



# Total Quality Systems, Inc.

Market Pull: Supporting the Sustainment of the USAF

# TQS Background

- Small Veteran-owned R&D business founded in 1994
- Awarded 7 SBIR Phase I contracts
- Awarded 4 SBIR Phase II contracts
- Awarded 10 SBIR Phase III contracts
- We specialize in solving the USAF's toughest sustainment problems

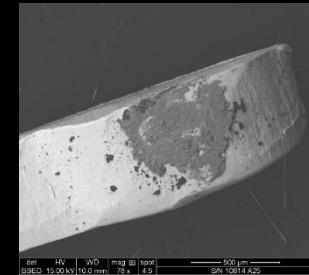
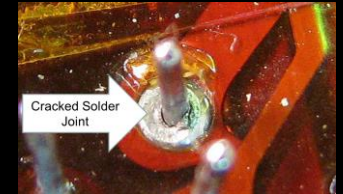


***“Companies like TQS represent the best in American ingenuity.”***

Sean Greene, SBA's Associate Administrator for Investment and Senior Adviser for Innovation

# Topics of Study

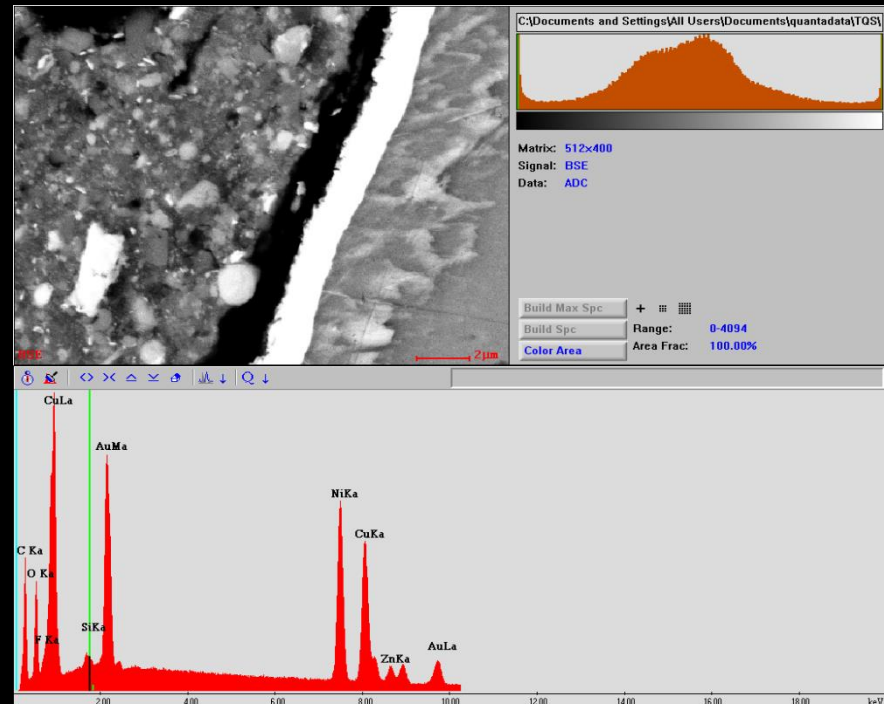
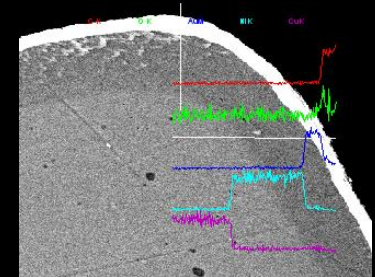
- Analysis of micro metal fatigue, fractures, corrosion, contamination in electrically conductive circuits
- Compositional analysis of contaminants on electrical connections
- Electrical continuity and electron flow through electrical circuit paths
- Analysis of the mechanisms of material wear and deterioration due to age and environmental impacts
- Reverse engineering of ICs
- Counterfeit IC analysis
- Micro or Nanoscale IUID markings





# Previous Utah NanoFab Project

- Intermittent conductivity in electrical contact pin in aircraft RADAR system detected
- Scanning Electron Microscope with X-ray detector used to characterize the contaminant causing the electrical problem
- Enabled the customer to understand the issue and determine the best approach to resolve the problem



# Potential STTR

- SBIR MDA15-T005, “*Gold Contaminated Solder Joint Characterization for Quantifying Risks Associated with Gold Embrittlement*”
- Purpose: Develop a model that will determine the risk of failure of gold-contaminated solder joints, for a variety of solder joint configurations, due to mechanical and thermal shock.
- Goal: Model to specify the environmental limits for electronics; and, quantifying the likelihood of failure of the hardware given its exposure to measured/or expected mechanical and thermal conditions.
- PHASE I: Develop the conceptual framework for failure mode testing to evaluate the variables affecting the reliability of gold contaminated solder joints. This framework should include methods of assessing gold concentration and distribution for a variety of packaging and termination types, favoring non-destructive testing whenever possible. The framework should also consider if data generated is strictly empirical or if the data can be used for mechanistic modeling. Preference is given to mechanistic modeling as it allows for a flexible risk assessment approach. Simple physical tests should be conducted to demonstrate proof of concept.

# Potential STTR

- STTR DLA15C-001, *“Detecting Counterfeit, Substandard, Nonconforming, and Improperly Processed Materiel”*
  1. Identify for further development a non-destructive inspection (NDI) method to ensure that the material in a component or in an unfinished state meets all processing requirements, and is not substandard nor does it have nonconforming physical properties.
  2. Identify for further development a non-destructive inspection (NDI) method to ensure that the material in a component or in an unfinished state is authentic, (not made from counterfeit subcomponents or substances).
  3. The process must be applicable to both conductive and non-conductive materials (both metallic and non-metallic).
  4. To the maximum extent practicable, address the prospective costs and benefits of the candidate NDI process.
  5. To the maximum extent practicable, address the time requirements imposed by the candidate NDI verification processes.
  6. Develop a comparative “library” of known good materials/items with known good processing as reference standards.
  7. Initiate the development of a standard for both commercial and Government use.

# Next SBIR/STTR Cycle

<b>DoD solicitations</b>	<b>Pre-Release (30 days)</b>	<b>Open (30 days)</b>	<b>Closes</b>
SBIR 16.1 & STTR 16.A	11-Dec-15	11-Jan-16	17-Feb-16
SBIR 15.3	27-Aug-15	28-Sep-15	28-Oct-15





*Innovative Process and Product Improvement Solutions for Industry and Military*

# Total Quality Systems Incorporated

4066 South 1900 West Roy, UT 84067-4100

Voice: (801) 731-2150

Fax: (801) 731-4457

<http://www.tqsinc.com>