

Space Safety

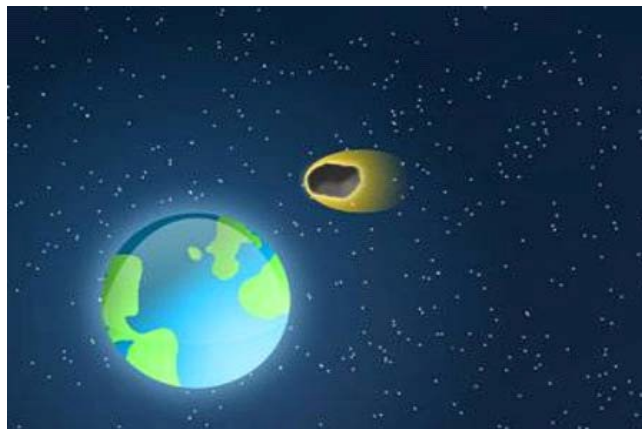
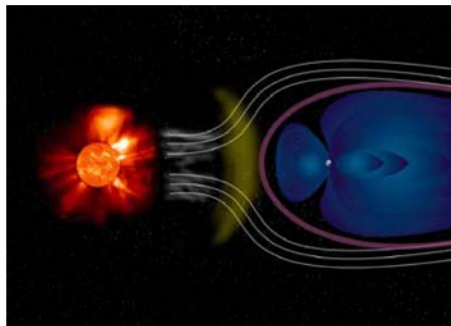


Rüdiger Jehn, ESA, Planetary Protection Office



European Space Agency

Protection of our Planet, of Humanity, and assets in space and on Earth from dangers originating in Space



Space Safety

Ambition:

An **single programme** covering:

- Space Weather
- Planetary Defence
- Debris and Cleanspace

- *Gap analysis and setting of priorities to identify new activities (proactive architect role!)*
- *new & strengthened partnerships*

Space Safety

Recover

Respond

Mitigate

Protect

Prevent

RESILIENCE

To address **threats** and **hazards** (man-made and natural), lines of activities can be pursued to contribute to:

- 1) Identify threats and hazards;
- 2) Analysis of their probability;
- 3) Recognition and analysis of severity and magnitude;
- 4) Prevention/Mitigation/Protection (as a function of 2 & 3);
- 5) Crisis management & communication management (management of situation);
- 6) Recovery

SAFETY AND SECURITY

Threat nature
and magnitude

Vulnerability
to a threat

Consequence that
could result

Focus of Space Situational Awareness Programme so far

A visualization of space weather showing a bright orange and red solar flare or coronal mass ejection on the left, with glowing white and purple magnetic field lines extending to the right.

Space Weather

A visualization of planetary defence showing a blue and green Earth on the left and a yellow, ringed planet (like Saturn) on the right, both set against a dark blue space background filled with white stars.

**Planetary
Defence**

Cornerstones of Space Safety

A photograph of a yellow satellite in orbit above Earth's blue and white clouds. The satellite has solar panels and various instruments.

**Debris and
Cleanspace -
Remediation**

A photograph of a dense field of white space debris, including many small particles and larger fragments, against a black background.

**Debris and
Cleanspace -
Prevention**

CORNERSTONE TOPICS

1. **SWE L5 mission** (L1, US)
2. **Asteroid deflection demo.** for Planetary Defence
3. **Debris removal** as an anchor institutional mission; and
4. **Spacecraft Collision Avoidance** addressing **Debris and Cleanspace**

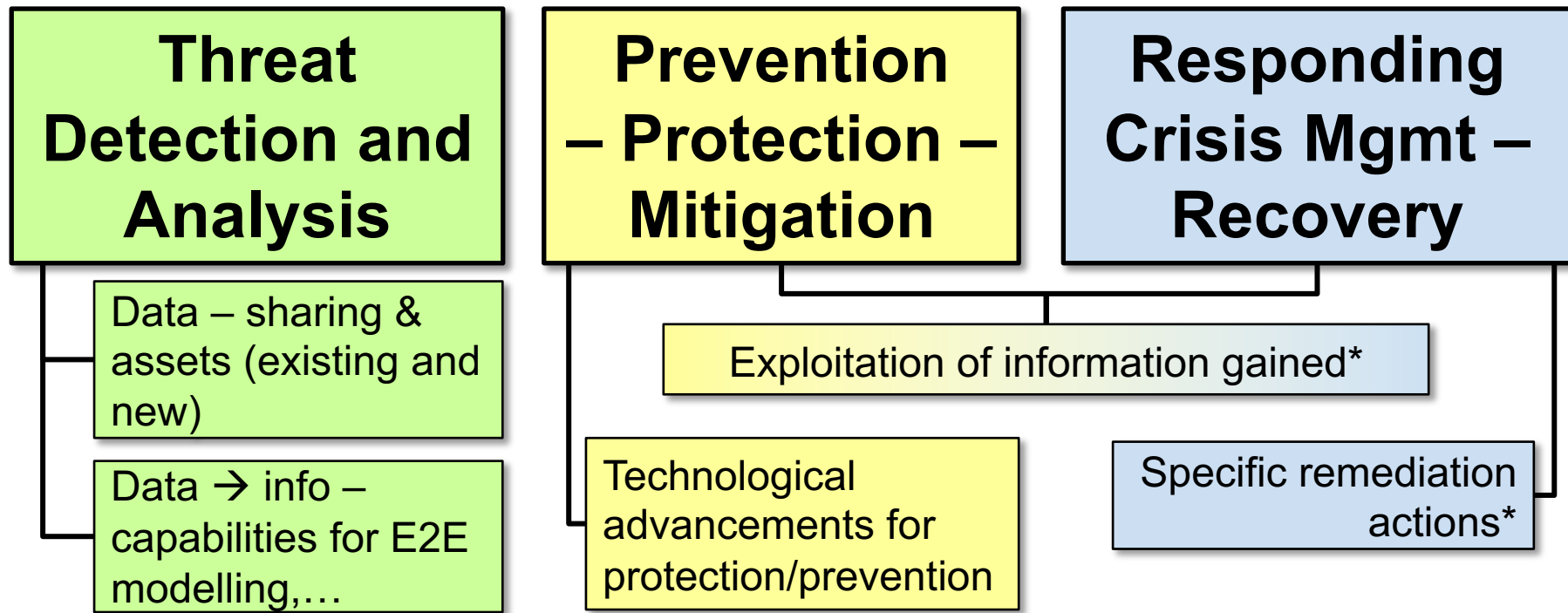
TECHNOLOGY DEMONSTRATORS

1. Close proximity GNC, etc.
2. SCAS demonstration on e.g. Proba 2

OPPORTUNITIES

1. Space servicing (& Co.) as a commercial follow-up of debris removal
2. Space Science....!

Gap analysis and setting priorities



* *high commercial potential*

NEO Detection and Threat Analysis

- NEO observations
- NEO sensors development
- Networking of assets

NEO impact mitigation and protection

- Deflection techniques
- *Asteroid deflection mission*
→ **Cornerstone**
- NEO applications and services



Planetary Defence Roadmap

