
 - Quick overview & assessment of information
 - Understand processes & work flows

- What did I have to learn:
 - Get to the point (best in short sentences 😊)
 - Result orientation
 - What's good in theory does not always work in practice

- Also important:
 - Communication skills
 - Resistance towards frustration
 - Be open to new ideas
 - But most of all:
HAVE FUN!



Thank you for your attention – questions?

For further information please contact:

Dr. Michael Martin



Tesat-Spacecom GmbH Co. KG

Gerberstraße 49

71522 Backnang

Tel.: (07191) 930-2571

Michael.martin@tesat.de

www.tesat.de