

# ESA's Space Situational Awareness Near-Earth Object programme

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What is Space Situational Awareness?  
The European SSA Programme  
The SSA-NEO segment  
Link to UN activities  
Current activities  
Architecture + system elements  
Conclusions



# What is Space Situational Awareness?

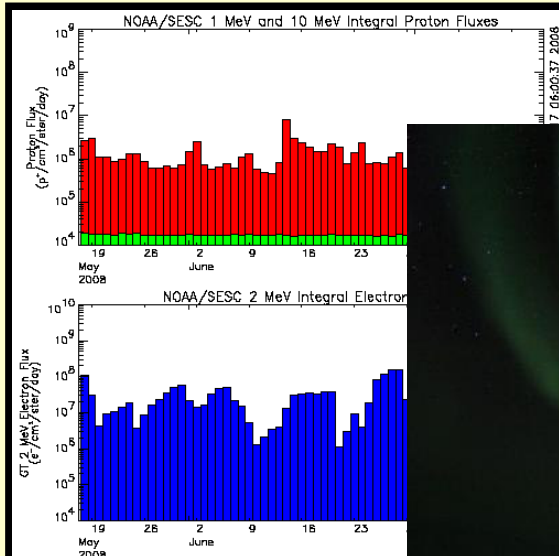
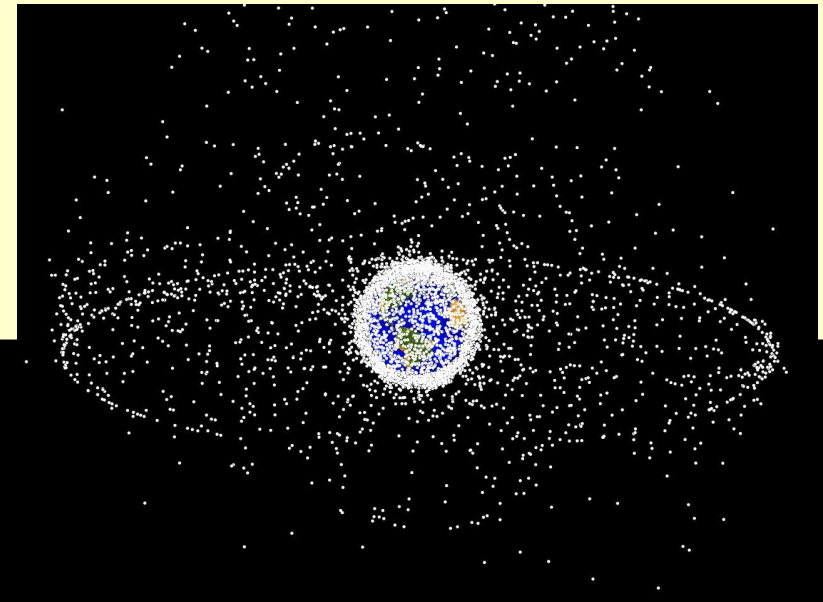
**The objective of the Space Situational Awareness (SSA) initiative is to support the European independent utilisation of and access to space for research or services, through providing timely and quality data, information, services and knowledge regarding the environment, the threats and the sustainable exploitation of the outer space.**

From the SSA Programme Declaration, ESA/C/SSA-PP(2008)2

# The European SSA Programme

## Three 'segments':

- Survey and Tracking (= Space Debris)
- Space Weather
- Near-Earth Objects
- Later: 'Imaging'



<- Proton and electron fluxes (NOAA)



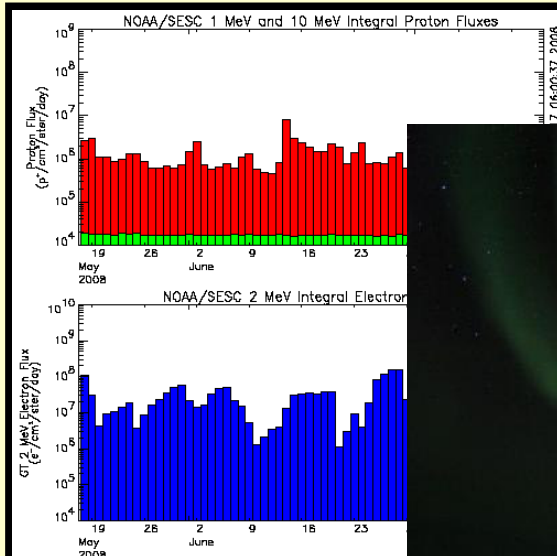
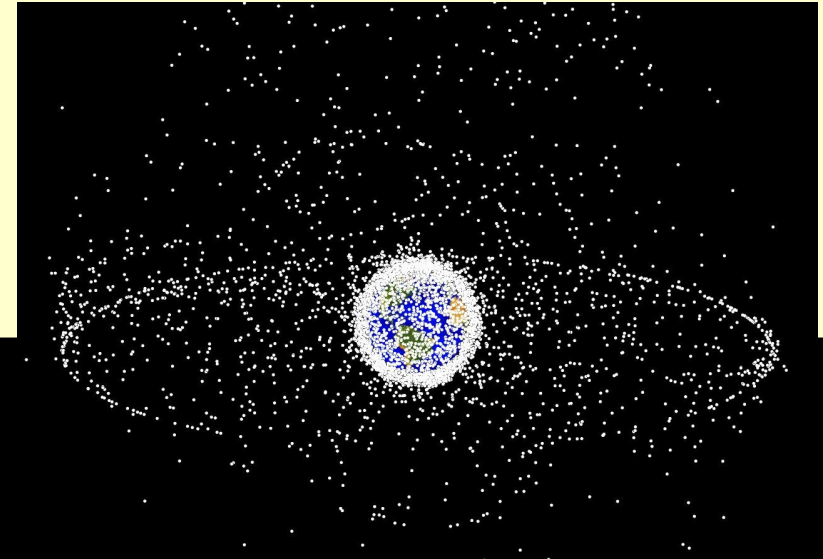
Aurorae - Robert Schwarz 2005



ISS Station from 400 km,  
VSW Munich, 80 cm aperture

# The European SSA Programme

- Preparatory phase (2009 – 2011) approved by ESA's Ministerial Council in Nov 2008 as an optional programme
- After confirmation: Nominal phase (10 years)



<- Proton and electron fluxes (NOAA)



Aurorae - Robert Schwarz 2005

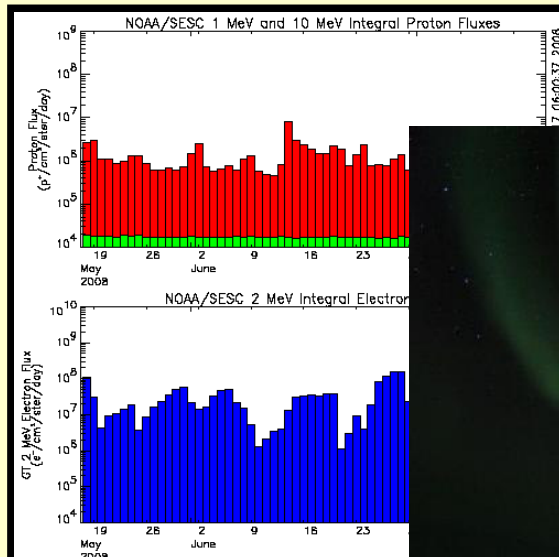
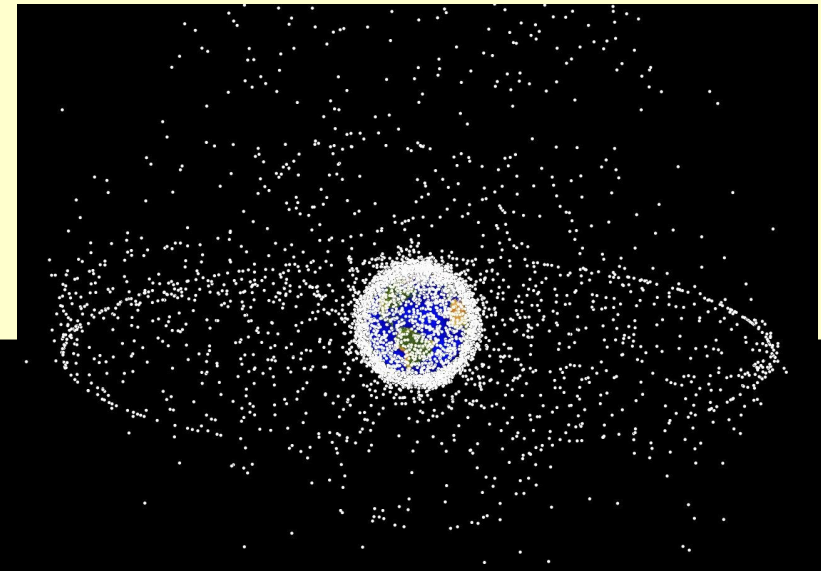


ISS Station from 400 km, VSW Munich, 80 cm aperture



# The European SSA Programme

- Network of sensors (ground- and space-based)
- Data centres
- Common data policy and standardization
- Optional programme, in D/OPS



<- Proton and electron fluxes (NOAA)

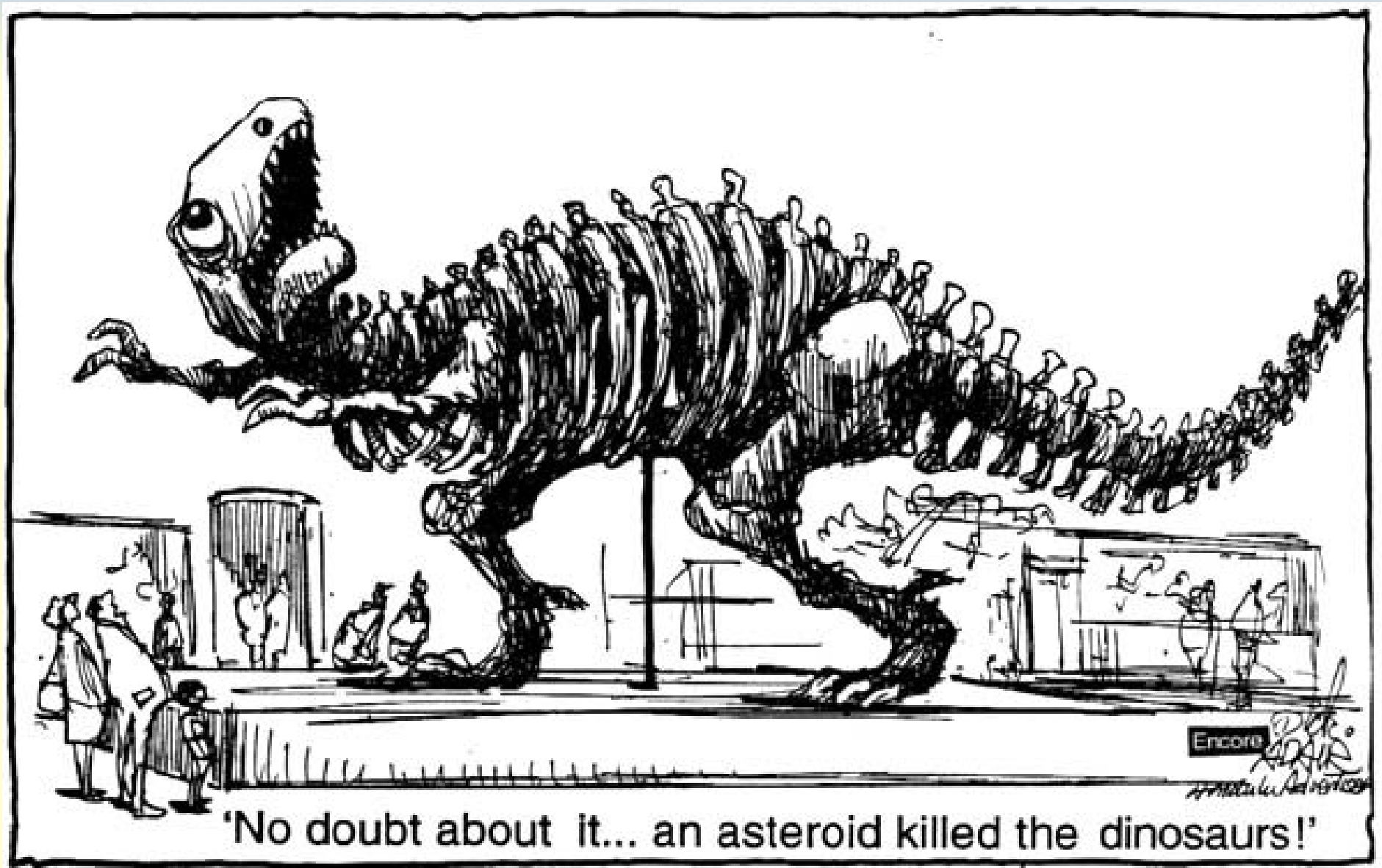


Aurorae - Robert Schwarz 2005



ISS Station from 400 km,  
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# Why should we care?

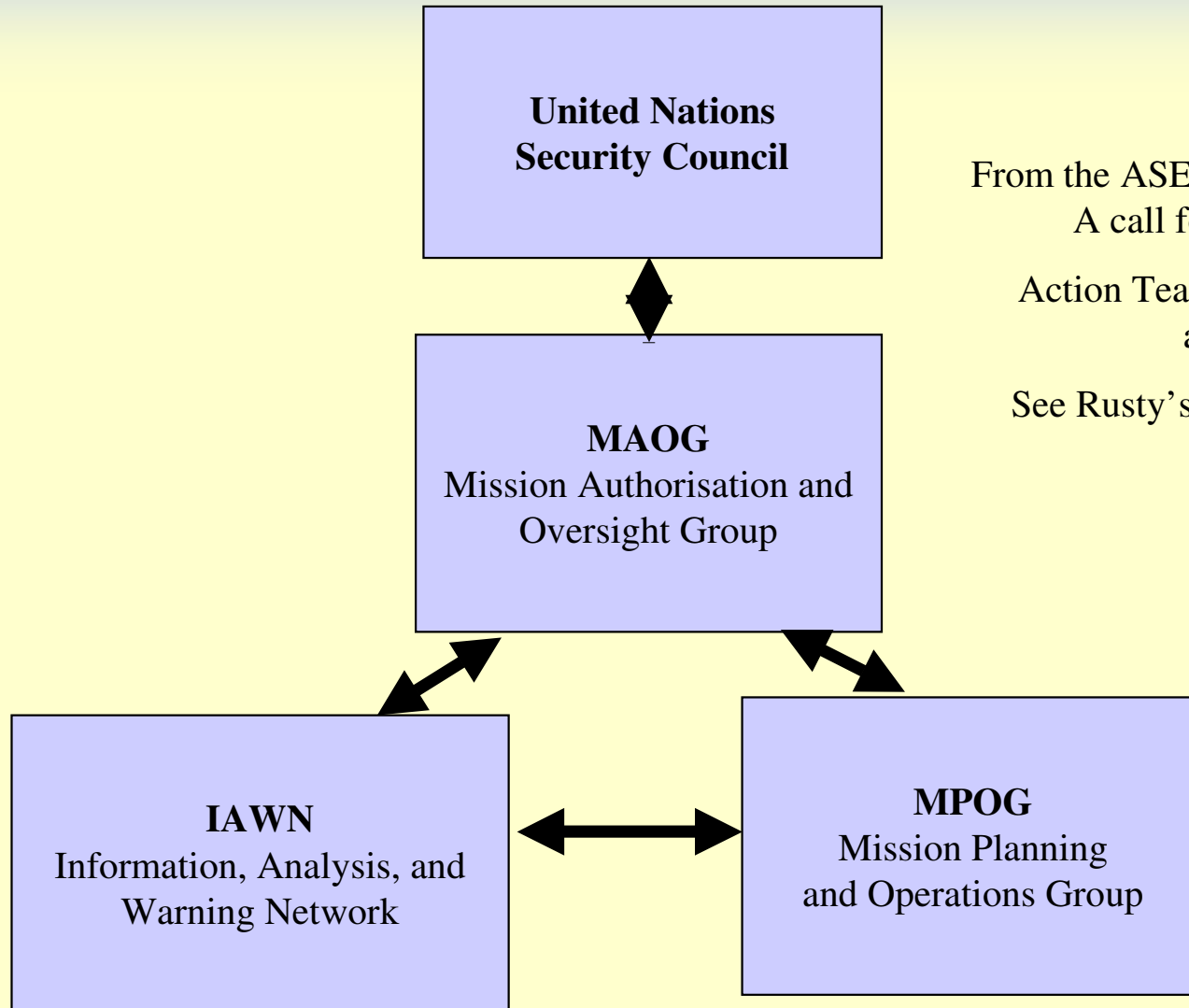


## **The European SSA-NEO segment - main requirements**

**The SSA-NEO segment shall provide information on the impact probability and/or miss distances of NEOs including associated uncertainties. To do this properly, it shall assess impact analyses, results, and perform its own impact risk assessments**

**Classify the risk of a NEO impact and issue warnings if the risk is higher than the background risk**

# SSA-NEO – link to UN activities



From the ASE report “Asteroid Threats:  
A call for global response”

Action Team 14 recommendations  
are followed

See Rusty’s presentation yesterday



# SSA-NEO – link to UN activities

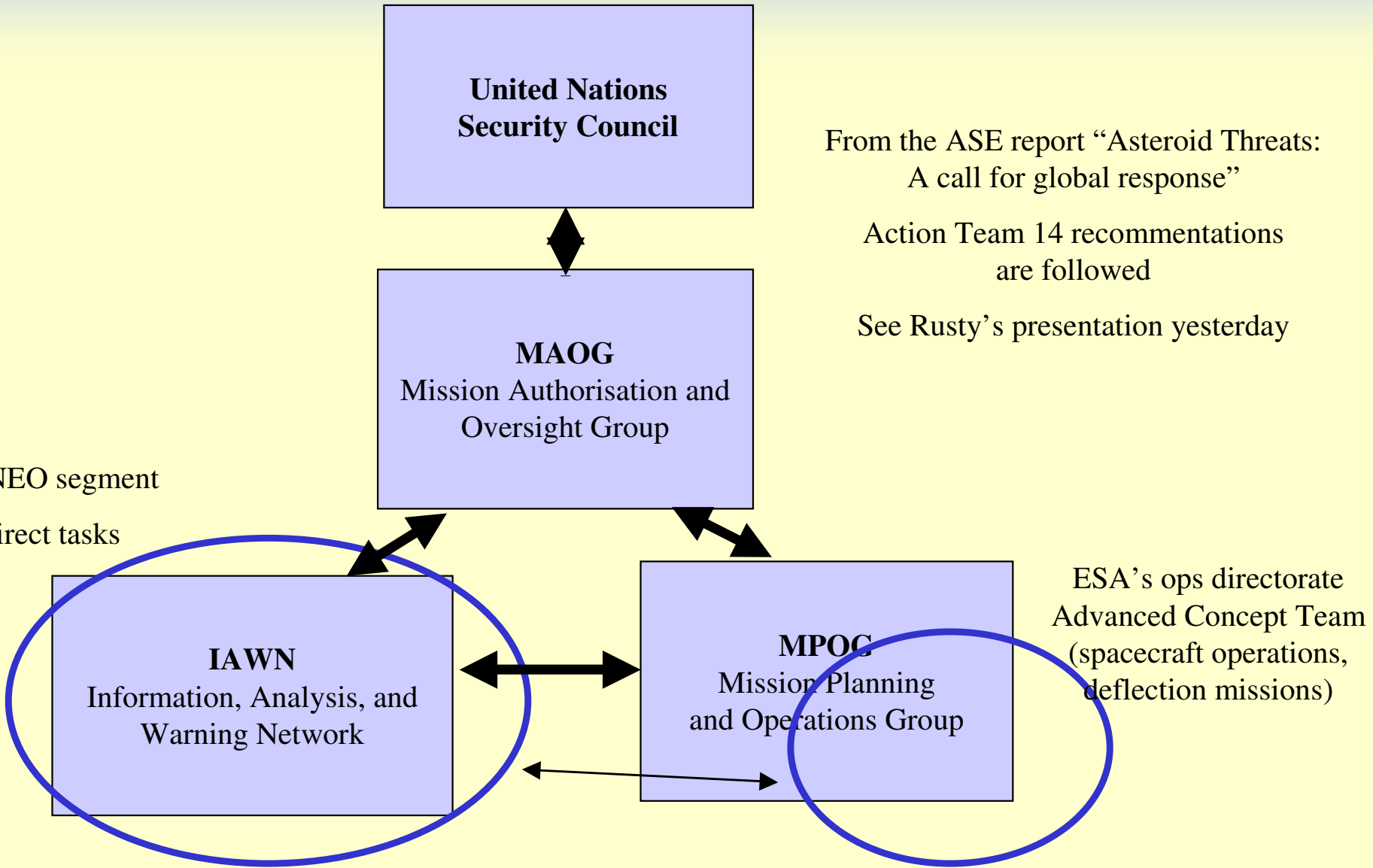
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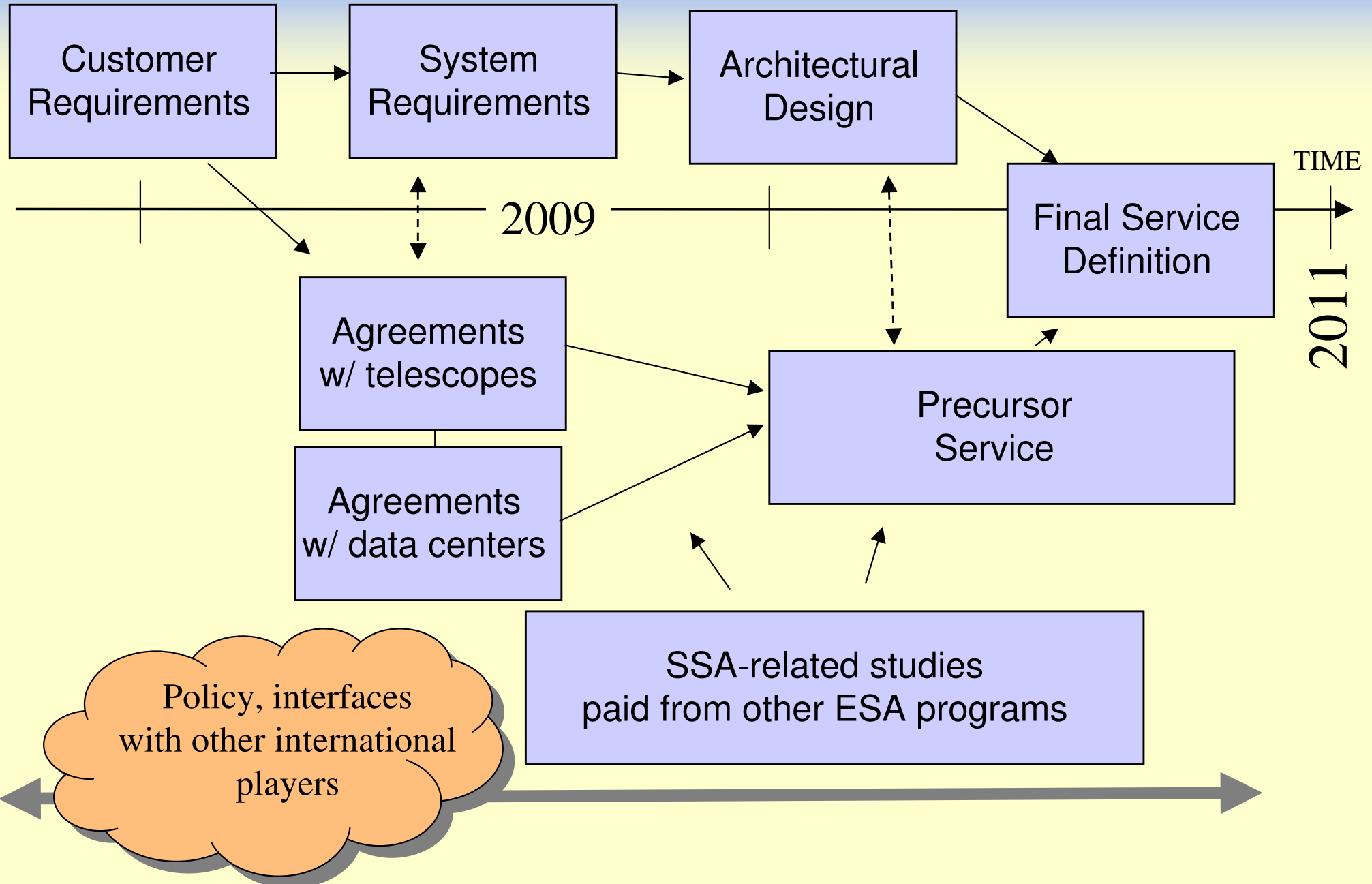
SSA-NEO segment

– direct tasks

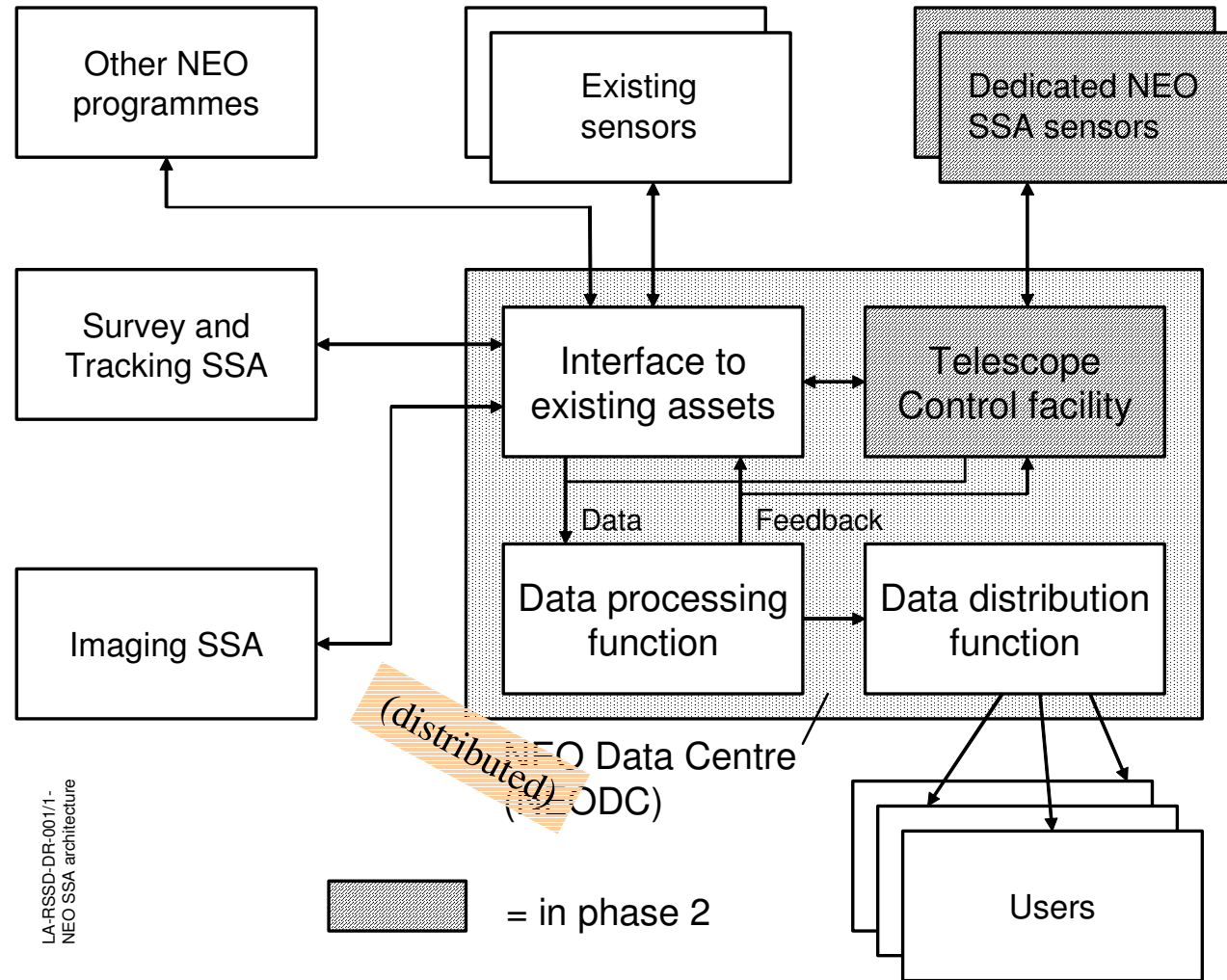


ESA’s ops directorate  
Advanced Concept Team  
(spacecraft operations,  
deflection missions)

# Current activities



# The European SSA-NEO segment - architecture



LA-RSSD-DR-001/1-  
NEO SSA architecture

# Envisaged system elements

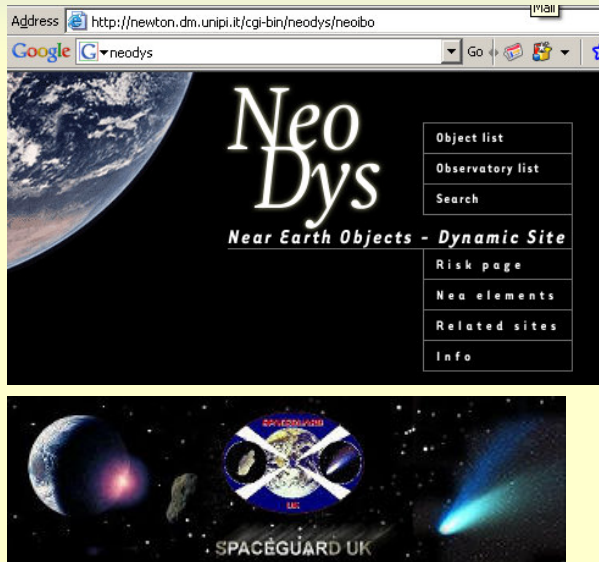
## Start with existing assets



**European Asteroid  
Research Node**

# Envisaged system elements

## Start with existing assets



European Asteroid  
Research Node

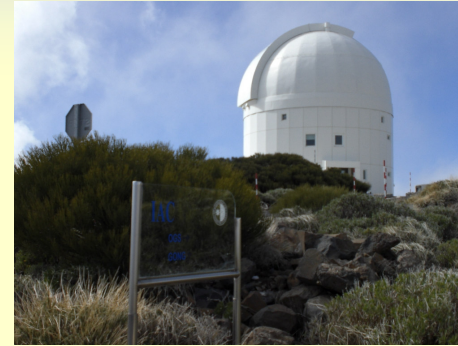
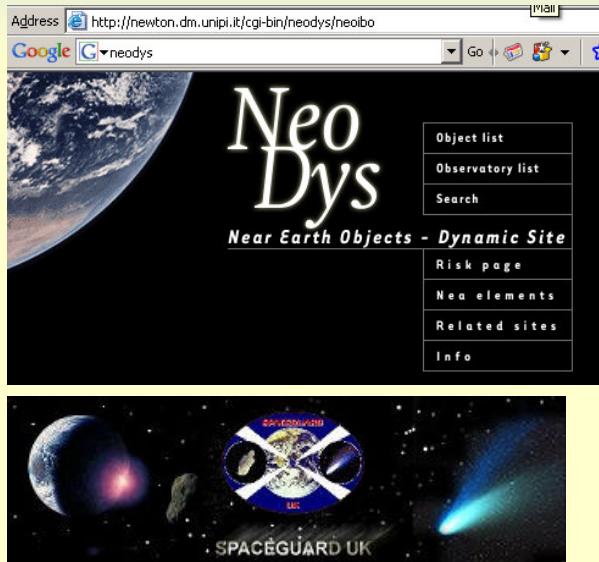
## Add missing functionality

- Bulletins, increase public information
- Visualisation e.g. of impact corridors (ref. Rusty's presentation)
- Duplicate service of Minor Planet Center?
- More...



# Envisaged system elements

## Start with existing assets



European Asteroid  
Research Node

## Add missing functionality

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## In phase 2

- Add dedicated telescopes, access to radar
- Add space-based element

## Participating countries in SSA

**Austria**

**Belgium**

**France**

**Germany**

**Greece**

**Italy**

**Norway**

**Portugal**

**Spain**

**Switzerland**

**United Kingdom**

Plus: Studies from other ESA programs -> all ESA member countries

## Conclusion

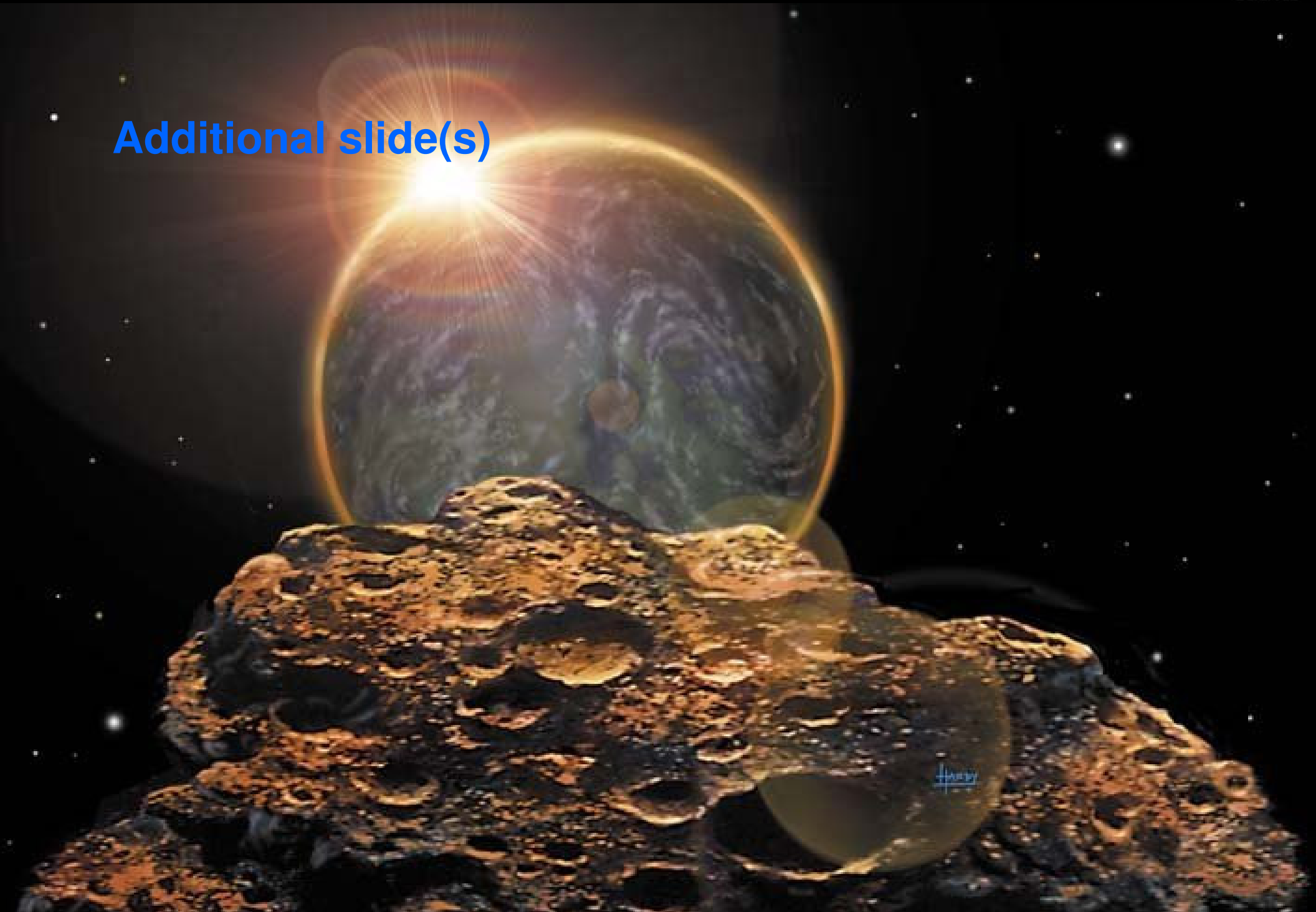
Europe now has the potential to contribute to the efforts of setting up a proper impact threat warning system.

SSA-NEO should to be part of an UN-sanctioned world-wide system.

COPUOS can help by acknowledging the activity and comment on program contents – members of Action Team 14 are in the SSA User Group



Additional slide(s)





# International context – possible

**Situation in 2012** After a drawing by Lindley Johnson, NASA

Observers Processing Archive Processing Interpretation Dissemination

