



Supportability Technology Development Needs

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Supportability Challenges

- In-Flight Operations

 - Reduce logistics footprint required to support long-duration missions – reduce mass and volume of spares and support equipment

 - Enhance mission autonomy and robustness

 - Reduce Life Cycle Cost

- Ground Operations

 - Reduce Life Cycle Cost



Diagnostic Systems

- Technology Needs:

- Electronic systems diagnosis

- » Clear diagnosis with minimal ambiguity
 - » Compact, low-mass diagnostic hardware
 - » Multi-function diagnostic units – minimum number of discreet pieces of diagnostic equipment
 - » Straightforward interpretation of results



Spacecraft System Repair



- Drive repair to lowest practical hardware level
- Enable manufacturing of selected parts
- Maximize reconfigurability
- Maximize reusability





Coatings for Ground Support Equipment

- Ground Support Equipment must be protected from the naturally corrosive marine environment at KSC
- Many coatings and materials do not protect from the acidic solid rocket booster exhaust
- Environmental regulation has reduced the number of available coatings

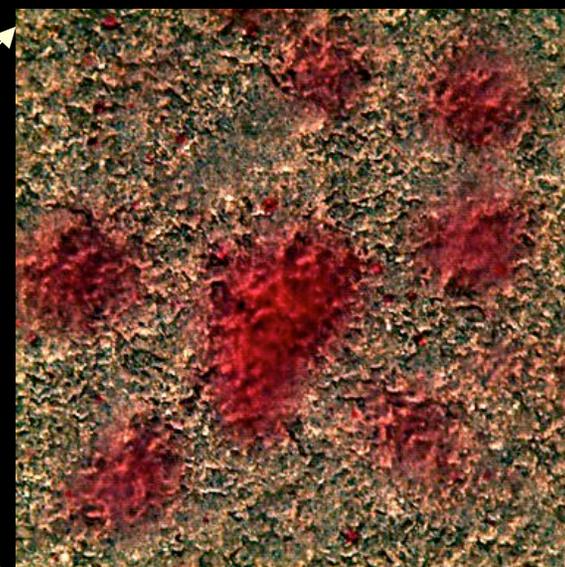
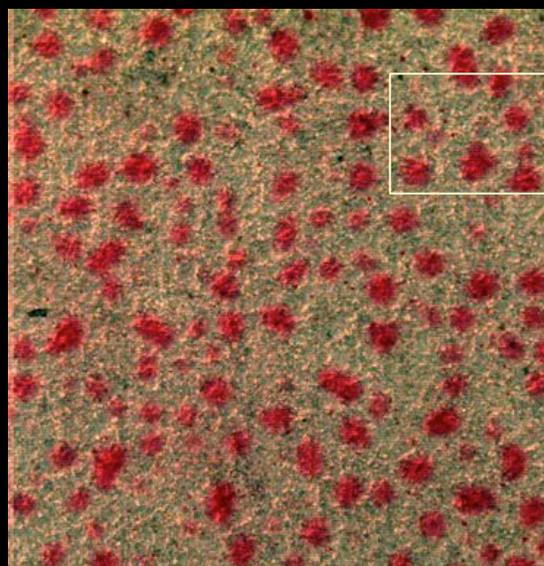


Smart Coatings for Corrosion Detection and Control

- Technologies:

Controlled-release microcapsules respond to corrosion by releasing contents

Capsules can contain a color change agent for corrosion detection, inhibitors for corrosion control and/or self-healing agents for coating repair

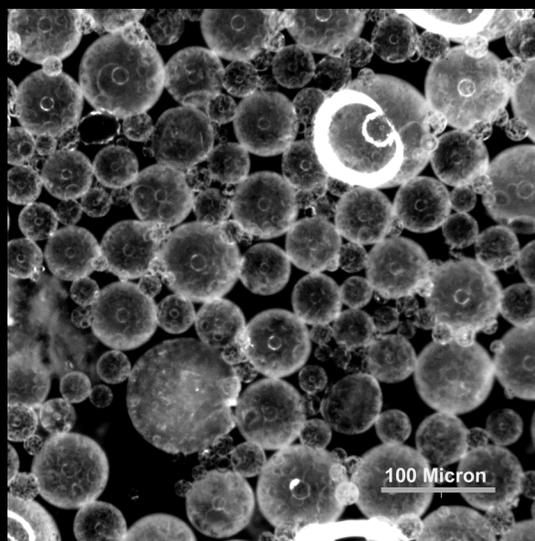


Microcapsules in paint responding to basic pH conditions

Smart Coatings

- Technology needs:
 - Capsule Contents:
 - Environmentally friendly corrosion inhibitor packages
 - Self healing systems for encapsulation
 - Paint formulations for microcapsules

Contents →



Capsules

→ Paint





Validation of Existing Corrosion Control Technologies

- Corrosion Technology Laboratory
 - Atmospheric Exposure Site
 - Accelerated Corrosion Facility
 - Electrochemistry Wet Lab
- Seeking robust, cost effective technologies for our unique environment
- Corrosion.ksc.nasa.gov

