Ideas for a More Proactive Role for Parts Management and DMSMS in Acquisition

Presented to the Parts Standardization Management Committee
April 28, 2015

IDA

Objective

To identify ideas for how parts management and Diminishing Manufacturing Sources and Material Shortages (DMSMS) can better influence Acquisition (especially early in the life cycle); therefore minimizing future DMSMS impacts

Outline

I. Planning
II. Initial Design
III. Sustainment and Redesign

I. PLANNING

I. Planning—Augment the Content of Existing Strategies and Plans *(1 of 3)*

- **Intellectual Property Strategy (IPS)**
  - **What are the minimum technical data requirements a program should have access to in order to be able to better address potential, future DMSMS issues?**
  - **What types of technical information would be desirable to support real time software-related resolutions?**
  - **What are the minimum technical requirements that a program should have access to in order to ensure the ability to perform validation and production testing for resolutions impacting testing performance?**

I. Planning—Augment the Content of Existing Strategies and Plans *(2 of 3)*

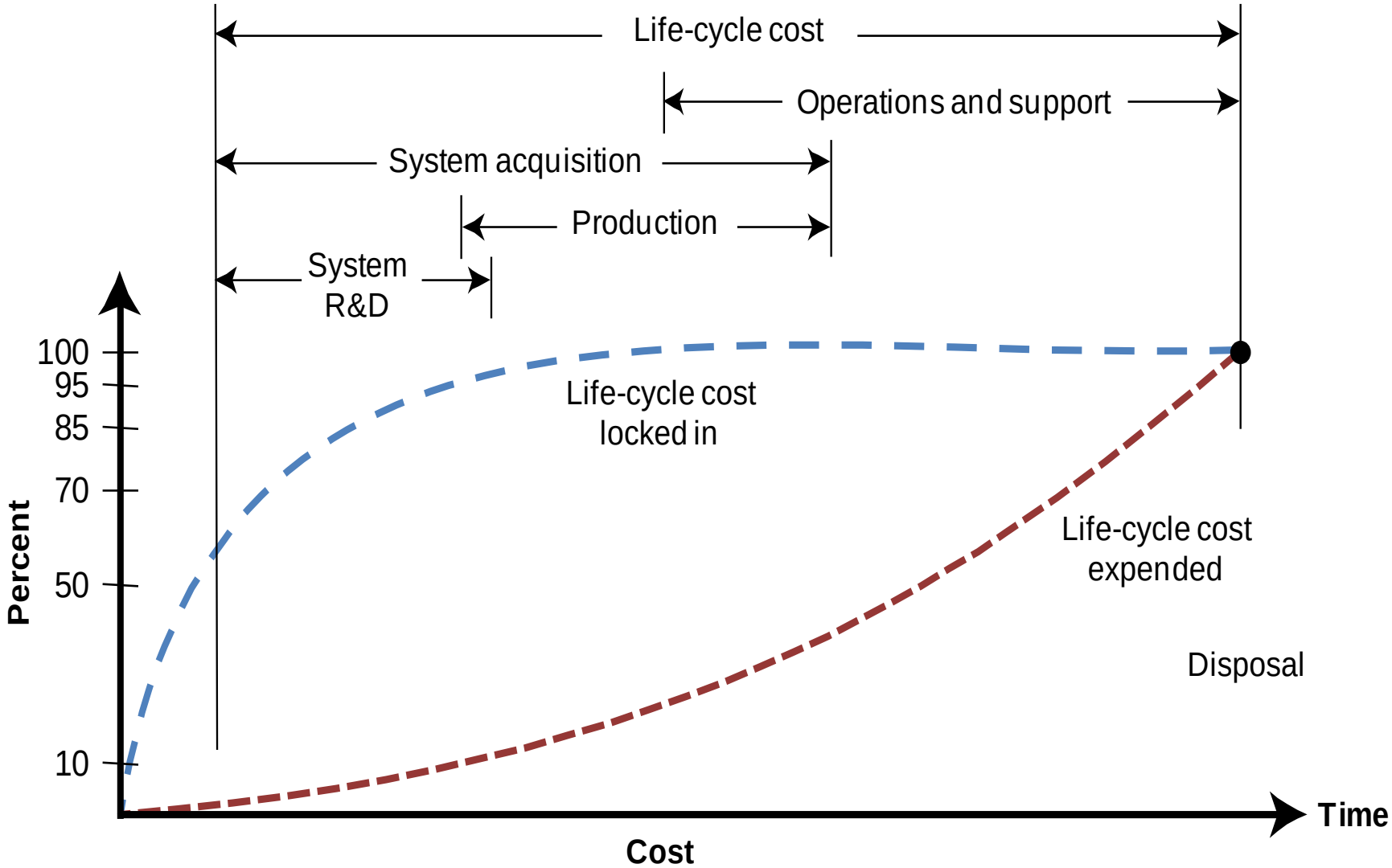
- **Life Cycle Sustainment Plan (LCSP)**
  - **How to better integrate DMSMS-related considerations into the following 6 of 12 integrated product support elements?**
    - **Product support management**
    - **Design interface**
    - **Sustaining engineering**
    - **Supply support**
    - **Technical data**
    - **Support equipment**
  - **Where does the DMSMS management plan fit in?**

I. Planning—Augment the Content of Existing Strategies and Plans *(3 of 3)*

- **Systems Engineering Plan (SEP)**
  - **How can DMSMS-related interests be reflected?**
- **Program Protection Plan (PPP)**
  - **Isn't obsolescence a vulnerability?**
  - **Is there anything the Program Protection community could do to mitigate future obsolescence risk?**
    - **Can a basis for prioritizing limited program protection resources be established?**

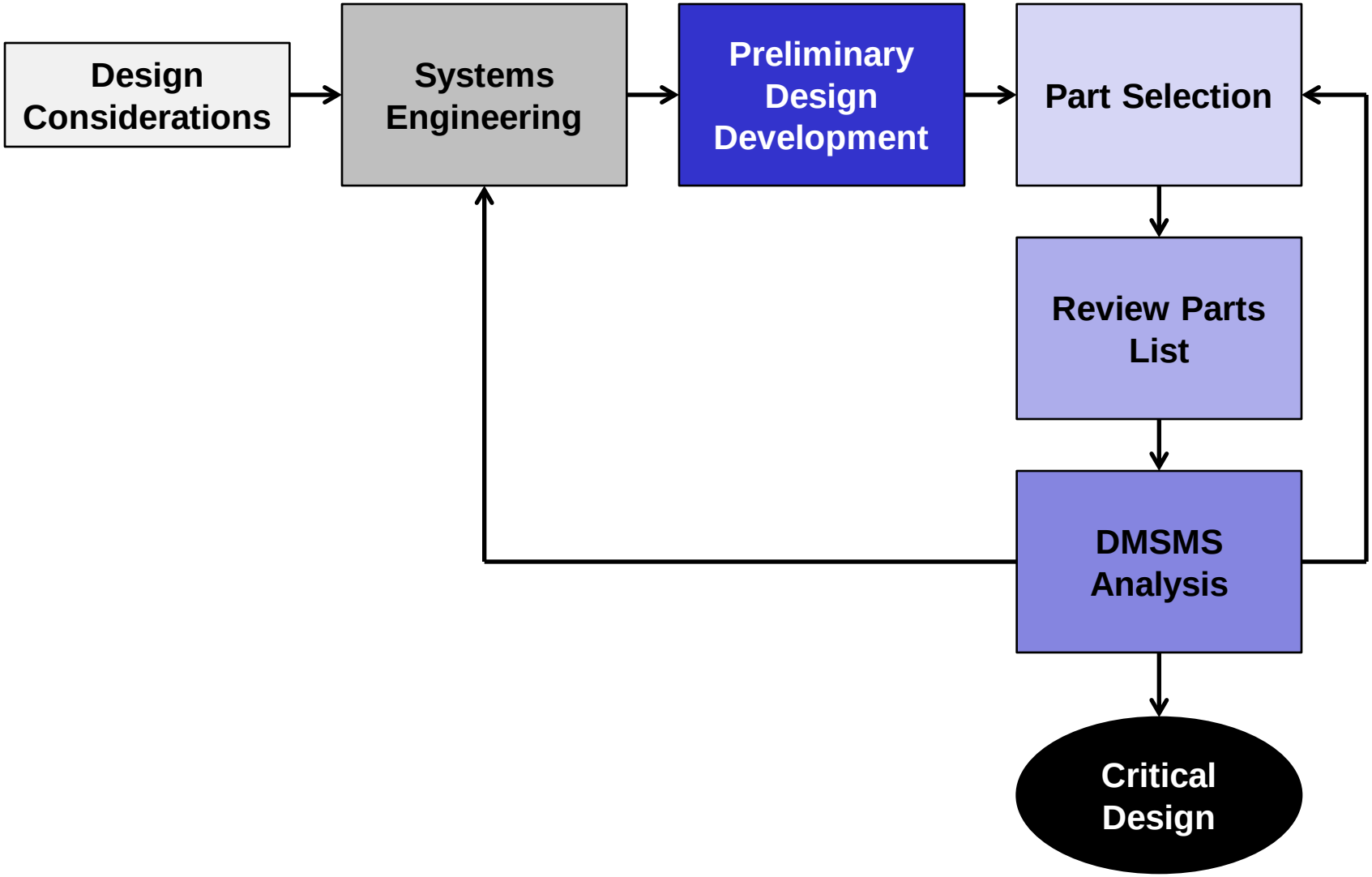
II. INITIAL DESIGN

II. Initial Design—Large Percentage of Life-Cycle Cost Locked in Early



Source: W.J. Larson and L.K. Pranke, *Human Spaceflight: Mission Analysis and Design* (McGraw-Hill, 1999).

II. Initial Design—Improve Linkages to Initial Design Process *(1 of 5)*



II. Initial Design—Improve Linkages to Initial Design Process *(2 of 5)*

- **Identify design considerations to minimize future issues**
  - **Technology and item selection**
    - **New technologies do not capture 100 percent of the market at once**
    - **Designs should not include items near the end of their functional life**
    - **Avoid the selection of sole source items, when possible**
  - **Parts management**
    - **Encompasses the selection of new parts and reuse of parts from previous designs**
    - **Standardize the use of parts and minimize the use of custom parts**

II. Initial Design—Improve Linkages to Initial Design Process *(3 of 5)*

- **Identify design considerations to minimize future issues**
  - **Open systems architecture—hardware and software**
    - **Use widely supported and consensus-based standards for key interfaces**
    - **Enable readily available alternatives and potential for future growth**
  - **Commercial Off-the-Shelf (COTS) assemblies**
    - **Opportunities for reduced development time, faster insertion of new technology, lower procurement costs, and potentially, lower life-cycle costs**
    - **…but also risk in terms of the likelihood of obsolescence**

II. Initial Design—Improve Linkages to Initial Design Process *(4 of 5)*

- **Systems Engineering –**
  - **Should be influenced by the program's stated design considerations**
  - **Select the appropriate design tools**
  - **Apply the systems engineering process to develop a preliminary design**
- **Parts Selection / Parts List**
  - **Are the risks associated with each part of the design's parts list known and understood?**
  - **How can high risk parts be identified and recommended for exclusion from the design?**

II. Initial Design—Improve Linkages to Initial Design Process *(5 of 5)*

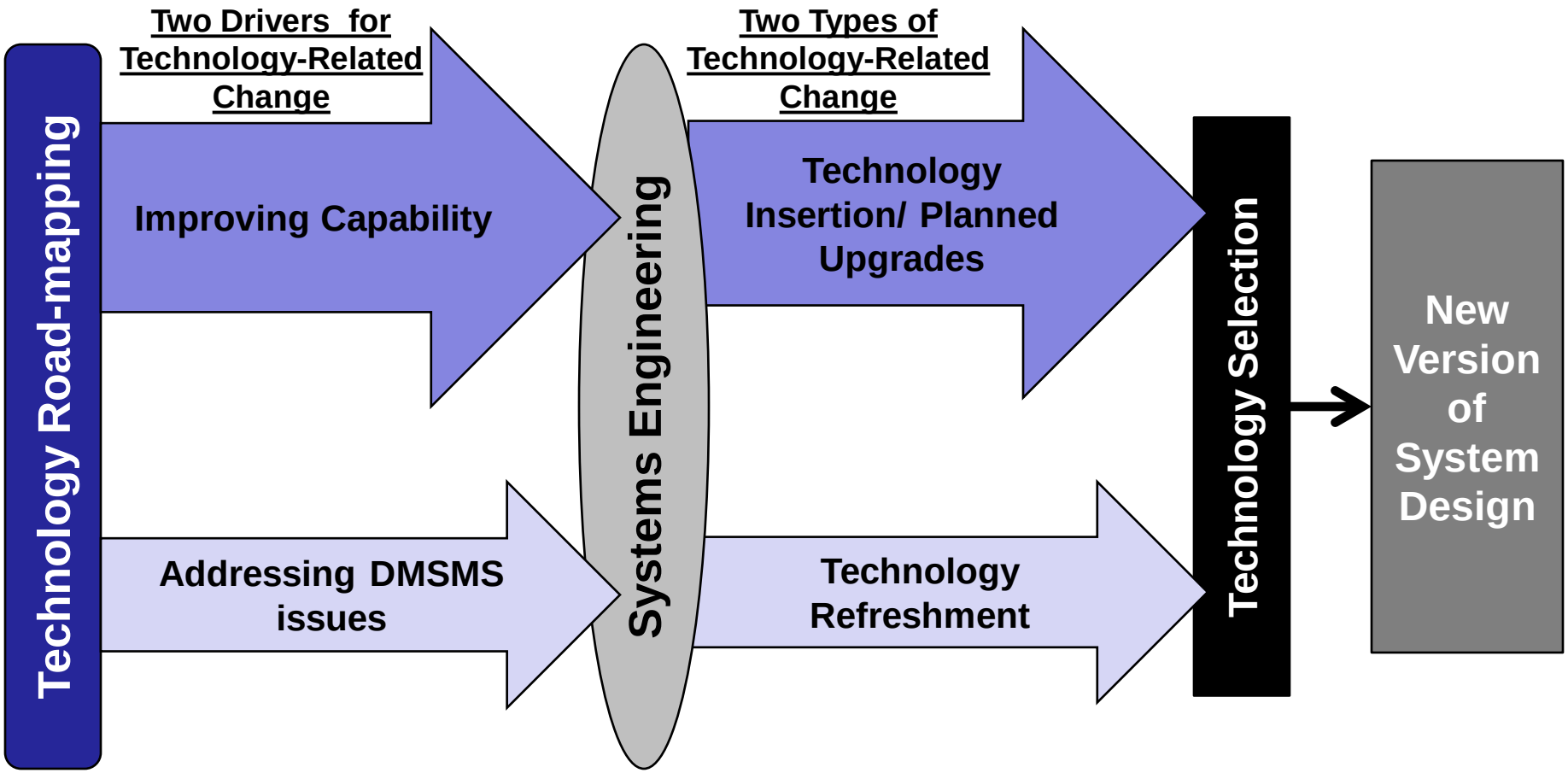
- **DMSMS analysis**
  - **Analyze parts lists to identify obsolete or near obsolete items in a design starting at PDR and attempt to eliminate them from design**
  - **Provide guidance on technical data, tooling, and insurance spares to preserve in order to facilitate resolutions (should they become necessary)**
  - **Prepare mitigation strategies for when use of a item with a high risk for obsolescence cannot be prevented**

II. Initial Design—Pursue Early, Front-End Involvement

- **Involvement can provide benefits at any point in the acquisition lifecycle—**
  - **How early should the parts management and DMSMS management communities seek to influence the programs systems engineering efforts for initial designs?**
  - **How can a program's systems engineering community leverage parts management and DMSMS subject matter experts (SMEs) during initial design?**
- **Maintain involvement through ongoing design reviews**

III. SUSTAINMENT & REDESIGN

III. Sustainment & Redesign—Do Technology Road-mapping for Two Purposes



III. Sustainment & Redesign—Integrate into Technology Selection for Redesigns

- **Parts Management and DMSMS SMEs can help a program identify items to select in order to minimize the impact of obsolescence throughout the life cycle of the system**
  - **Just as in initial design, the same design considerations apply to redesigns**
  - **Avoid items late in their life cycle, although perhaps also not too new in the life cycle**

III. Sustainment & Redesign—Integrate into Technology Insertion

- **When a program is planning an upgrade or technology insertion to obtain improved capability, it should also address any current and soon to be obsolete items**
  - **Parts management SMEs can make recommendations on the standardization and use of parts**
  - **DMSMS SMEs need visibility into the timing and scope of planned upgrades**
  - **DMSMS SMEs can identify resolutions to obsolete items that can be incorporated into a planned upgrade**
    - **Presents an opportunity to address an obsolescence issue before its impact is felt by the program**
    - **More efficient than addressing resolutions for an obsolete item or items as a stand-alone activity**

III. Sustainment & Redesign—Contribute to Technology Refreshment

- **The DMSMS community is not the lead for technology refreshment, but plays a critical role**
- **If a program has to pursue a redesign to address a set of obsolete items, it should seek to achieve desired capability gains as well**
  - **Parts management SMEs can make recommendations on the standardization and use of parts**
  - **DMSMS SMEs should remain engaged with the program's SE community to help identify how recommended resolutions to DMSMS issues may be able to achieve improved capability for the system**

III. Sustainment & Redesign—Integrate Technology Insertion with Technology Refreshment

- **Integrate content as already discussed**
- **Integrate timing**
  - **Tombstone charts for DMSMS**
  - **Program improvement plans**
- **Improve assumptions for calculating life of need buys**

Questions for Further Consideration

- **How do the parts management and DMSMS communities influence design when program management has to deal with numerous competing priorities?**
- **When improved capability dominates a program's priorities, how can parts management and DMSMS communities get the importance of their issues raised and addressed?**
- **What is the "life-cycle sweet spot" for recommending an item that will minimize the impact of obsolescence?**

Key Points

- **Parts management and DMSMS communities should maintain close ties with systems engineering**
- **Technology Roadmaps are an important tool managing technology-related change; *parts management and DMSMS communities need to be involved***
- **Technology insertion efforts to attain improved capability should be leveraged to the greatest extent possible; *parts management community can recommend standardization and reuse of parts in the redesign, while the DMSMS community can seek to incorporate resolutions to DMSMS issues***
- **Parts management and DMSMS communities should be reviewing ALL designs (initial designs and redesigns)**

Questions?