



## **SATELLITE SUPPORT OPERATIONS**

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**Satellite Operations.** Satellite operations are conducted to maneuver, configure, operate, and sustain on-orbit assets and are characterized as either spacecraft or payload operations. Spacecraft operations include TT&C, maneuvering, state-of-health monitoring, and maintenance sub-functions. Payload operations include monitoring and commanding the satellite payload to collect data or provide capability in the operational environment. Spacecraft and payload operations may be conducted by a single Service, multiple Services, or joint organizations. Satellite operations should include protection mechanisms to ensure access to [space](#) capabilities. This continued access is a critical service to combat support operations that enable the delivery of vital capabilities to the warfighter. Mission assurance may be achieved by a myriad of protection techniques and or technologies that may be incorporated into various parts of the satellite operations network. Additional information about protection measures can be found in the [defensive space control](#) (DSC) section of this annex.

**Satellite Control Network.** Department of Defense (DOD) satellites are monitored, sustained, and operated by Service component satellite operations centers. Globally-dispersed antennas for commanding satellites provide the necessary link between the satellite operations centers and the on-orbit satellites. Some systems use dedicated antennas for both mission data retrieval and routine satellite telemetry, tracking, and control (TT&C). The scheduling of this shared resource is centrally managed in order to provide optimal use of this capability to the DOD, [National Aeronautics and Space Administration](#) (NASA), and other mission partners.

**On-Orbit Reconstitution.** Reconstitution involves actions to restore operations following the loss of a capability. In the event of a system degradation or loss, on-orbit assets may satisfy or mitigate a capability gap by repositioning or reconfiguring other assets or by augmenting assets with civil and commercial capabilities.

**Disposal of Space Vehicles.** To minimize space debris and collision risk, spacecraft should be properly disposed of at their end of life. Potential options include controlled or uncontrolled atmospheric reentry, transfer to a disposal orbit, or direct retrieval. Planners should consider disposal options during life cycle development and on-orbit operations to ensure the viability of disposal at the spacecraft's end of life.

**Rendezvous and Proximity Operations.** Rendezvous and proximity operations (RPO) are conducted to support mission requirements such as on-orbit activities like assembly and servicing and include the potential to support a wide range of future US space capabilities. To minimize the risk of collision and the creation of orbital debris, all

RPO activities should ensure space flight safety. Rendezvous operations are specific processes where two space objects are intentionally brought close together in support of an operation. Proximity operations are on-orbit activities of a space object that deliberately and necessarily maintains a close distance from another space object for a specific purpose.

Servicing of space assets requires the capability to rendezvous, conduct close proximity operations, and/or dock with the space asset. On-orbit servicing capabilities enable inspection, repair, replacement, and/or upgrade of spacecraft subsystem components and replenishment of spacecraft consumables (e.g., fuels, fluids, cryogenics, etc.). RPO may also be used to provide battlespace information on spacecraft events.

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