# Prognosis for Combat Asset Readiness

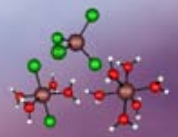
## Unprecedented Warfighting Capability

System

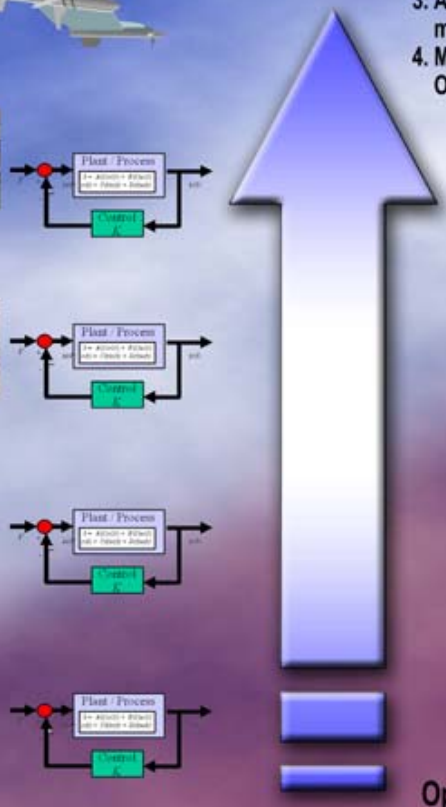
Sub-system

Component

Structure & Surface



Molecular




### Proposal Overview

**Approach:**

Provide effective real-time integration of:

1. A suite of "active" sensors that effect the material environment. (e.g. embedded piezo/optical fiber, active corrosion electro-chem sensor...)
2. Multi-level model of material, functionality, and evolution in time
3. Adaptive multi-level model linking material (predicted) state with machinery functionality (MRAC with prognostics)
4. Model / function / decision support integrated in a real-time OSA-CBM control model.

Model for structures and material chemistry (contaminant, species, additives, corrosion..)

Suite of "active" sensors that stimulate the environment and adaptively model the response. (Embedded optical wear, embedded optical strain, active MEMS/chemical sensor)

**Opportunities:**

1. New (safe) regimes of operation
2. Effective integration of multi-level state information with operational decision
3. Prediction accuracy improves over time.
4. Un-precedented opportunities for operating out of the design envelope and for dynamic re-configuration...

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