

Low Earth Orbit Kinetic Space Safety Workshop

Debris Remediation *The Big Picture...*

Darren McKnight
Senior Technical Fellow
LeoLabs

4-5 May 2022

Lausanne, Switzerland



Remediation: Derelict Collision Prevention

Debris Mitigation

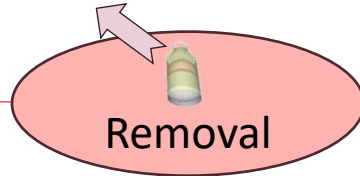
- Deorbit in 25 yrs
- Do not create

By Self (During)

- Only for op. objects

Collision Avoidance (CA)

- CDMs issued
- Satellites respond



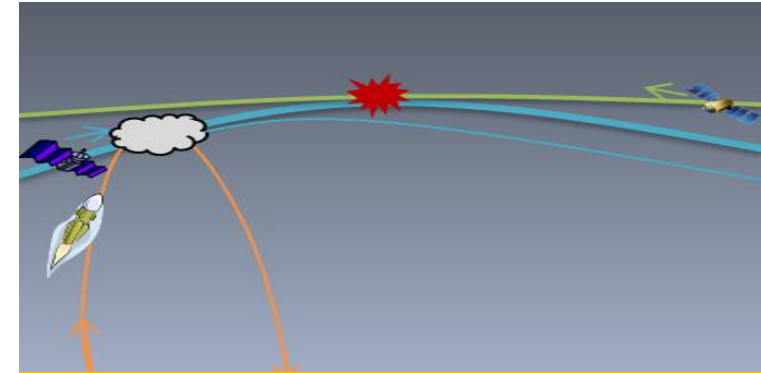
Active Debris Removal (ADR)

- ID/Despin/Grapple/(Re)move
- Requires large impulse
- Takes time to realize benefit
- Manage reentry risk
- Permanent solution

Statistical

By Other (After)

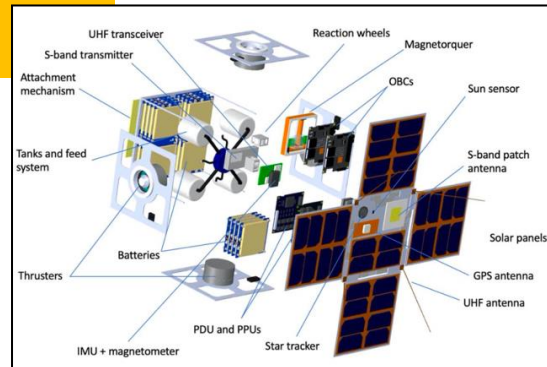
- Not operational



Just-In-Time CA (JCA)

- ID/Deploy/Nudge
- More responsive/accurate SSA
- Immediate benefit
- No reentry risk
- Temporary solution

Deterministic



Nano-tug

- ID/Grapple/React
- Delayed benefit
- No reentry risk
- Temporary solution

Hybrid

Sweep up fragments

Remediation: Derelict Collision Prevention

Debris Mitigation

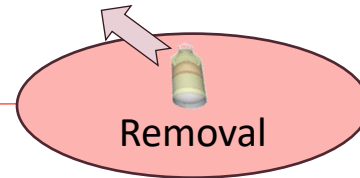
- Deorbit in 25 yrs
- Do not create

By Self (During)

- Only for op. objects

Collision Avoidance (CA)

- CDMs issued
- Satellites respond



Active Debris Removal (ADR)

- ID/Despin/Grapple/(Re)move
- Requires large impulse
- Takes time to realize benefit
- Manage reentry risk
- Permanent solution

Statistical

By Other (After)

- Not operational

Just-In-Time CA (JCA)

- ID/Deploy/Nudge
- More responsive/accurate SSA
- Immediate benefit
- No reentry risk
- Temporary solution

Deterministic

Nano-tug

- ID/Grapple/React
- Delayed benefit
- No reentry risk
- Temporary solution

Hybrid

Sweep up fragments

THANK YOU

