Sparing Satellites

Comparative Strategies of On-Orbit and In-Factory Storage

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Outline

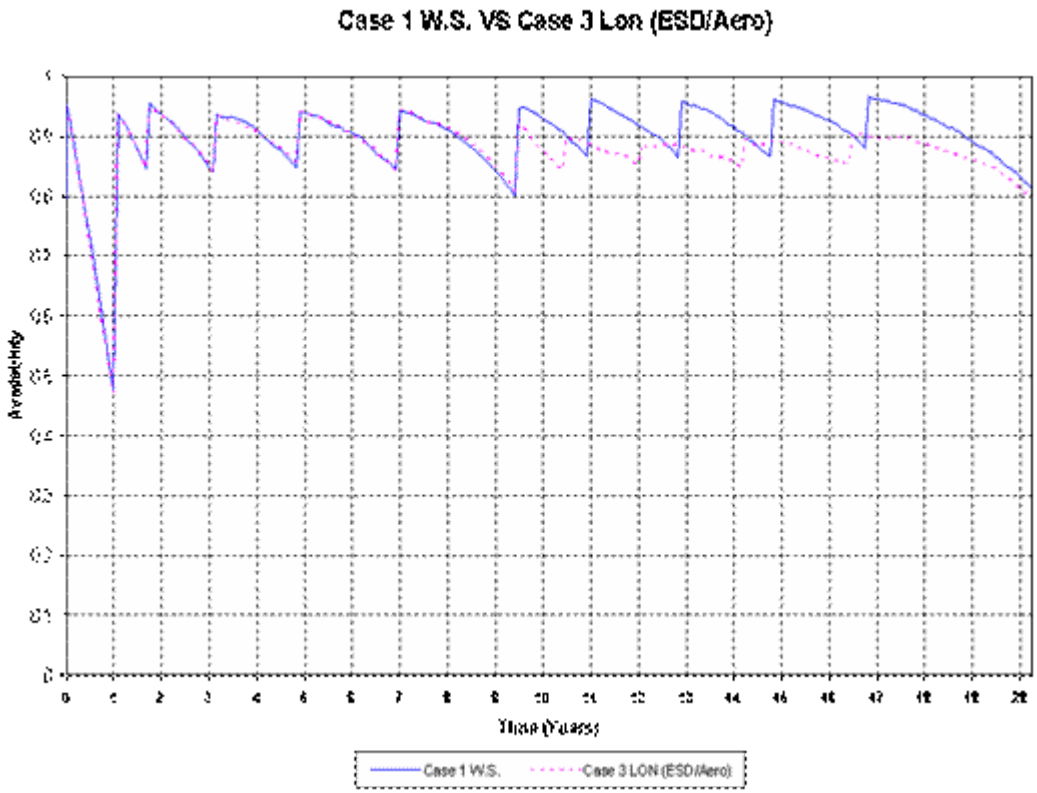
- Introduction
- Warm Spare vs. Launch on Need Comparison
- Analysis of Operational Programs
  - Defense Satellite Communications System
  - Tactical Data Relay Satellite System
  - Geostationary Operational Environmental Satellite
- Commercial Systems
- Advantages & Disadvantages of OOS
- Conclusion

Introduction

- Time required to produce satellite
- Generalized Availability Program (GAP)
- Milestone Schedule Elements

Warm Spare vs. Launch on Need

Case 1 vs Case 3 LON (ESD/Aero)



Analysis of Operational Programs

- A military satellite communications system
  - 240 day LON = $1M recurring
  - 60 day LON = $22.5 M non-recurring & $5.3 M recurring
- Tactical Data Relay Satellite System
  - On-orbit savings = $6.5 M over 2 years

Commercial Systems

Commercial systems universally store on orbit to take advantage of surge requirements and difficult maintenance issues.

Advantages & Disadvantages of On-Orbit Storage

- Advantages: Cost (with assumptions).

- Satellites do not fail in order of launch
  - UHF Follow-On failures on orbit
    - Flight 3 and Flight 7
  - UHF Follow-On operational spacecraft
    - Flight 2 and Flight 4 (among others)

Advantages & Disadvantages of On-Orbit Storage

- Advantages: Cost (with assumptions).
- Disadvantages:
  - Fuel budget
  - TT&C components extended life requirement
  - Additional radiation
  - Thermal/power degredation
  - Additional ground station resources required

Conclusion

Cost savings wins (with assumptions).