

Electronic Design, Production & Analysis

Space quality affordable to everyone



Together
ahead. **RUAG**

Welcome to RUAG Space

With our origin as a space equipment supplier we offer technical service to everyone, based on the knowledge and experience gained from our space heritage.

We offer a full range of design, production & test services!

Our activities span from design, purchasing and control of incoming materials through PCB and unit assembly to electrical and environmental testing.

We offer "High End Lean Production, where "High End" stands for our competence and capacity to deliver products also with extreme demands on reliability, quality and traceability, with "Lean Production" as our basic philosophy characterized by e.g. elimination of waste and constant improvements in order to achieve high efficiency and competitiveness.

RUAG Space are:

- Highly qualified staff in all areas
- Modern facilities
- Efficient logistics
- Excellent quality system
- Technical support to customers
- Track record of on time, on quality, on performance, on cost

We design for performance and reliability

Space applications are characterized by requirements on first-class performance combined with the highest reliability. This influences the way we perform our design work, taking parts stress, long term drifts, environmental impact, end of life performance etc. into account from the beginning. We are experts in safety critical embedded systems. We can share our skills and capabilities with other companies outside the space business by offering:

- Design support and capability, e.g. for digital and microwave electronics, systems and antennas.
- Design of ASICs, embedded software, FPGA based systems, advanced test systems etc.
- Performance and system analysis, including long term and environmental effects.
- Reliability analysis
- Test capability

Supply

We have a strong competence in component engineering and procurement. We offer services in specification, procurement and analysis of components and materials. We cooperate directly with most of the component manufacturers to establish good control and reduce supply costs.

The procurement organization is coordinating supplier activities such as capability assessments, on-site reviews and direct communication with the supplier top management. The component technology and procurement is well integrated in the design and production flow, with excellent product and manufacturer knowledge.



Production of electronics in high and low volumes

During almost 2 decades RUAG Space has provided technical services, such as electronics production, to other market segments than space. Our services benefit from the complete palette of competences, knowledge and experiences gained from our space heritage.

- Total cost focus: High quality, competence and skills give competitive total cost.
- Flexible volume: Experience from volume ranges from single to 17,000 boards yearly per project.
- High competence and wide process-range at one site: From printed circuit board or Multi Chip Module assemblies up to functional and environmental tests and advanced material and failure analysis, radiation tests etc.
- Excellent quality system: Correct quality in every process is part of our way of doing business, supported by our management system.
- Efficient logistics: An MPC-tool keeps track of our work-orders, materials, components etc, providing traceability according to the highest demands. Value stream analysis is used to reduce waste in transports, buffers, storage etc.
- Efficient planning: All projects are prioritized and planned to single day level, based on the Critical Chain philosophy using visual planning and pull-flow.



PCB mounting and final assembly

In our high quality production facility we use automated processes combined with manual workmanship as needed. Our personnel is multi-skilled with high competence and long experience. We conduct extensive programs for training and certification of all our employees.

We continuously adopt new technologies to further automate our production resources and minimize the number of steps in our processes.

We are well equipped for efficient PCB production:

- Stencil printing and solder paste dispensing
- Two fully automated pick 'n place equipments
- Automatic forced convection oven (8 heat-zones)
- Semi-automatic rework station
- Automatic wave and selective wave soldering
- Two automatic cleaning equipments
- Automatic Optical Inspection
- In-Circuit-Test, Boundary Scan
- 3 000 m² class ISO-8 (100.000) clean room

Hybrid production

RUAG Space has long experience and skilled personnel for complex mounting / bonding on different hybrid substrates like thick film, thin film and LTCC. We also have an excellent record regarding manufacturing of prototypes.



Example of operations/facilities:

- Die mounting
- Gold wedge bonding
- Gold ribbon bonding
- Parallel gap welding
- Die shear, peel strength and bond pull testing
- Electrical tests
- Burn-in facilities
- Class ISO-7 (10.000) clean room

Environmental testing

RUAG Space has modern test facilities operated by skilled and highly experienced personnel. We are capable of performing qualification and acceptance tests from component level to unit/system level.



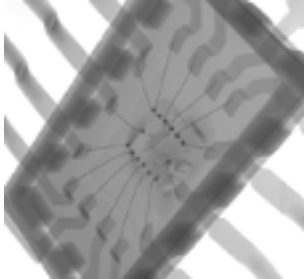
Example of operations/facilities:

- Vibration and shock testing
- Simulated pyroshock testing
- Thermal vacuum testing
- Thermal testing
- Centre of Gravity measurements
- Moment of Inertia measurements
- Class ISO-8 (100.000) clean room

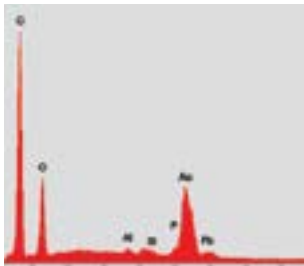
Analysis of electronic components and materials

RUAG Space has a fully equipped analysis laboratory.
The highly skilled personnel has extensive experience in complex analyses.

Destructive Physical Analysis



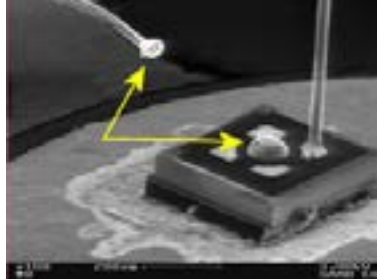
Real-time x-ray image



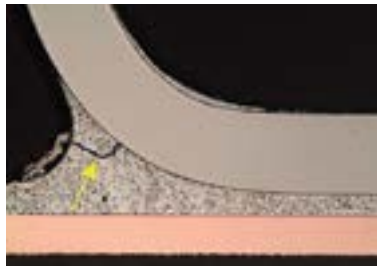
Elemental analysis spectrum

Investigation for physical defects, physical construction, design weakness and reliability risks in EEE parts.

Failure Analysis



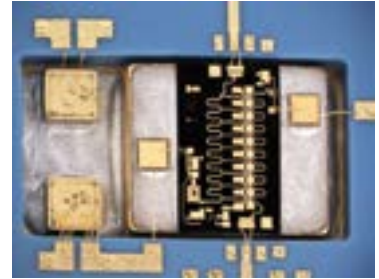
SEM image of fused bond wire



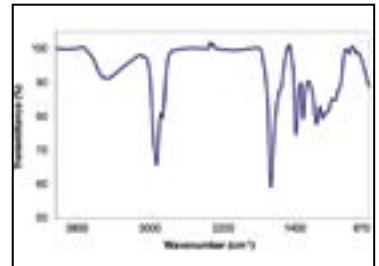
Cross-section of crack in solder joint

Determination of failure cause and corrective actions.

Material Analysis



Optical image of hybrid circuit



FT-IR spectrum of organic contamination

Thermal, mechanical and chemical analysis.

Areas of expertise:

- Failure analysis
- Micro-sectioning
- Radiation effects
- Material analysis
- Constructional analysis
- Non-destructive and destructive testing of EEE parts
- Qualification of materials, EEE parts and processes.

Certificate

We are proud holders of the following certificates:

- ISO 9001:2015 and AS/EN JISQ 9100:2016 - Quality Management system standard and Aerospace Quality System Standard

With 40 years of experience in electronics design and manufacturing
RUAG Space is the partner for Your needs!