

**Structuring The Space Exploration's  
Supportability and Logistics & Maintenance  
Functions**

**Includes ISS Supportability Lessons Learned**

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# Logistics and Maintenance in Exploration

- **The ISS Program studied in depth the question of how to structure the Logistics & Maintenance management function, and where to locate it organizationally.**
  - **Operations Phase Assessment Team (1991)**
  - **OPAT II (1992)**
  - **Utilization, Operations and Training Assessment Team (UOTAT) (1994)**
- **The common conclusion from each study was that the L&M management function must be closely tied to System Engineering especially during early development.**
  - **OPAT II and UOTAT performed extensive trade studies to assess the proper organizational location for L&M.**
  - **Separating L&M from System Engineering organizationally and geographically was found to detract significantly from the integration of L&M with design, development, manufacturing, engineering oversight, and on-orbit operations.**

# Logistics and Maintenance during DDT&E

## ■ Program Management Level

- **Co-locate L&M with System Engineering and Engineering management.**
  - » **Greatly improves system engineering practices by integrating the logistics support development with the design development – logistics support is not a separate stand alone activity.**
  - » **Greatly enhances concurrent engineering – logistics support is developed with design, not following design.**
  - » **L&M requirements are better integrated into the Program by being co-mingled with Engineering, rather than be seen as coming from the “outside”.**
- **Operational and launch site support requirement inputs feed naturally into a Programs L&M Management.**

## ■ Technical Level

- **Logistics analysts work concurrently with design engineers, reliability engineers, test engineers, etc. Greatly improves the design, manufacturing, test and initial start up of system hardware.**
- **Logistics engineers work directly with design engineers to improve design to reduce support costs – eliminates the “over the fence” processes that occur when the two organizations are separate.**
- **Logistics engineers get direct feedback from engineering on quality of logistics products-maintenance source data, sparing plans, repair concepts, transportation plans, storage plans, etc.**
- **Operational and launch site considerations feed naturally into logistics engineers to enhance design.**

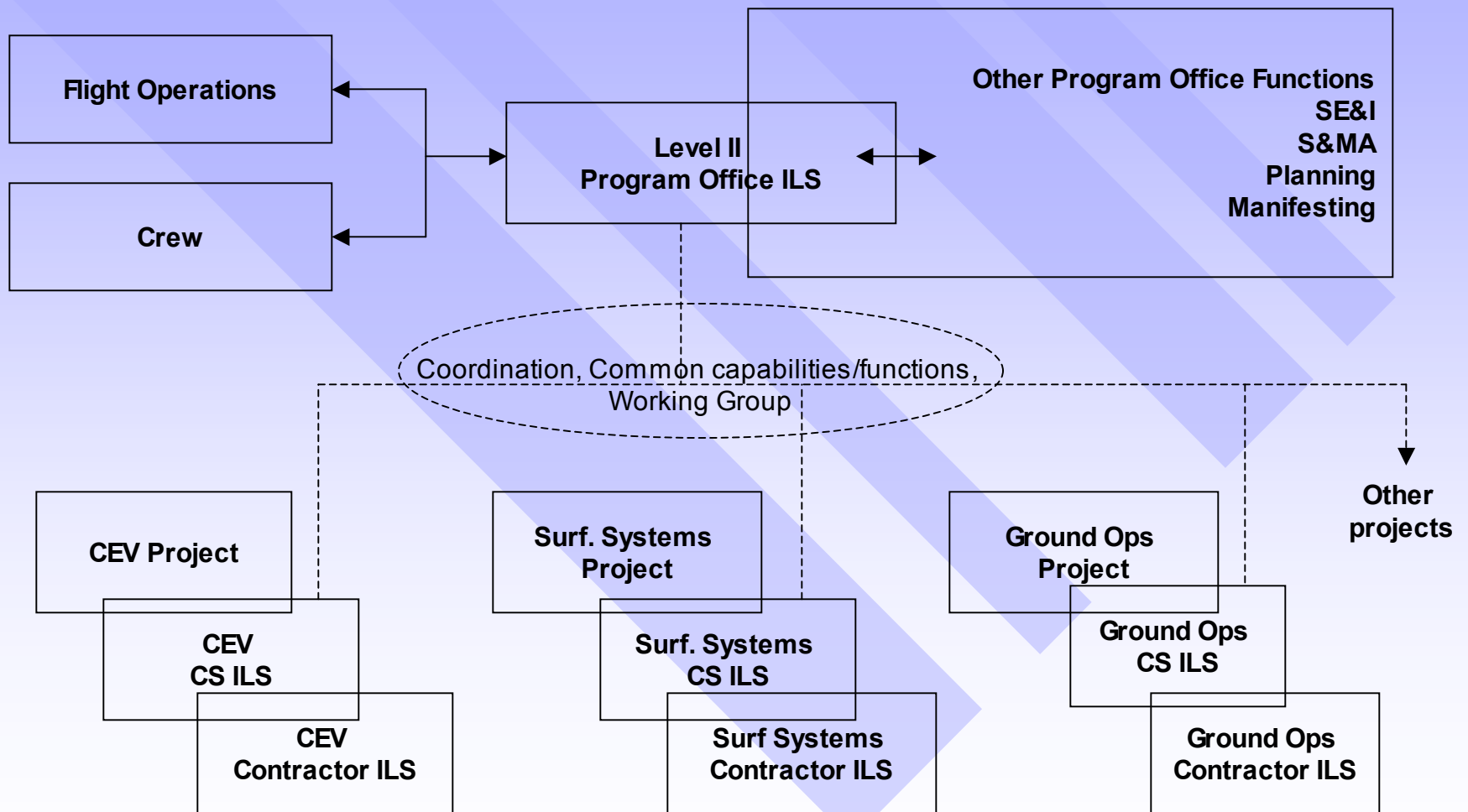
# Logistics and Maintenance during Operations

- **The System Engineering and Logistics & Maintenance management functions should be co-located in the Program Office.**
  - **Support of Exploration, like ISS, will primarily be on the “in space” and “surface destination” hardware, especially on long duration missions.**
  - **Evolution of the systems maintenance concept and troubleshooting of in transit and surface destination problems is a shared task between System Engineers, Logistics & Maintenance and MOD.**
  - **Trades to determine the most effective and economical repair agents (original manufacturer versus government depot) is a shared task between System Engineers and Logistics & Maintenance.**
  - **Depot certification is a shared task between System Engineers and Logistics & Maintenance.**
  - **Contractor base for operations will be largely the same as was during design and manufacturing – keeping L&M with Engineering assists in a smooth transition.**

# Launch Site Logistics Roles & MOD

- **Some Logistics & Maintenance roles can and should be allocated to the Launch Site and MOD.**
  - **Launch Site:**
    - » **Developing design requirements to reduce launch and return costs.**
    - » **Warehousing of spares for launch.**
    - » **Inventory management of launch site spares.**
    - » **Maintenance of Launch Site facilities and support equipment.**
    - » **Developing and managing in-line processing of hardware for launch and return.**
  - **MOD**
    - » **Performance and planning of real time maintenance operations.**
    - » **Pre and post on-orbit maintenance operations.**

# Notional Organization Structure



**ILS – Integrated Logistics Support**