Repair & NDE Technologies

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Repair & NDE Technologies Overview

In-Space Soldering Investigation video
(Size: 17 MB).
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The Repair & NDE (non-destructive evaluation) Technologies sub-element will provide a means of repairing systems during transport and while on the Moon, Mars, and other extraterrestrial bodies. NDE technologies will be developed from existing techniques to support the monitoring and validation of the quality and safety integrity for the repair processes, the initial fabrication and assembly of in situ habitats and structures, and replacement parts. Self healing techniques will be developed for wire insulation and composite repairs where applicable, as well as other techniques for electrical component repair. Welding and patching/bonding techniques will be developed to provide repair process for most or all materials subject to in-situ failures. These technologies will utilize in-situ, imported, and recycled materials as provided by a logistics support function. Repairs will target the inclusion of all system and element material types utilized during transport and while on extraterrestrial bodies.

Repair & NDE Technologies will reduce/eliminate the need for spares through the utilization of in-situ, imported, and recycled materials in the restoration of system and element functionality. Repairs are considered a cheaper, better, faster mode of returning function in lieu of sparing. Repairs will utilize shop, portable, and robotic handheld equipment to perform functions. Some examples of technologies being investigated include:

Patching/Bonding

- Adhesives
- Tapes
- Amalgams
- Self-propagating high temperature synthesis

Electrical

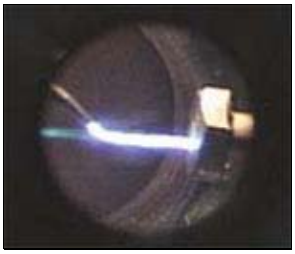
- Soldering Techniques
- Soldering Heating Methods
  - Laser
  - Hot Air
  - Resistance
  - Coldheat TM
- Self-Healing Wire Insulation
  - Viscous Poly-isobutane
  - Net Actuators
  - Embedded Microspheres
- Conformal Coating Repair
- Conductive Epoxies

Composites

- Self-Healing Methods:
  - Bleeding
  - Microcapsules
- Conventional Methods:
  - Cosmetic
  - Resin Injection
  - Plug/Patch
  - Bonded Repair
  - Curing - E Beam

Welding

- Electric Arc
  - Gas Metal
  - Gas Tungsten
  - Plasma
- Electron Beam
- Friction Stir
- Ultrasonic
- Laser
- Hybrid Arc System



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Last Updated: 26 July 2016.