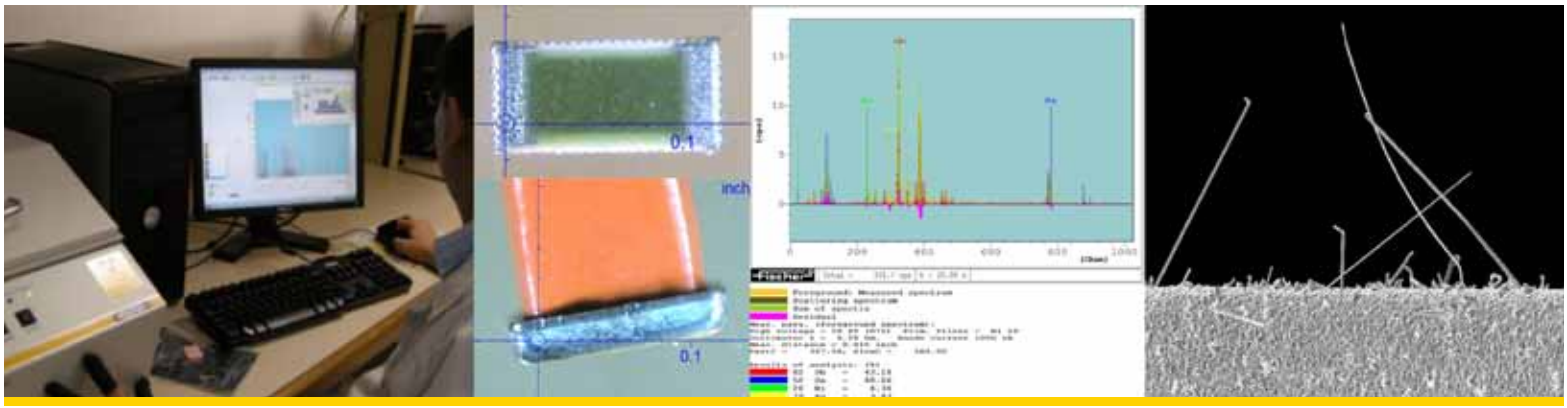
TCS Space & Component Technology



Experience

- Over 150 major space programs
- Over 10,000 part types supplied
- Millions of individual parts supplied
- Zero on-orbit failures or launch delays attributable to TCS-supplied parts
- Experienced program management, component engineering, quality assurance, and procurement staff
- Services tailored to meet customer requirements
- Proven performance for over 35 years...originally established as TRW Components International in 1976 and formerly Trident Space & Defense
- AS9100C / ISO 9001:2008 and ISO27001 Certified

Your Established Partner

TCS brings proven, technology problem-solving expertise to its professional service offerings for the public sector. From continuity of operations and information assurance, to cyber security and integrated logistics support, TCS solves the toughest technical challenges, under conditions that demand the highest level of reliability, availability, and security. As an ISO 9000-certified provider with many consultants holding active security clearances, TCS has an established track record over the past decade as a trusted partner providing mission continuity for the Department of Defense, Special Operations and intelligence communities, the Department of Homeland Security and the Department of State.

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Electronic Components Group

Prohibited Material Analysis

For hardware destined for use in space, “pure tin”—meaning tin that is at least 97% pure—is prohibited as a surface finish, because it can spontaneously start growing slim filaments known as tin whiskers. A tin whisker can grow long enough to create an electrical shorting path to nearby circuitry. In the vacuum of space, such a short can create a plasma that can carry large amounts of current, enough to destroy circuitry and disable satellites.

Why is the risk increasing? Catastrophic failures due to whisker growth from cadmium and pure tin surfaces have been observed since the 1940’s:

- Since 2006, the European Union’s Restriction of Hazardous Substances (RoHS) directive has restricted lead in metal finishes and solder coatings. Hence, the designation “lead-free” can mean “pure tin.”
- Counterfeiters providing obsolete or hard-to-find parts frequently take new RoHS-complaint parts and re-mark them as older, more valuable parts. While the genuine parts may not have pure tin, your parts may.
- Cadmium and zinc are known to sublimate in a hard vacuum. The sublimation products are conductive and can redeposit to cause short circuiting. In addition, cadmium and zinc are subject to whisker growth.

How do we protect you? Our X-ray fluorescence equipment and processes satisfy the new military standard for prohibited material analyses adopted in late 2010:

- Pure tin analysis performed in accordance with MIL-STD-1580 requirements, JEDEC JESD213, or specific customer requirements
- Fischer system with silicon drift detector has a resolution of 150 eV, far exceeding the MIL-STD-1580 requirement maximum of 290 eV
- Calibrated with a 97Sn/3Pb standard procured directly from the National Institute of Standards and Technology
- Nondestructive identification of surface finishes, underplate materials, and base metals
- Scanning electron microscopy with energy-dispersive spectroscopy (SEM-EDS) available as referee when needed

TCS TeleCommunication Systems
Enabling Convergent Technologies®