Geostationary Orbit, Orbital Slots Cleaning (GEOOSC)

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COE EE AE 4 ICS

Problem Statement

End-of-life geostationary satellites become debris that threaten spacecraft and operational satellites. GEOOSC's CubeSat constellation will relocate a 990 kg inactive satellite to a graveyard orbit.

Constraints

1. Debris mass ≥ 990 kg
2. Pre-known debris trajectory
3. Comms within Saudi frequency rules
4. Real-time subsystem data access
5. Instant detection results

Specifications

- CubeSat size: 12 U
- Propulsion: thrust to move ≥ 990 kg (≥ 250 kg per unit)
- Communication: S-band (2–4 GHz) or higher
- Onboard computer: 4-core ≥ 2 GHz CPU, 8 GB RAM
- Detection accuracy: > 90%
- Velocity match: ≥ 3 km/s
- Status updates: every 15 min

Prototype Development

| System	Key Specs
Structure	12 U frame (20 × 20 × 30 cm)
Power	Solar panels, rechargeable battery, PDU
Propulsion	Thrusters ≥ 250 kg thrust per CubeSat
Communications	S-band transceiver (2–4 GHz), Saudi-compliant
Nav & Control	IMU, star tracker, GPS, reaction wheels
Payload	LiDAR, camera, robotic arm
Main Computer	Quad-core ≥ 2 GHz CPU, 8 GB RAM
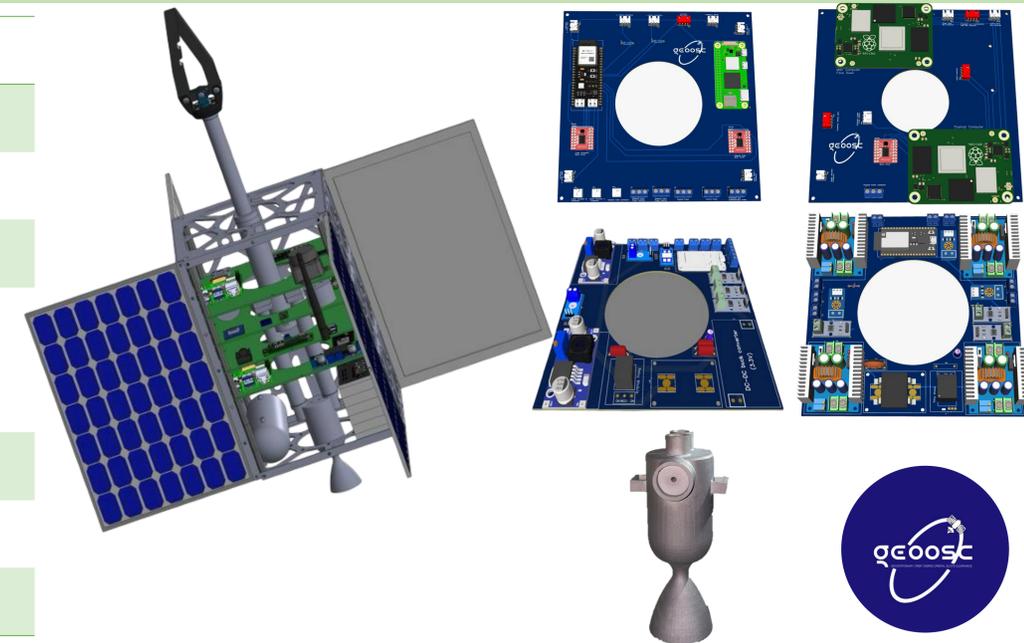
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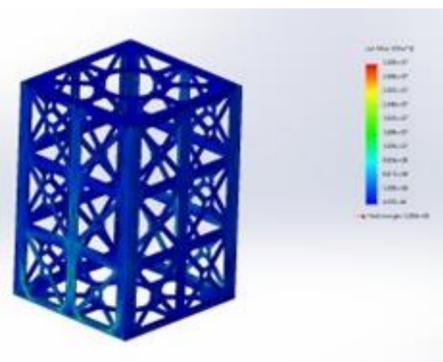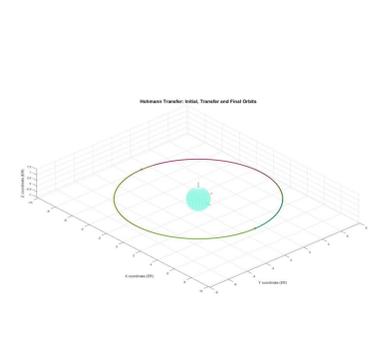
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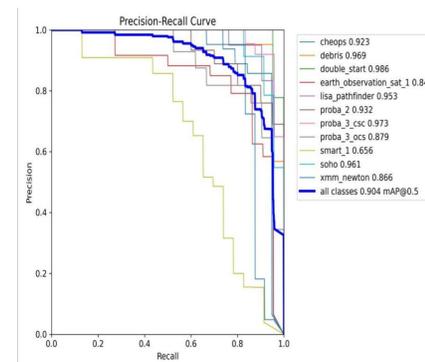
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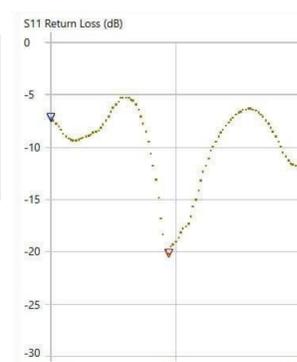
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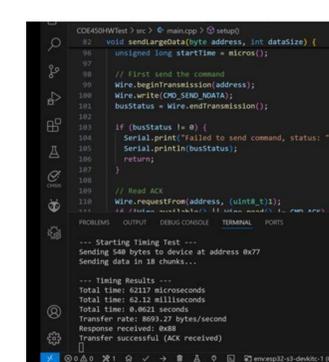
Real-Time Data

Orbital Transfer

Conclusion

By permanently relocating end-of-life GEO satellites to a graveyard orbit, GEOOSC ensures the long-term safety and reliability of critical satellite services.