

Proposed CTV Design Reference Missions in Support of
Space Station Freedom
(Abstract)

14 10
NBS ONLY
146784
N93-22800

R.J. Saucillo
MDSSC Engineering Services Division
(301)670-7925

W.M. Cirillo
NASA LaRC SSFO Advanced Programs Office
(804)864-1938

Use of design reference missions (DRMs) for the CTV in support of Space Station Freedom (SSF) can provide a common baseline for the design and assessment of CTV systems and mission operations. These DRMs may also provide baseline operations scenarios for integrated CTV, Shuttle, and SSF operations. This presentation describes proposed DRMs for CTV, SSF, and Shuttle operations envisioned during the early post-PMC time frame and continuing through mature, SSF evolutionary operations. These proposed DRMs are outlines for detailed mission definition; by treating these DRMs as top-level input for mission design studies, a range of parametric studies for systems / operations may be performed.

CTV-SSF design reference missions for the early post-PMC time frame relate to NLS delivery of SSF resupply logistics. In this scenario, an NLS-based CTV delivers SSF logistics via autonomous rendezvous and is temporarily berthed at SSF until return to Earth by the Shuttle. A second potential mission is the atmospheric disposal of SSF waste by the CTV. Prior to return to Earth by the Shuttle, the CTV delivers SSF waste to an orbit providing near term atmospheric entry; the CTV then returns to SSF. Potential CTV-SSF design reference missions for the SSF evolution time frame include:

- Delivery of SSF growth elements
- In-situ or SSF-based free flyer servicing
- SEI support including transport of crew/cargo to an assembly node.

Shuttle flight design experience, particularly rendezvous flight design, provides an excellent basis for DRM operations studies. To begin analysis of the DRMs, Shuttle trajectory design tools have been used in "single case" analysis to define CTV performance requirements. A summary of these results is presented herein.