

STANDARD PROTOCOL STACK FOR MISSION CONTROL,

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ABSTRACT

overwhelming pressures exist to drastically reduce the costs of designing and operating spacecraft. Standardization has emerged as a key weapon in the conflict between necessary increases in space mission complexity and rapidly declining space mission budgets.

The command and control of the spacecraft -- the business of creating the contents of actual command messages, transmitting them, monitoring, their execution, and ensuring throughout that the integrity of the flight system is preserved -- is an area ripe for standardization. There is a clear need to develop and emplace standard Application layer user services that allow many different types of spacecraft to appear basically similar from the perspective of ground controllers. With such standard Application services in place, the spiral of constant redesign can be broken and mission operations budgets can be contained.

Underlying these Application services, new space data communications standards are needed to support File Transfer (Layer 7), end-to-end Transport and Data Protection (Layer 4) and more flexible Networking (Layer 3) services. Both NASA and DoD are collaborating in the joint development of a "Skinny Stack for Space Systems" which will provide these underlying communications services. Within the civil space community, the new Skinny Stack will interface directly with existing (Layer 1,2) CCSDS data communications standards.

This paper reviews current work in developing new standard mechanisms for spacecraft control, and their supporting stack of skinny, space-based data communications protocols.