

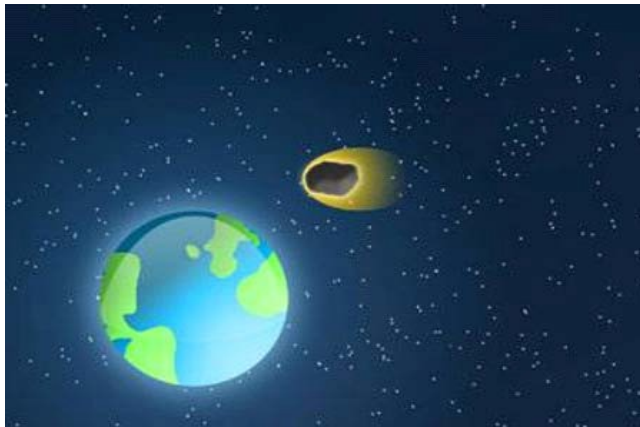
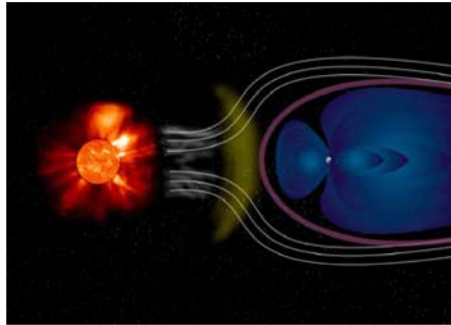
# Space Safety



ESA, Planetary Protection Office



*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 sun on the left, with white and purple magnetic field lines curving around it towards the right.

**Space Weather**

A visualization of planetary defence showing a blue and green Earth on the left, with a yellow, ringed planet or moon on the right, set against a dark blue starry background.

**Planetary  
Defence**

**Cornerstones of Space Safety**

A photograph of a yellow satellite component in space, with a blue satellite panel visible on the left and the Earth's surface below.

**Debris and  
Cleanspace -  
Remediation**

A photograph of a satellite in space, surrounded by a dense field of small white particles representing space debris, with the Earth's surface visible below.

**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**

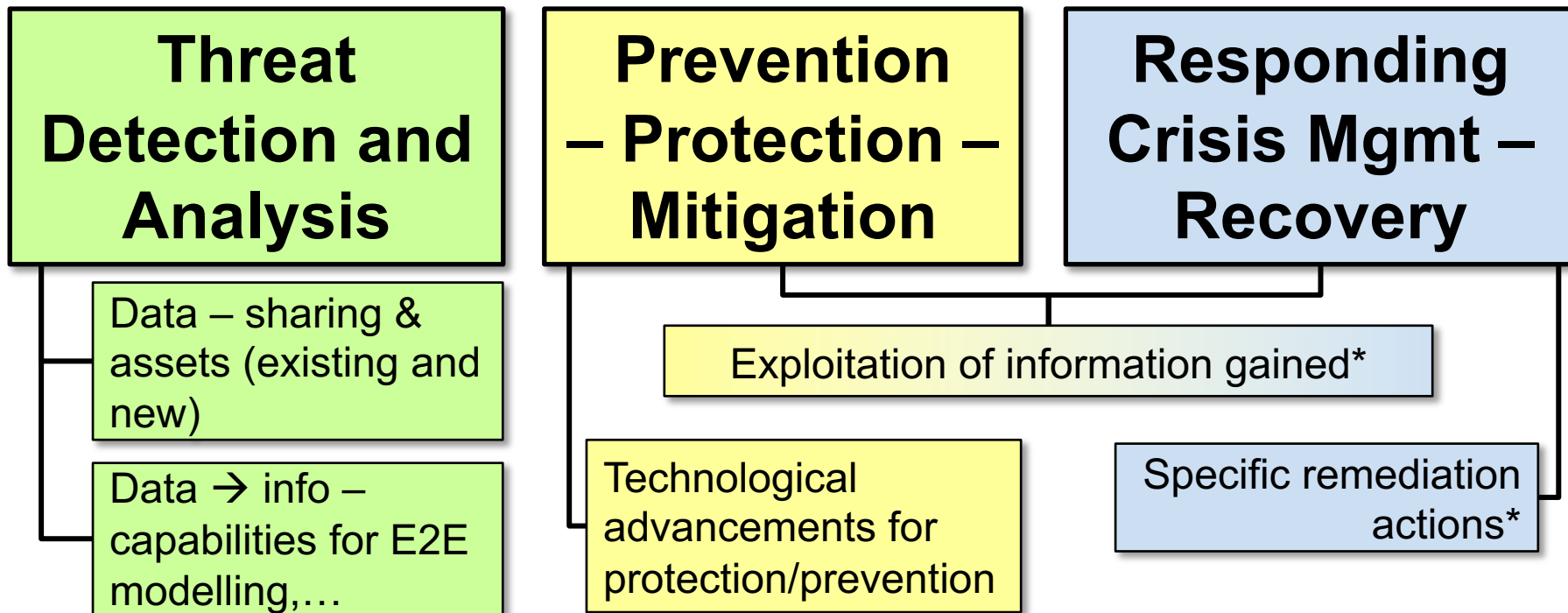
## TECHNOLOGY DEMONSTRATORS

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

