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LABORATORY

Presented to the
Space Parts
Working Group

Space Parts Consortium

JPL Institutional Parts Program

Kevin. P. Clark
Manager, Electronic Parts Engineering Office

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The Context — Faster–Better–Cheaper

- Past environment characterized by
  - Flagship missions that smaller missions could benefit from
    - Overage of long lead, high reliability parts available
    - Parts procurement contracts available for add-on buys
    - Preferred parts list developed and parts qualified
    - Large equipment items funded by flagship mission
  - Maintenance of core part support capabilities partially subsidized by flagship missions
    - Device evaluations, methodologies, qualifications
    - Part information systems, etc.
  - Substantial support to parts industry infrastructure by DOD and NASA
    - Reliability engineering
    - Radiation hardening and testing

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The Context — Faster–Better–Cheaper

- Need to adapt to new environment
  - No flagship mission
    - Many BFC missions that must work synergistically
    - Short development cycles incompatible with long lead part procurements
  - Many, smaller projects with
    - No investment in parts engineering core capabilities
    - No sustaining parts engineering support
  - Part Delivery Schedules More Constrained
    - Flight parts: 12-24 months (past); > 3-6 months (today)

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The Context — Faster–Better–Cheaper

- Need to adapt to new environment (Continued)
  - Parts industry infrastructure driven by commercial needs
    - Decreased radiation hardening and testing
    - Cancellation of Mil specs
    - Substantial decrease in "Class S" parts
  - Part Process Resource Sharply Diminished
    - Typical parts program cost (as % of total project cost) reduced
    - Less parts engineering, evaluation, qualification, acquisition labor resources
  - Industrial partnerships
    - less visibility, more trust, less oversight

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The Context — Faster–Better–Cheaper

- Need to adapt to new environment (Continued)
  - Industry Significantly Changed
    - COTS, diminishing sources (mil-spec parts), improving commercial quality, less knowledge and control of parts suppliers process changes
  - Technology Issues
    - Increased complexity, radiation susceptibility
    - Rapidly accelerating part obsolescence
    - Transition to low voltage and low power technology, and need for low temperature performance
  - Many New Initiatives
    - ISO9000 Certification
    - Single-process initiative, etc.

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The Challenge — Faster–Better–Cheaper

- **Given: Flight mission and instrument development processes are being reengineered**

  Stretch goal — Reduce the start-to-launch cycle time by 1/2 …

CYCLE TIME

Example –
Reduce JPL's Mars Pathfinder cycle time from 36 months to 18 months

… and reduce development costs by 1/3 …

… while not adding risk or reducing quality

- **Challenge: Reduce total parts life cycle cost**

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Solution - Faster, Better, Cheaper Parts Program

- Faster
  - Have parts inventory
    - Real (parts in Flight Stores or available from partners)
    - Virtual (open orders or other contracts in place)
- Better
  - Less risk by having many parts on hand
  - Use parts with known pedigree, history, characteristics, etc.
  - Increased access to newer technology
- Cheaper
  - Share cost of acquisition, evaluation, parts engineering, and problem resolution
  - Have information on problems, application issues, etc. "up front" to avoid problems

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Space Parts Consortium (SPC) Concept

- Phase I
  - Provide venue to increase involvement between aerospace organizations to leverage resources
    - Shared Activities
      - Share cost of acquisition, evaluation, parts engineering, and problem resolution
    - Technical Information Interchange
      - Allow limited access to portions of each members parts information data base
        - Limited to Components, Quality, and Reliability information not Application information
      - Allow for informal communication between consortium members parts specialists or engineers

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Space Parts Consortium Concept

- **Phase II**
  - **Increase involvement with our suppliers to emphasize inventory and supply chain management to lower costs, speed delivery, and obtain improved quality and reliability through**

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Initial Meeting Objectives

- Introduce the Space Parts Consortium Concept
- Engage participants in the further definition and implementation of the SPC
- Solicit participants EEE parts
  - Interests
  - Current Parts Evaluation Activities
  - Constraints (on SPC participation or information sharing)
- Initial implementation of selected activities
  - Initiate shared evaluation efforts
  - Initiate selected data sharing
- Devise Implementation Action Plan for follow-on activities

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Many Issues / Concerns

- Competitiveness
- Fairness
- Liability
- ITAR
- Is this just another "Initiative"?
- Why not use existing venues?
  - DSCC
  - STACK
  - GIDEP
  - G12

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What Do We Want From You?

- Be willing to share (within constraints imposed by your organization)
  - Parts Information
  - Evaluation and Test Activities and the results

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We Are Seeking Other SPC Opportunities

- We currently are focusing on opportunities regarding EEE parts;
  - Technical information exchange
  - Cooperative Testing
- However, we welcome expansion to any other topics of interest to you such as
  - Residual inventory
  - Supplier Agreements
  - Links to your materiel-availability databases
- We welcome your ideas on other ways to make parts programs Faster, Better, Cheaper

Kevin.p.clark@jpl.nasa.gov

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• Backup Material (SPC)

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The Context — Faster–Better–Cheaper

- Current Project customers require <u>more</u> support than past
  - Need to utilize more new technology to accomplish advanced missions within tight constraints
  - Risk management/balancing
  - Decrease in reliability, radiation and application margins
  - Industrial partners have leaner contracts than past
  - Smaller projects can't afford independent parts assurance activities
  - Advanced technology brings new issues (e.g., Radiation, failure mechanism identification, new materials reliability issues, testability, complexity, etc.)
  - COTS parts bring new issues (e.g., intra-lot variability, decreased traceability, unknowns, not driven by space/DOD requirements)

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The Context — Faster–Better–Cheaper

- Current Project customers require <u>more</u> support than past (Continued)
  - Unlike the past mil-parts/rad-hard parts are not readily available and need more attention
  - Mass constraints lead to decreased use of redundancy
  - Smaller, faster, leaner, independent and fragmented Projects
    - Increased mission competition and NASA direction drives cost ~1/10x which forces leaner Projects
    - Decrease in development time by a factor of 2 drives need for
      - pre-project or very early long lead time part procurement initiation
      - early and accurate parts information
      - getting it right the first time (no time for rework)