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NATIONAL LAUNCH SYSTEM OVERVIEW WITH FOCUS ON CARGO TRANSFER VEHICLE

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As a result of the Augustine Committee's recommendation to the National Space Council, the NASA and the DOD have embarked on a joint program to provide the nation with a new capability for transporting payloads into space. The National Launch System (NLS) consists of a family of modular launch vehicles, combining elements of current launchers (Titan and Shuttle) with newly developed components. This family consists of 1) NLS-1 (a vehicle capable of delivering 80k to SSF), 2) NLS-2 (a vehicle capable of delivering 50k to LEO) and 3) NLS-3 (a vehicle capable of delivering 20k to LEO). Management of the program is shared between the two agencies with a Joint Program Office carrying out the Level II management and integration function while both the NASA and Air Force field organizations are charged with the various development and operational responsibilities.

For cargo delivery to SSF, the CTV is an integral and necessary part of the NLS. It performs two distinct functions: 1) first it provides the necessary delta vee to circularize the payload an place it in a phasing orbit which will cause it to rendezvous with the SSF; 2) once this rendezvous has taken place, the CTV is responsible for bringing the cargo close to the station and holding it for capture by the SSF mobile arm. In addition the CTV will be responsible for disposal of the unloaded cargo carrier and any SSF trash that has been placed on board.

AS many of you know the CTV program has had two NASA precursors, the Teleoperator Retrieval System (TRS), which was designed to reboost the Skylab space station and the more recent Orbital Maneuvering Vehicle (OMV). Both of these vehicles were designed to be remotely piloted using a video image transmitted from the vehicle to a pilot console. The pilot then used hand controllers to fly the vehicle for docking or other proximity maneuvers. While both of these programs were cancelled, this basic scheme was found to be generally workable although it was complex in implementation.

Because the CTV is an unmanned vehicle carrying out repetitive maneuvers with SSF, it can benefit substantially from automated rendezvous and capture technology such as that being discussed at this conference. A remotely piloted system, in which the pilot constitutes an integral part of the flight control system, results in complex interactions between questions involving communication, on board redundancy, control console/pilot redundancy, etc. In an automated design systems can be simpler to design, failure modes are easier to define and plan for and the verification of the flight control system is a more manageable job. From a SSF point of view the amount of CTV related gear required on the SSF can generally be reduced since most of the system can be built into the CTV. This of course translates into a simpler interface that is easier to manage.