

ASTRODYNAMICS SYMPOSIUM (C1)
Attitude Dynamics (1) (8)

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ACS FEED-FORWARD FOR MANIPULATOR CONTROL DURING COUPLED SATELLITE
DETUMBLING**Abstract**

Satellite servicing is an area of active research and great interest. The vast majority of satellites on orbit have not been designed for servicing, leaving them without docking mechanisms that facilitate easy and stiff coupling of a client satellite with a servicer vehicle. Systems that employ dexterous robotic manipulators to grapple hard points on the client satellite have been proposed in place docking systems. This introduces a complex and flexible link between the two satellites that must be controlled. This paper presents a method for using the commanded forces and torques of the servicer vehicle's attitude control system to inform the motion of a manipulator used as the connection between a servicer and client satellite to ensure appropriate transmission of desired control forces. Furthermore, with the manipulator under active control, rather than with its joints locked, structural filters can be employed to avoid the excitation of problematic frequencies. The ability to successfully detumble client satellites through these flexible connections increases the number of potential servicing clients.