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SCRAP - Resource Coordination for Space

What it is

SCRAP (Satellite Capability Routing Authorization and Payment Protocol) is an open coordination protocol for allocating orbital resources across space systems. It enables satellites and space infrastructure to quote, reserve, authorize, execute, and verify services directly in orbit without continuous ground control. SCRAP helps companies meet Federal Rule of Evidence 901 for insurance proceedings.

SCRAP operates at the application layer and is designed to run on existing spacecraft hardware and communications links, providing standardized primitives for autonomous coordination and verifiable execution. Settlement is backhauled to Dyson Ground servers. SCRAP can be implemented in ground software or flight software and operates above existing communications links.

The problem

Modern space operations face intermittent connectivity, limited power and spectrum, long ground latency, and increasing interaction across independently operated systems. Despite this, coordination remains largely ground-scheduled, static, and human-mediated.

This approach does not scale to dense constellations, crosslinks, on-orbit services, or contested environments.

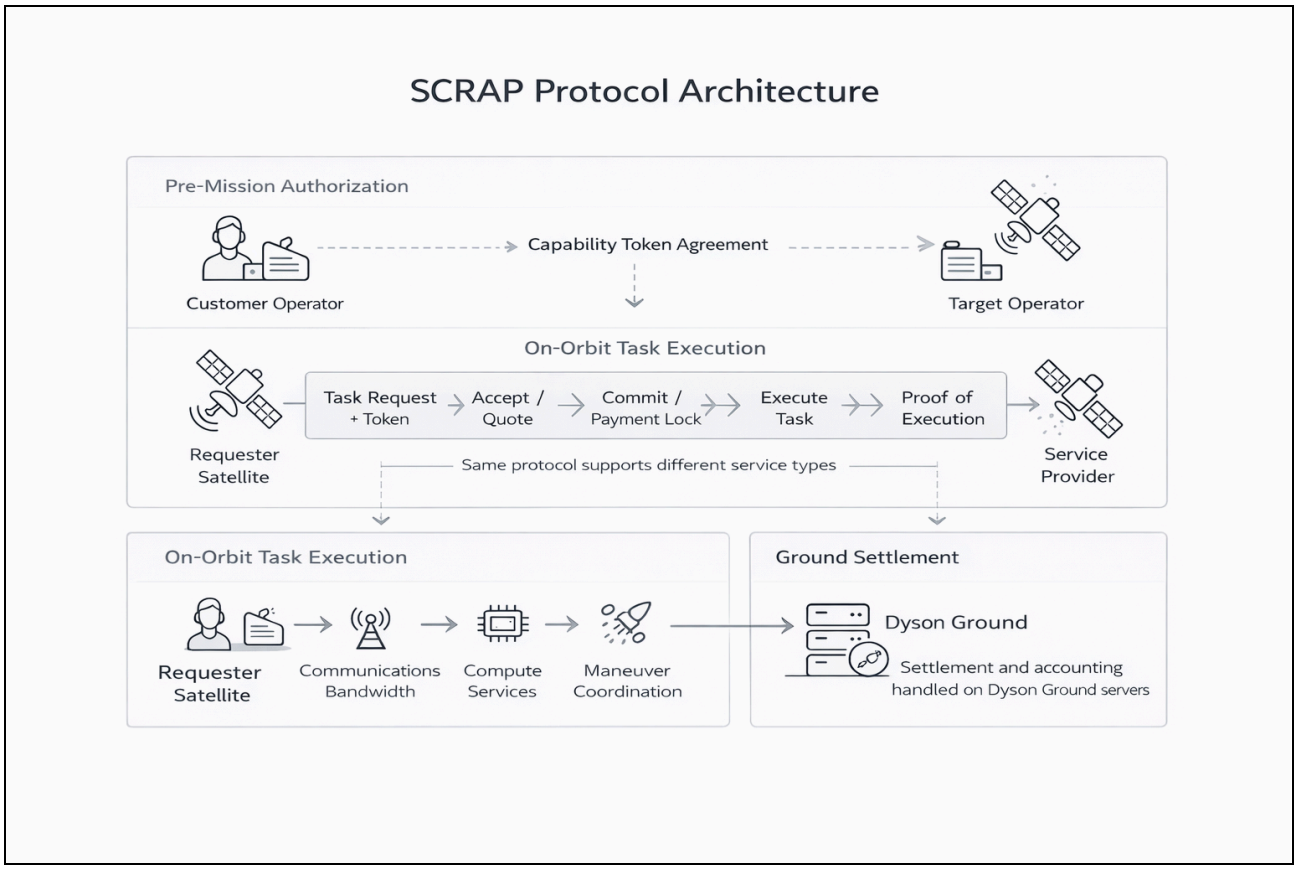
SCRAP: operational and economic coordination

SCRAP defines machine-readable transaction primitives that allow spacecraft to treat orbital resources as allocatable services.

Quote — request price, availability, and reliability
Reserve — temporarily hold capacity
Commit — authorize execution or release the reservation
Receipt — cryptographic proof that the service was completed

Together these primitives form a transaction lifecycle for allocating scarce capacity dynamically in orbit, allowing spacecraft to coordinate based on real-time system state rather than preplanned ground schedules.

This coordination model allows operators to safely oversubscribe orbital resources. Power generation, compute capacity, and communications bandwidth are rarely used at peak simultaneously. SCRAP preserves guarantees with dynamic quoting and capacity reserves.



Communications Bandwidth

Satellites frequently compete for limited downlink and relay bandwidth. SCRAP allows systems to dynamically quote, reserve, and allocate communications capacity across ground stations or relay satellites.

Operators can oversubscribe bandwidth safely, allocating idle capacity while preserving guarantees for higher-priority traffic.

Compute Services

Spacecraft increasingly carry onboard compute capacity that sits idle between mission workloads. SCRAP allows compute tasks to be quoted, reserved, and executed across available nodes, creating a market for distributed in-orbit computation.

Execution receipts provide verifiable proof that tasks were completed.

Maneuver Coordination

Collision avoidance decisions today often rely on manual coordination between operators. SCRAP allows spacecraft and ground systems to dynamically coordinate, assign, and verify maneuver responsibility when conjunction risks arise.

SCRAP is for machine-speed accountability.

For access to the SCRAP specification
https://dyson-labs.com/contact

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