



**PARTS AGENCY**

**FOR CLASSIC & NEW SPACE MARKET**



## REVIEW 2018/19

### 45 YEARS OF EEE PARTS AGENCY SERVICES



• 42 ONGOING PROJECTS

• 729 PURCHASE ORDERS

• 3686 MANUFACTURER  
SHIPMENTS RECEIVED

### SPACE PROJECTS HIGHLIGHTS



Over the course of five decades, Tesat has developed in-depth expertise in manufacturing of payload equipment for communication satellites and has established itself as a clear European market leader. On its 60,000m<sup>2</sup> premises in Backnang, Germany, about 1,000 employees develop, assemble, integrate, and test systems and equipment for telecommunication via satellite. To date, more than 700 space projects have been completed.

Our product offerings encompass highly reliable equipment as for example the travelling wave tube amplifiers, multiplexers, waveguide switches, and modulators, which along with complete systems are delivered globally to all leading satellite manufacturers. Therefore, we offer the complete communication technology necessary, to for example emit television signals over the antenna of a satellite to each household. More than half of all communication satellites in orbit have Tesat equipment on board.

We are convinced that in future global communication will only be viable with the incorporation of space. Therefore, as the first organization in the world, we are developing and delivering equipment for optical broadband communication in space. Using laser, these terminals can transmit data and images between satellites and from satellites to earth. Advantages of laser communication are, for example, the high transfer rate of 5.5Gbps (equivalent to 200,000 pages of information per second) and its stability.

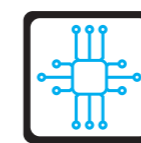
Given our competitive position in the commercial satellite market and the quality standards required of us there, our products are now used more frequently in the various satellite-based systems of the security and defense sectors in Germany, Europe, and the United States.

In addition to our technical expertise, we cultivate our standing in Backnang through social engagement and by supporting public projects.

### SELECTION OF OUR PARTS AGENCY SERVICES



Failure  
Analyses



PCBs



TESAT  
Campus



Construction  
Analyses



Project  
Management



## WHY A PARTS AGENCY?

### THE MISSION

Spacecraft have to withstand a harsh environment such as vibration and mechanical shock during launch, exposure to radiation in orbit, a much wider temperature range than in terrestrial applications, the environment on other planets and more.

Despite these extreme environmental conditions the equipment has to function without failure for many years (e.g. 15 years or more for telecommunication satellites), so maximum attention must be given to reliability.

For electronic equipment the key factor to meet these requirements are the EEE parts used. Thus the selection and testing of EEE parts must be optimized to fit to the mission demands to be successful.

There are various drivers in the process of sourcing EEE parts for space use:

- Identifying the correct EEE parts: needed quality level, manufacturer, type and the necessary testing and quality assurance measures.

- Logistic complexity: many different part types have to be procured from numerous parts manufacturers at the same time. Additional testing and quality assurance measures have to be organized for a large selection of items in parallel and on time, often involving third parties such as specialized test houses.
- Schedule: The delivery times of EEE parts have a major influence on the equipment schedule. Knowledge of critical schedule drivers and processes to avoid or minimize their risk is mandatory.
- Supplier market: For HiRel EEE parts there are many monopolistic suppliers or suppliers who require close control of quality and schedule.
- Counterfeit Parts: A threat that af-

fects more and more the space industry and requires a sophisticated approach and continuous improvement in methods to stay ahead.

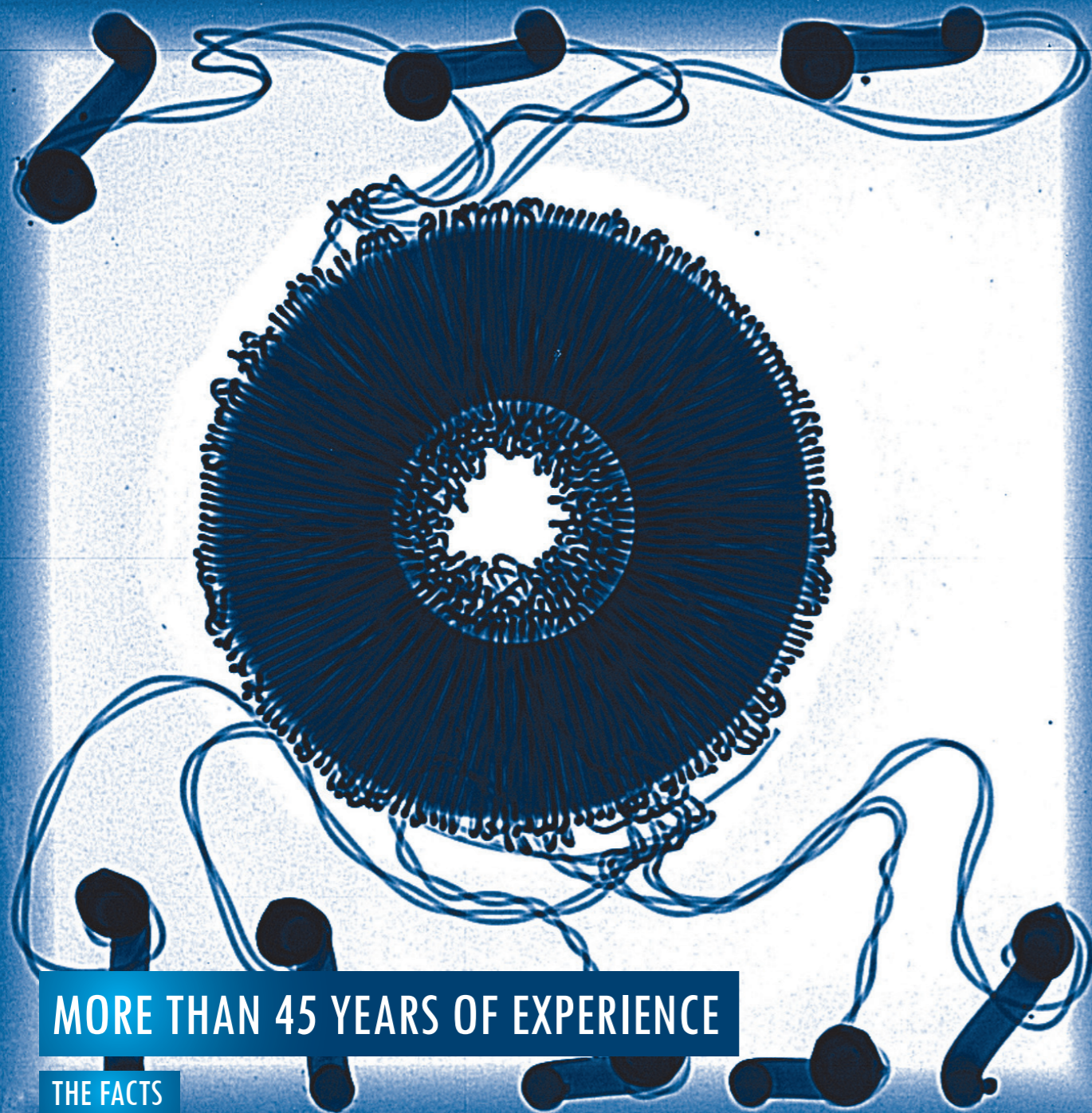
- End customer demand on specific documentation or need for justification for the use of specific parts requiring statements and support by experts.
- Compliance to export control regulations.

All these facets are handled most efficiently by a dedicated organisation, a Parts Agency.

The Parts Agency at TESAT has all the know-how, expertise, manpower and tools to successfully fulfill any EEE parts demand for space use.

As engaged Parts Agency we share our knowledge in the Community. Themes range from New Space to Classic Space, from Basic EEE knowledge to Radiation Experts training. Feel free to contact us via [partsagency@tesat.de](mailto:partsagency@tesat.de).

New Space projects require break through processes and turnaround solutions. Ask us for the SPOCK workpackage to handle constellation projects or defined low budget solutions made for smallsat projects.



**MORE THAN 45 YEARS OF EXPERIENCE**

**THE FACTS**

TESAT as a major producer of space equipment is one of the largest users of high reliability EEE parts in Europe. Today at TESAT's Parts Agency over 85 experts are deeply involved in all aspects of supply and use of EEE parts in space.

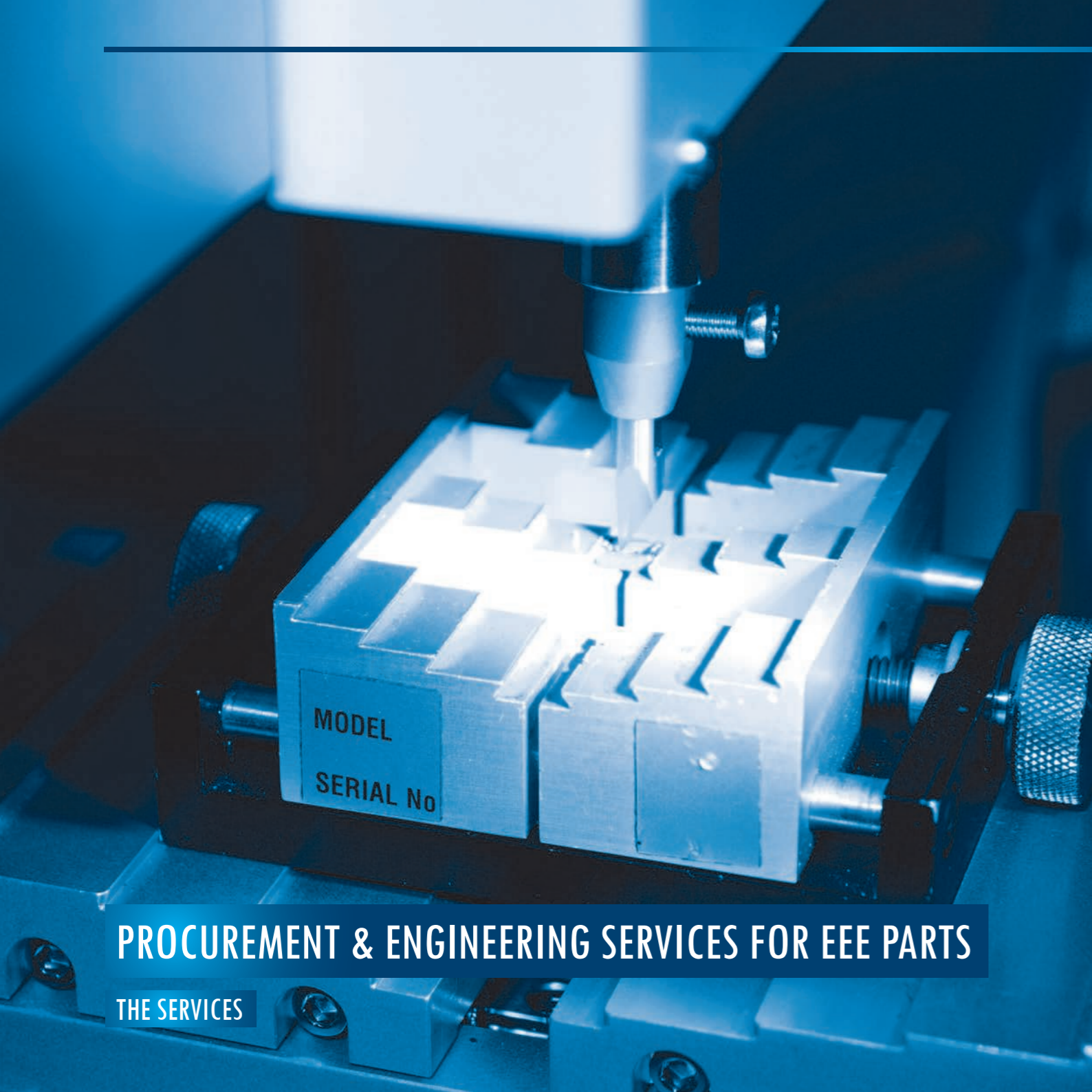
We assist the external customers and the equipment business lines at TESAT regarding the EEE parts selection process, conduct all purchasing as well as quality assurance activities. Finally we also solve any parts related problem that may arise on parts level as well as during equipment production, test and flight operation.

Started in 1972, up to now many thousands of different part types have been procured and thus have established TESAT as Europe's largest and most experienced procurer of EEE parts for space.

More than 70 customers worldwide have entrusted TESAT to procure their

EEE parts. Besides these we have also been acting as Centralised or Coordinated Parts Procurement Agency (CPPA) for numerous major European programmes.

- Long-term experience in procurement of EEE parts
- Procurement ability and know-how of any type of EEE parts and any quality level used in space
- Excellent knowledge of part types, their performance and technologies
- Outstanding know-how and relationship within the Hi-Rel component market
- Comprehensive quality assurance systems and processes
- Independence from manufacturers allow unbiased judgement of quality, cost and schedule
- In depth knowledge of equipment design, assembly, production and testing
- Excellent facilities for handling, quality assurance, storage & data management
- Infrastructure and manpower set to constantly handle high volumes
- Well equipped laboratory run by experienced staff
- Access to additional test facilities within TESAT and close cooperation with specialised test houses
- Reliable supply chain



## PROCUREMENT & ENGINEERING SERVICES FOR EEE PARTS

THE SERVICES

### TECHNICAL & ENGINEERING SERVICES

Parts to be used for space applications are carefully selected according to their materials, their radiation sensitivity, and the component technologies. Here extensive know-how gained in support of TESAT's equipment business is an asset.

Our in-depth knowledge of the supplier market as well as long experience with most major end customers enables us to recommend EEE parts to you – most appropriate for your specific project requirements.

Well known part types which are listed in Preferred Parts Lists (PPLs) are used extensively. If new part types are required, evaluation programs are performed to investigate the sustainability of those parts for space applications. Whenever necessary, specifications (resp. source control

drawings) are issued by TESAT with a format similar to the ESCC or MIL system.

Our technical experts will issue all documents needed for additional testing (e.g. RVT, Up-Screening) and will perform or control the testing to the full satisfaction of the customer.

Key components that are not available as qualified parts or only from single sources are a major problem for the space industry. We are continuously cooperating with the manufacturers

to promote qualification of new part types and support their market introduction.

- Parts selection
- Review of qualification status
- Develop alternative sources
- Evaluation
- Specifications
- Parts Approval Documents
- RVT plans & testing
- Manufacturing know-how
- TESAT equipment lines synergies
- Obsolescence management

### EEE LAB SERVICES

TESAT has 30 years of experience in making the hidden visible.

With a highly trained team of testing engineers and experts we are able to offer a wide variety of EEE labs services. From the smallest passive part to the most complex integrated components – we achieve a high level of service and outstanding testing reliability.

Our high degree of engineering expertise enables us to serve both the most widely applied testing standards as well as customers' individual requirements.

- Destructive Physical Analysis (DPA)
- Qualification
- Construction Analysis
- Up-Screening

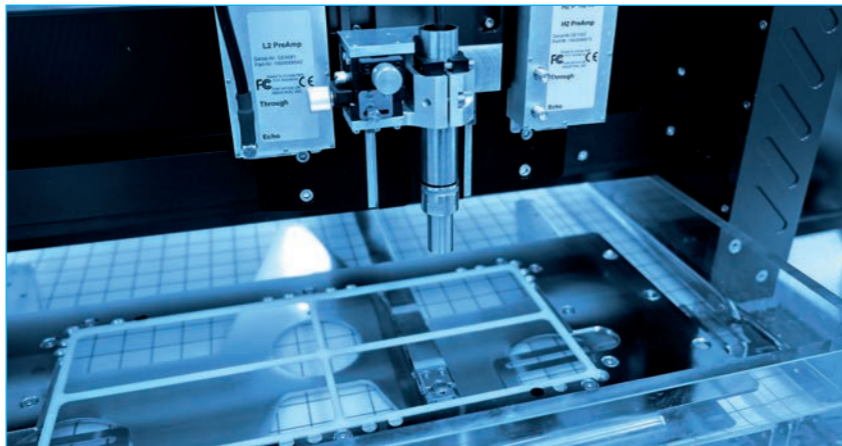
## QUALITY ASSURANCE

The requirements for a quality management system are particularly high in the space industry. The failure of components or deficient components can have far-reaching and even devastating consequences. Therefore, an effective quality management system is essential for a Parts Agency. The main objective of the quality management system is to minimize risks and provide a reliable framework for organizing the procurement of the components.

The quality and reliability of EEE parts for space is assured by extensive evaluation and qualification of parts before they are used for space applications. For flight parts, the manufacturing processes and the measurement and inspection procedures are tightly controlled. In addition, detailed inspection and analysis of batches of parts is carried out at the manufacturer's sites as well as independently at TESAT. Also the documentation supplied by the manufacturer is thoroughly reviewed. Approved parts are shipped to the users with Certificates of Conformance (CoCs). Parts problems are dealt with using the non-conformance procedures according to ESCC requirements.

A constantly increasing risk is counterfeit parts. Avoiding such parts and detecting them as early as possible in the supply chain requires more and more meticulous approaches. As a techni-

cally highly competent and independent expert this issue is addressed by us with maximum attention and a clear strategy of quality assurance measures such as dedicated test, data reviews, plausibility checks etc. Our state-of-the-art parts laboratory that is fully equipped with the necessary tools greatly facilitates the technical analysis and post-procurement inspections required for quality assurance.



- Manufacturers surveillance
- Source Inspection
- Incoming inspection at TESAT
- Documentation Review
- Counterfeit Prevention
- Alerts Management
- Failure Analysis
- PCN Management

## PROJECT MANAGEMENT

An experienced project manager is assigned to each customer. The project managers are dedicated to provide all necessary support from purchase order placement to post-delivery support. Giving the customer one qualified point of contact for all his questions, the project managers are focused on providing complete and satisfying solutions for the customers.

Reporting Tools allow the customer to monitor the whole procurement process through a realtime Internet Reporting System. This tracking system shows the detailed delivery status of the components, technical information about the components, PAD and release status and additional testing activities.

TESAT has also extensive stocks of Hi-Rel components that can be of great use in procurement projects. TESAT EEE stock parts can be accessed through the TESAT website or directly via: [stockparts@tesat.de](mailto:stockparts@tesat.de)

- Nominated point of contact
- Interface to customer for all issues
- Solution oriented
- Coordination and follow-up of activities
- Status Reporting
- Internet Reporting Tools
- Support with higher level customers

## PURCHASING

The purchasing of the parts must be carried out in a manner that ensures the lowest cost and shortest delivery time within the necessary timeframe. The basis for ordering parts are the requirements determined in the Parts Approval Document (PAD), the quantities needed and the need date of the customer.

On that basis, TESAT negotiates with the supplier, orders the parts, and monitors the manufacturing. High order volumes, frame contracts and a long-term relationship with all major manufacturers ensure the reliable and prompt availability of the parts needed under excellent commercial conditions. We take care of all activities necessary to meet export control regulations affecting the parts. Issuing correct and complete documents in time is crucial for a timely release of the parts.

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- Qualification
- Construction Analysis
- Up-Screening

# PRINTED CIRCUIT BOARDS (PCB) & HYBRIDS

## THE PRODUCTION

### PCB PRODUCTION

TESAT has an ESA qualified line for PCB production. The product range of PCBs includes rigid, rigid-flexible and flexible 2-sided boards, multi-layer boards and composite multi-dielectric boards as well as special designs with metal core inlays for thermal management and control of thermal expansion. Various surface finishes and combinations can be produced, e.g. tin/lead reflow, copper/tin diffusion layer, electroless nickel/immersion palladium/immersion gold.

We are offering customers our ESA ECSS-Q-ST-70-10C certified products of 2-sided up to sequential multi-layer boards in rigid HTg FR4 with tin/lead reflow finish, copper/tin diffusion layer finish or electroless nickel/palladium/gold finish. We are also Airbus Defense & Space qualified for sequential rigid polyimide PCBs as Polyimide products are widely spread in the space and military market. We support our customers during development programs or check their designs against our technical feasibility within a short turnaround time.

### PCB POPULATION SERVICE

This service is offered to customers based on the capabilities of the processes for which TESAT's assembly line is qualified. Mounting of parts will be either by automated pick and place machines followed by vapour phase soldering or parts will be assembled manually. The Surface Mount Technology (SMT) assembly line at TESAT is also ESA qualified and all operators are certified also for manual soldering. Dedicated and worldleading inspection procedures and automated methods developed for TESAT's high volume production are employed to assure the highest quality of the final product.

The customer may either provide PCBs or the EEE parts or both to TESAT or order one or both via us. Offering EEE parts engineering and procurement as well as PCB production and PCB population as one package will minimize your effort and risk.

Our portfolio also covers any combination of the above mentioned services, including the procurement of the EEE parts.

### HYBRID PRODUCTION

TESAT has an ESA qualified line for microwave and optical hybrids. The product portfolio goes from thin film microwave hybrids in a metal frame housing over HTCC up to LTCC and covers hermetic and non-hermetic technologies (e.g. COB/COC modules for high voltage/digital application). Our line is qualified via PCA according to ESCC2566000 and beside manufacturing services TESAT also offers a test service and engineering support in order to choose the right technologies and their implementation for your space product. TESAT offers the appropriate automation and the production capacity to meet cost and throughput requirements even for upcoming satellite mega constellations. Different screening scenarios are available for the hybrids/devices from commercial grade up to MIL/ESA specification with a complete qualification program for new hybrids.

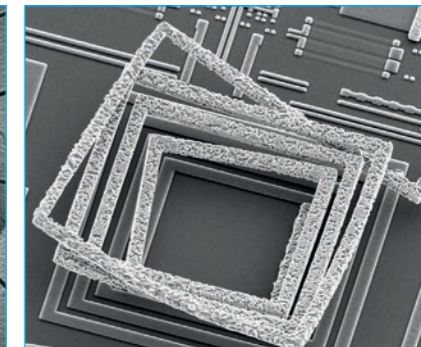
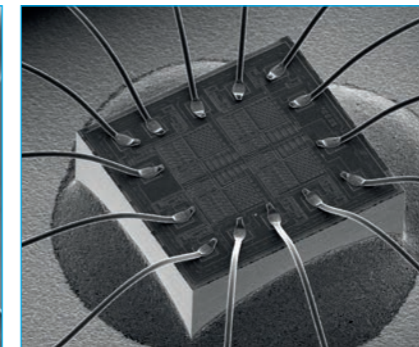
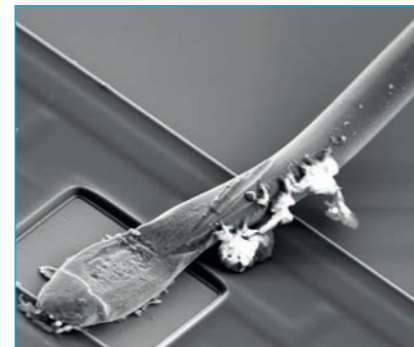


# SOLUTIONS TO MEET ALL YOUR EEE COMPONENTS NEEDS

## THE FOCUS

### THE FOCUS

We pioneer with passion and strive to be the number one partner for your success. We provide solutions to meet all your EEE component and PCB needs. We are in direct personal contact with our customers and suppliers and will work trustfully and performance-oriented with them together. We are looking forward to work together with you!



### AWARDS



The TESAT Parts Agency procures and provides all services for more than two million EEE parts per year. We serve our worldwide customers of the space industry with the same high level of quality as we do for our internal production.

With pride we receive honors as e.g. the "Supplier of the Year" award in the category "Value-Add Supplier" by Rockwell Collins recently. The US aerospace company awards this prize annually from hundreds of suppliers to only ten chosen companies.







EN 9100:2018  
BUREAU VERITAS  
Certification



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