

The Best Space Resource Is The One You Can Catch And Reuse

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1 Space Debris potential as reusable and recyclable space resource

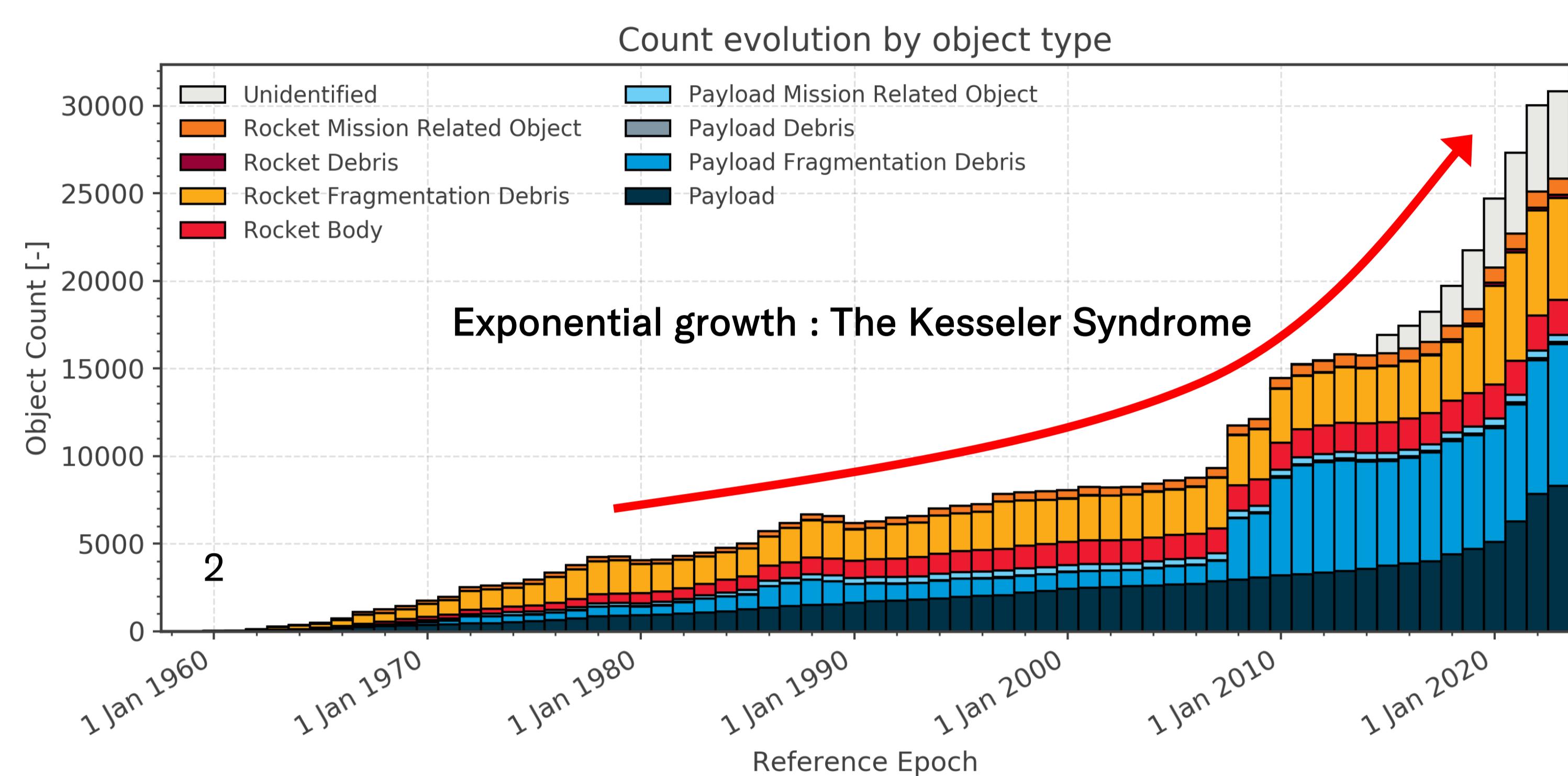


Statistical Models estimation

→ More than 130 million space debris > 1 mm

→ 0.024% (30820 objects) tracked by Space Surveillance Networks

Unsustainable + Orbit saturation + Unsafe for future space missions



No object removed for more than 60 years

Many more constellations are to be set in LEO

9900 tonnes of different objects in orbit

Big potential for reuse and recycle

2 Can be exploited efficiently with new Active Debris Removal capturing system

Autonomous capturing is challenging



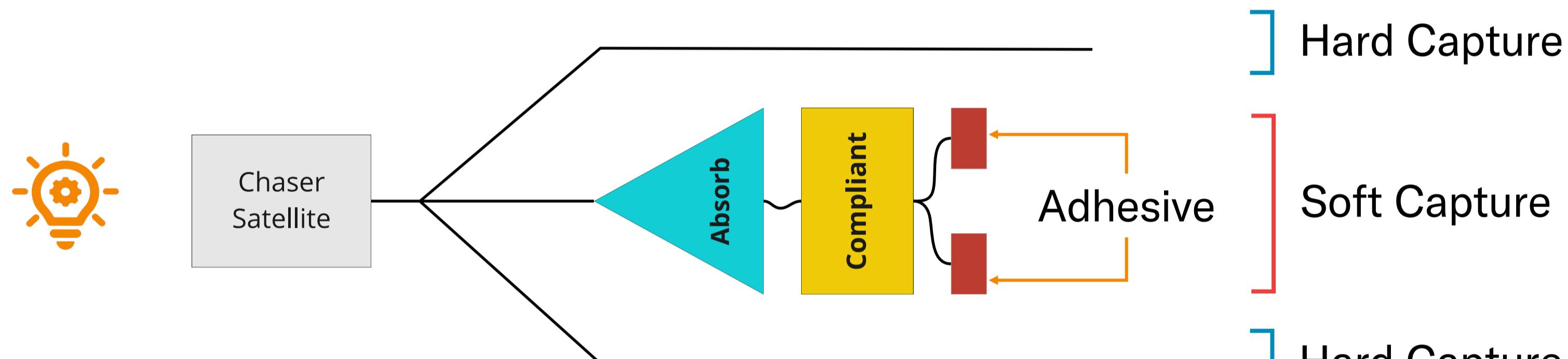
Catching harmlessly an uncooperative debris tumbling at high velocity needs:

- compliance
- reliability
- robustness

Not harming the target = Maximizing resource reusability

Rigid capture interfaces → Generate more smaller debris tumbling in orbit

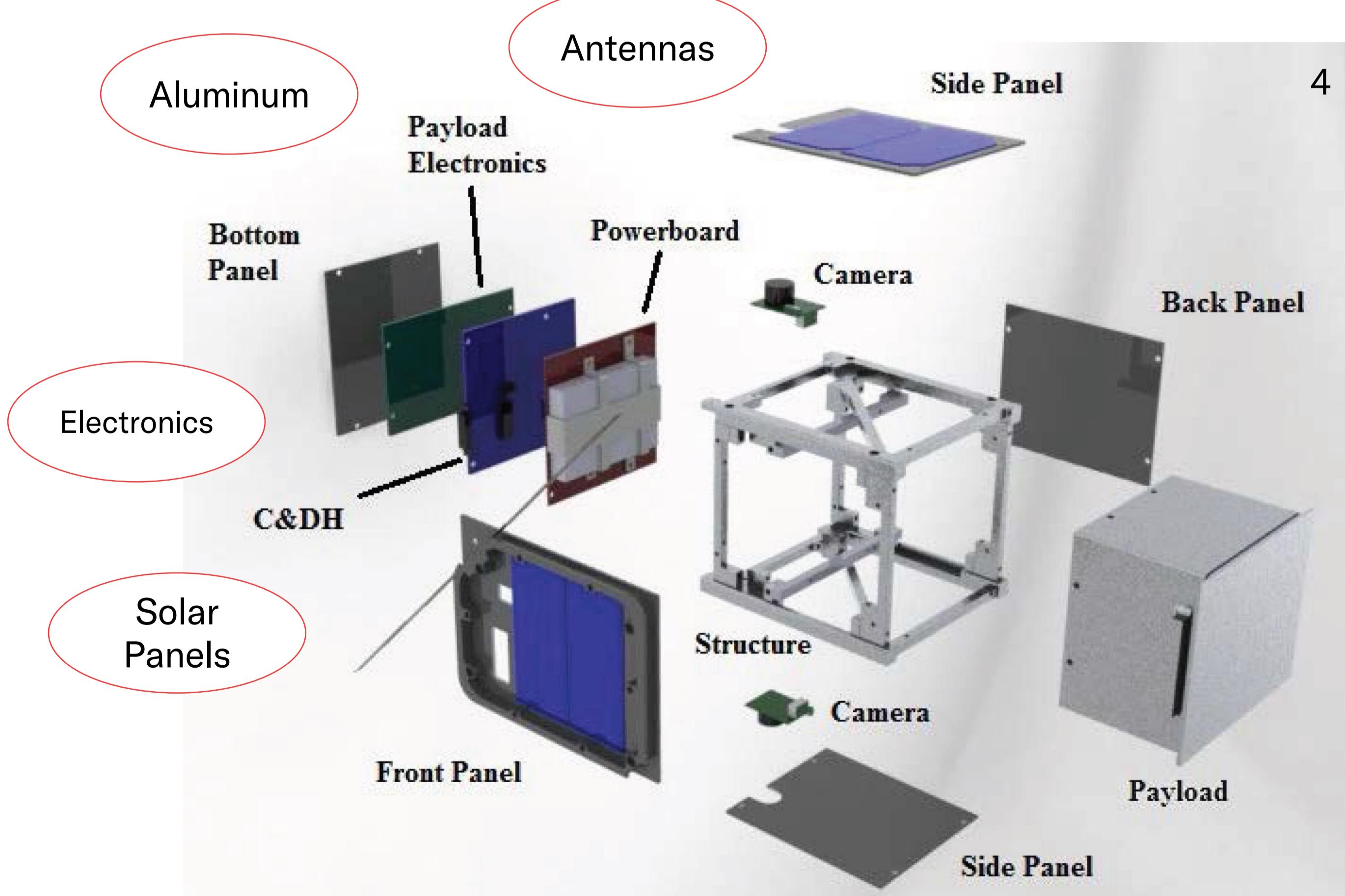
Soft capture interfaces → No harm of debris & Exploitable resource



Two-step capturing mechanism

→ 'Soft Capture' absorb and dampen vibrations generated during the contact
→ 'Hard Capture' secures the debris

3 Opening the door to advanced opportunities for space resources utilization



Many different subsystems can be reused or recycled from CubeSats

The proposed ADR capturing technology can collect harmlessly defunct satellites and debris such as CubeSats, using this new two-step capturing mechanism, which will contribute to:

- A more sustainable environment in space
- Possible gathering on a recycling orbit
- Possible gathering in future Space Station for reuse
- A better reusability index due to the harmless capturing

1. ESA model of the space debris environment | 2. Count evolution by object type – ESA April 2022 | 3. Artist's concept of an ADR system – EPFL | 4. NASA exploded view of the basic modules that comprise a typical CubeSat | 5. 3D Concept CAD of the proposed technology