Status of the
Space Mission Planning Advisory Group
SMPAG

April 2015

G. Drolshagen

(Chair of SMPAG)

SMPAG establishment and purpose

Establishment of the Space Mission Planning Advisory Group was recommended by the Working Group on near-Earth objects of the STSC during its 50th session in February 2013 and formally endorsed by UN COPUOS at its 56th session in June 2013 and by the 68th session of the UN General Assembly in December 2013.

The purpose of the SMPAG is to prepare for an international response to a NEO impact threat through the exchange of information, development of options for collaborative research and mission opportunities and NEO threat mitigation planning activities.

SMPAG status

The SMPAG was officially established during a meeting at ESOC, Darmstadt, on 6/7 February 2014.

During a second meeting on 12-13 June 2014, held at the margins of COPUOS, the Terms of Reference were finalized.
ESA was elected as SMPAG chair for 2 years.
The establishment of a work plan was started.

A SMPAG Steering Committee meeting was held on 5/6 February 2015 on the margins of this STSC meeting.

SMPAG status, cont.

A joint presentation of the IAWN and SMPAG status were given to the STSC of UN-COPUOS on 4 February 2015.

A report to COPUOS was drafted and send for final editing by OOSA.

Observer status for SMPAG at UN-COPUOS was requested. A decision is expected by end of 2015 (acceptance by OOSA, COPUOS and UN-GA is required).

It is planned to obtain a dedicated domain smpag.int.

SMPAG Membership
(Status April 2015)

Official members with nominated delegations:

AEM (Mexico)
ASI (Italy)
Belspo (Belgium)
CNES (France)
DLR (Germany)
IAWN (ex officio)
ISA (Israel)
JAXA (Japan)
ESA
NASA (USA)
ROSA (Romania)
ROSCOSMOS (Russian Federation)
SSAU (Ukraine)
SUPARCO (Pakistan)
UKSA (UK)

Intention of Membership indicated:

CSA (Canada)
China

SMPAG ToR

Main points of the SMPAG Terms of Reference:

- Membership is open to all national space agencies or governmental or inter-governmental entities that coordinate and fund space activities and are capable of contribution to or carrying out a space based NEO mitigation campaign.
- SMPAG consists of a plenary group and a steering group with a rotating chair.
- Delegates have to be nominated by the SMPAG members.
- New members may be included upon consensus of the current members.
- Any member may withdraw its membership at any time.
- Each member shall provide its own funding and resources for its activities

SMPAG draft work plan

An initial list of 10 activities has been identified by SMPAG:

- Recommend, in collaboration with the IAWN, criteria and thresholds for action. (Lead: NASA)
- Develop and agree to a set of NEO deflection reference missions. (Lead: ASI)
- Develop a plan for SMPAG action in case of a credible threat. (Lead: TBD)
- Communication guidelines in case of a credible threat. (Lead: NASA)
- Produce a 'road map' for future work on planetary defense. (Lead: DLR)

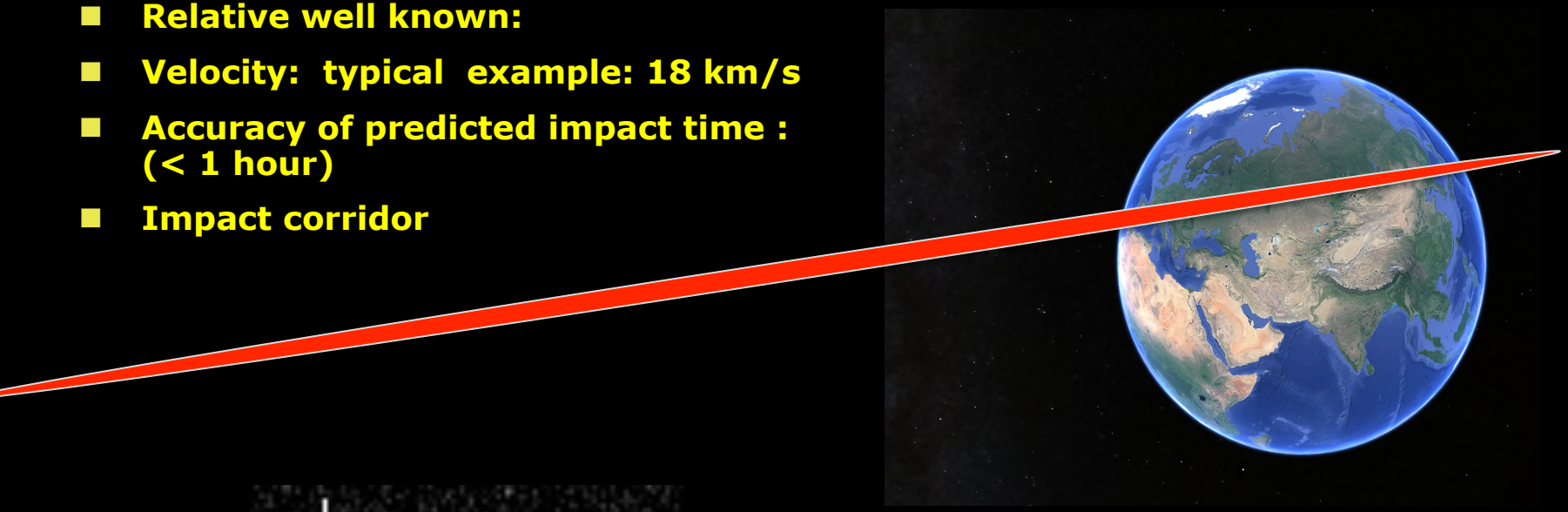
SMPAG draft work plan, cont.

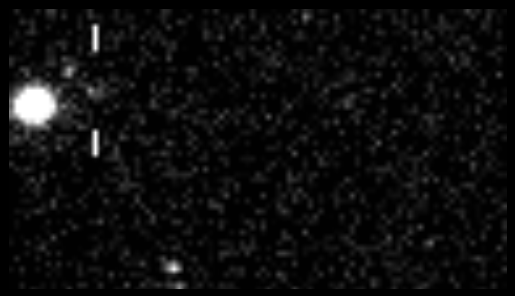
- Decision and event timelines for reference missions. (Lead: ESA)
- Technical maturity and consequences, including failure, of space-based NEO mitigation techniques. (Lead: TBD)
- Criteria for deflection targeting. (Lead: TBD)
- Study the nuclear device option and how to deal with it. (Lead TBD)
- Identify a ‘toolbox’ for a characterization payload (Lead: CNES)

Threshold and criteria for NEO deflection mission

Example of initial uncertainties:

- **Impact probability: < 10 %**
- **Size estimate: 40 m - 120 m (based on brightness)**
- **Relative well known:**
- **Velocity: typical example: 18 km/s**
- **Accuracy of predicted impact time : (< 1 hour)**
- **Impact corridor**



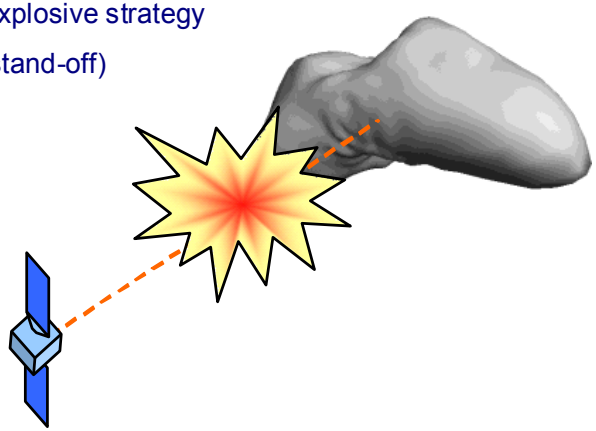


Orbit uncertainty as seen from the asteroid

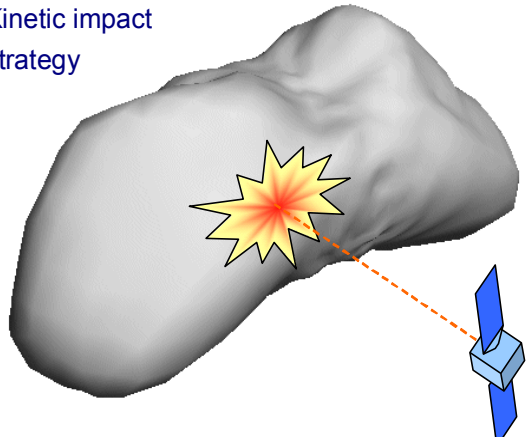
Possible NEO deflection strategies
(Illustrationen von L. Cano, Deimos)

Explosive strategy

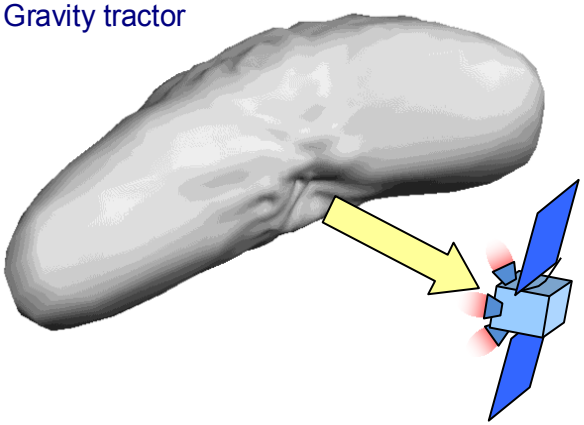
(stand-off)



Kinetic impact strategy



Gravity tractor



Ion beam shepherd