ESA's SSA-NEO Segment

Status 2015 Nov

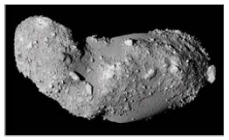
Gerhard Drolshagen, Detlef Koschny (ESA)
SSA-NEO Segment Managers

Image credit: ESA

Mission statement

- **ESA's SSA-NEO segment shall be aware of the situation in space related to natural solar system objects. In particular, it shall provide warnings of potentially impacting objects. It shall prepare for mitigitation of the resulting risk.**

SSA-NEO setup - context



NEOs

Minor Planet Center (US)

ESA

others

National Cooperating telescopes

SSA tasking centre

Political entities

SSA sensors

SSA-NEO Coordination Centre

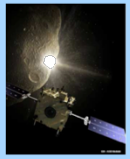
- Orbit determinatior
- Impact monitoring
- Phys. Properties
- Databases
- Light curves
- Shape models

General users

Space missions

National research expertise

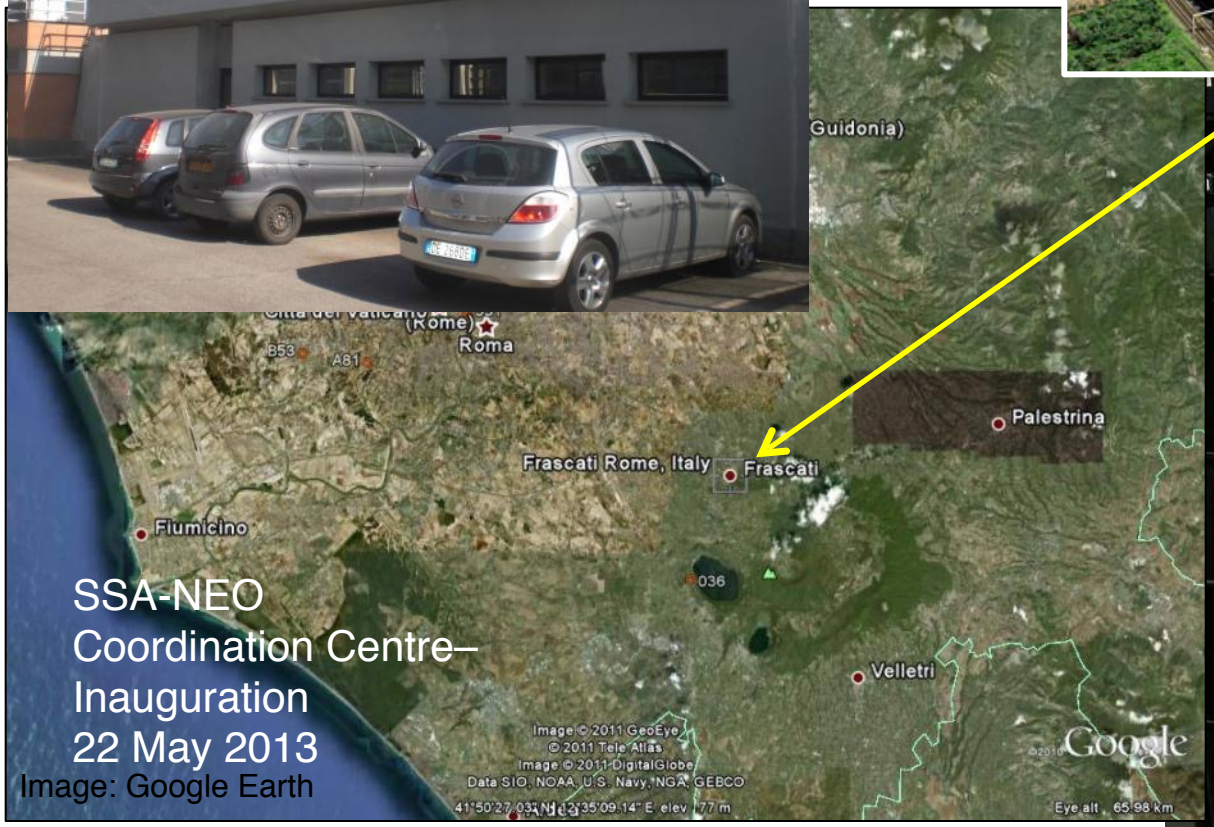
Space-related activities



NEO image credit: JAXA

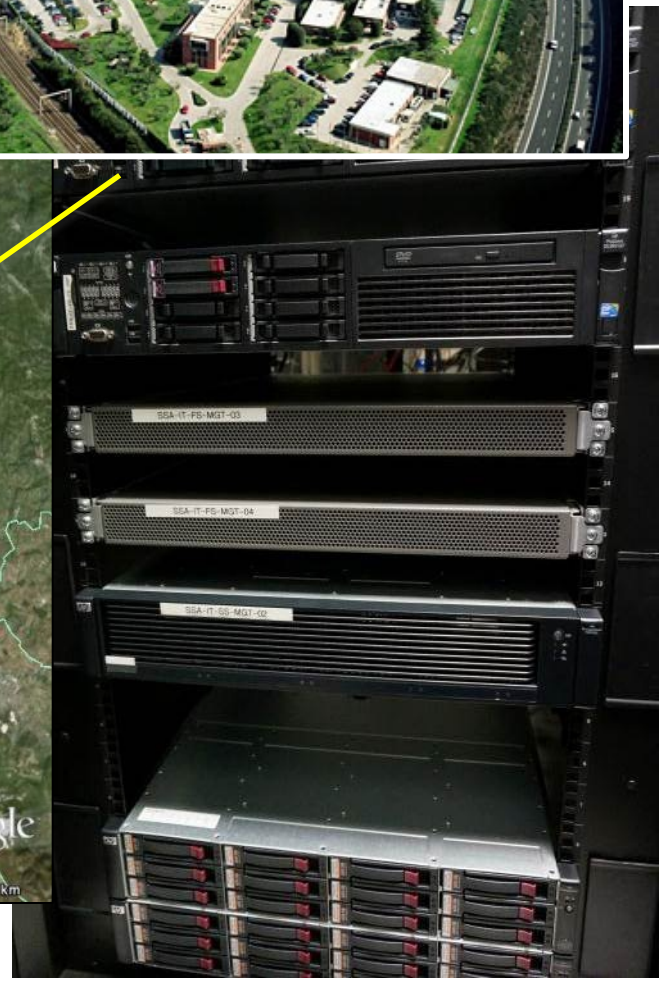
NEO Coordination Centre – ESRIN, Italy

Image: ESA



SSA-NEO Coordination Centre– Inauguration 22 May 2013

Image: Google Earth

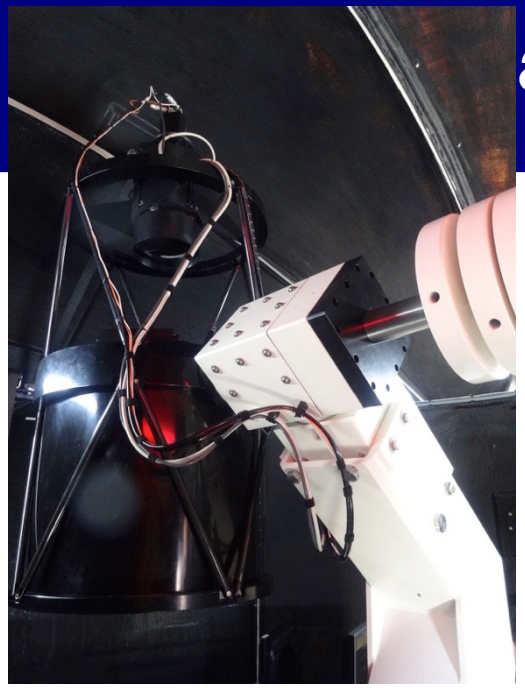


Observations – main assets

- **Optical Ground Station (OGS)**
  - 1 m f/4.4
  - 0.7 deg x 0.7 deg FoV
  - 4-6 nights per month
- **Klet observatory**
  - 1 m f/4
  - 0.8 deg x 0.8 deg FoV
  - Only used for NEOs
- **Very Large Telescope**
  - ESO 8 m telescope
  - 11 hours per semester
  - Used for follow-up of faint NEOs on risk list
- **Precovery searches**

Observations – main assets

- **Test-Bed Telescope**
  - 56 cm aperture
  - 2.2 deg x 2.2 deg field of view
  - For testing scheduling/tasking and data processing
  - 1st telescope being commissioned in Spain
  - 2nd telescope should start in 2016 in Chile
- **Fly-Eye Telescope**
  - 1 m effective aperture
  - 6.7 deg x 6.7 deg field of view
  - Prototype with two optical channels under development
  - 1st telescope 2017



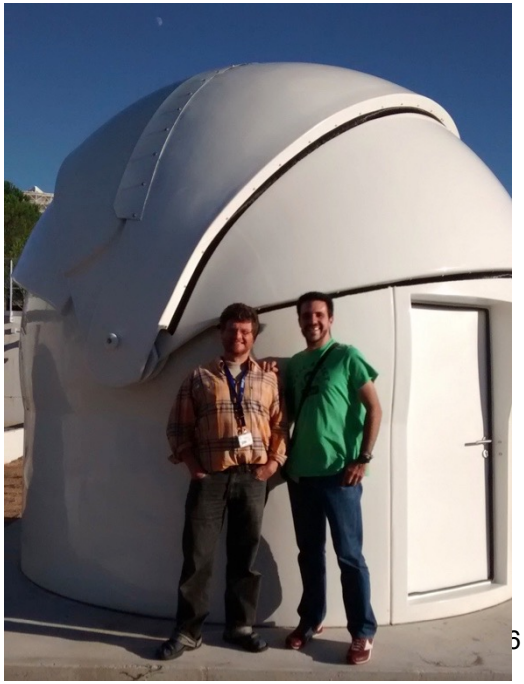
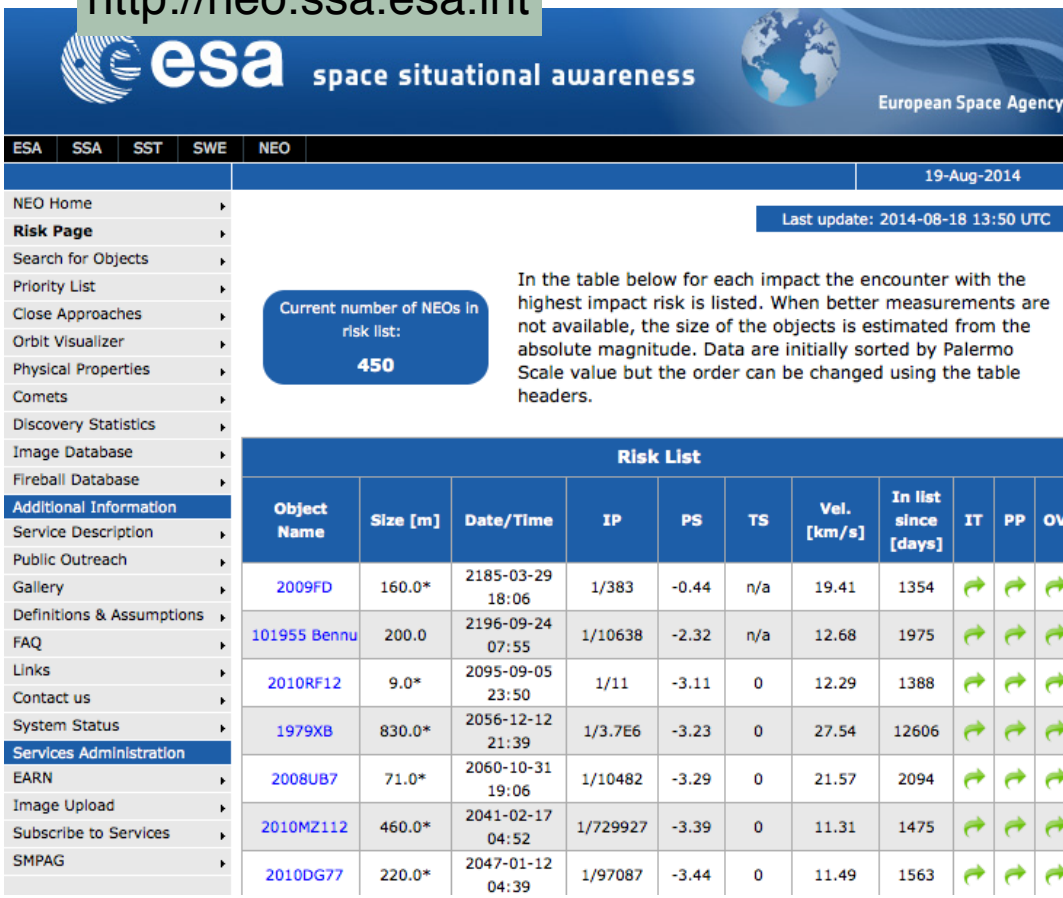


Image CGS/Cibin

Technical web portal

- **NEOCC maintains 'risk list'**
  - NEODyS is one of the 'federated' assets of the NEOCC
  - Computes precise orbits including co-variances
  - Makes impact prediction
  - In the process of establishing long-term support, integrate more into NEOCC

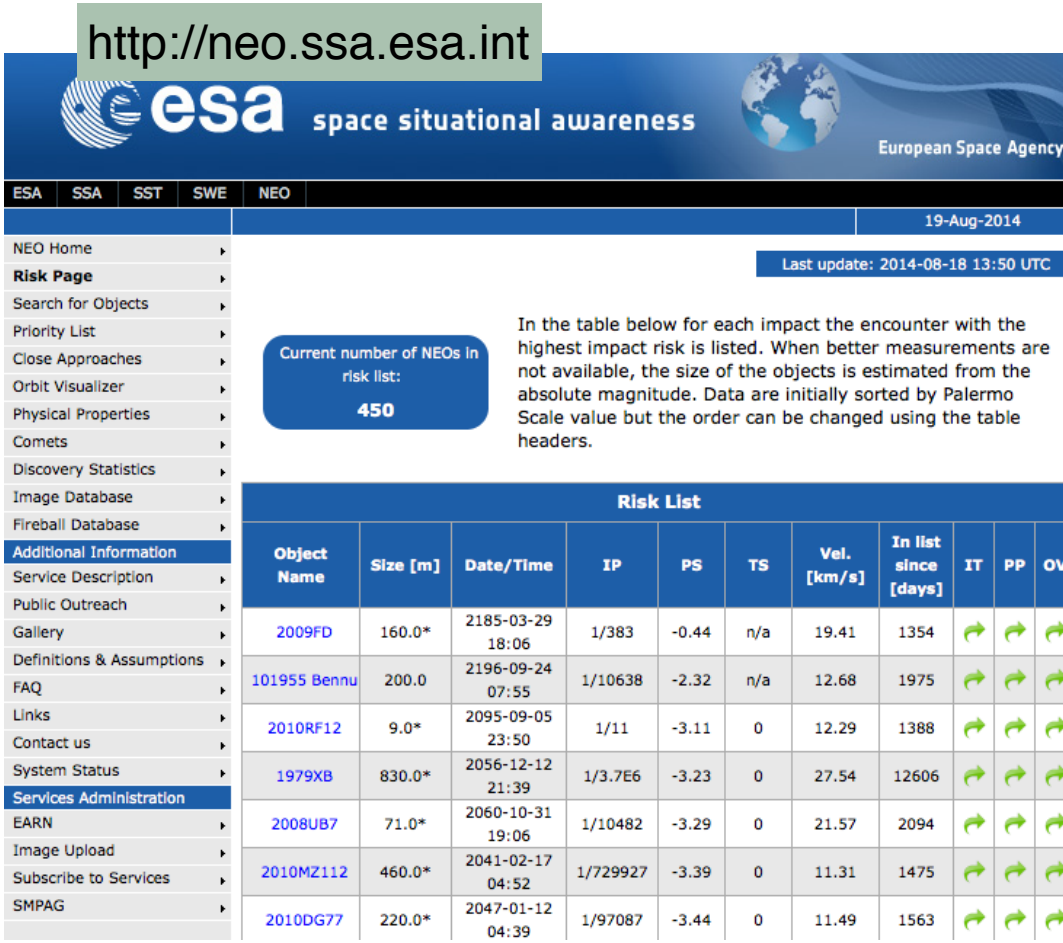
http://neo.ssa.esa.int



The 'risk list' showing all NEOs having an impact probability >0 within the next 100 years

Technical web portal - II

- **Orbit visualization tool**
- **NEO chronology by IAU**
- **Physical properties database**
- **Image database under development**
- **NEODyS is being moved to ESRIN**



Interface to emergency response

- **Workshops to collect input, training, raise awareness**
- **'NEO Information Plan' describes information distribution**
- **Presented to SSA Delegate body in Dec 2015**

ESA Unclassified – For official use

ESA/PB-SSA(
Paris, xx Septe
(Original: Engl

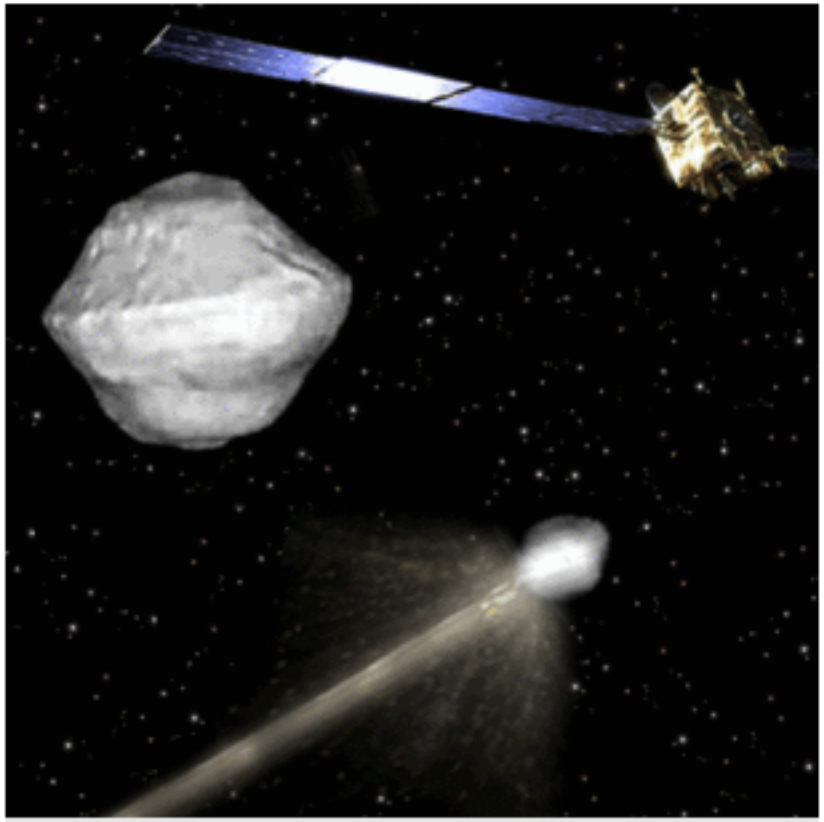
EUROPEAN SPACE AGENCY

SPACE SITUATIONAL AWARENESS PROGRAMME BOA

Outcome of the second workshop on NEO impact hazards for national civil protection authorities

Space-based activities

ASTEROID IMPACT & DEFLECTION ASSESSMENT (AIDA) STUDY



AIDA mission concept

The Asteroid Impact & Deflection Assessment

Phase A study of AIM ongoing (within ESA's 'General Studies Programme')

Using star trackers as test-bed for space-based asteroid observations

Studies for NEO cameras in L1 or L4, L5

Future

- **2016 Dec: ESA council meeting on ministerial level**
- **New funding will be requested for 2017-2020**
- **Coordination with IAWN needs to be enforced**