

# **Recommendations of the Action Team on NEOs for an International Response to the Near-Earth Object Impact Threat**

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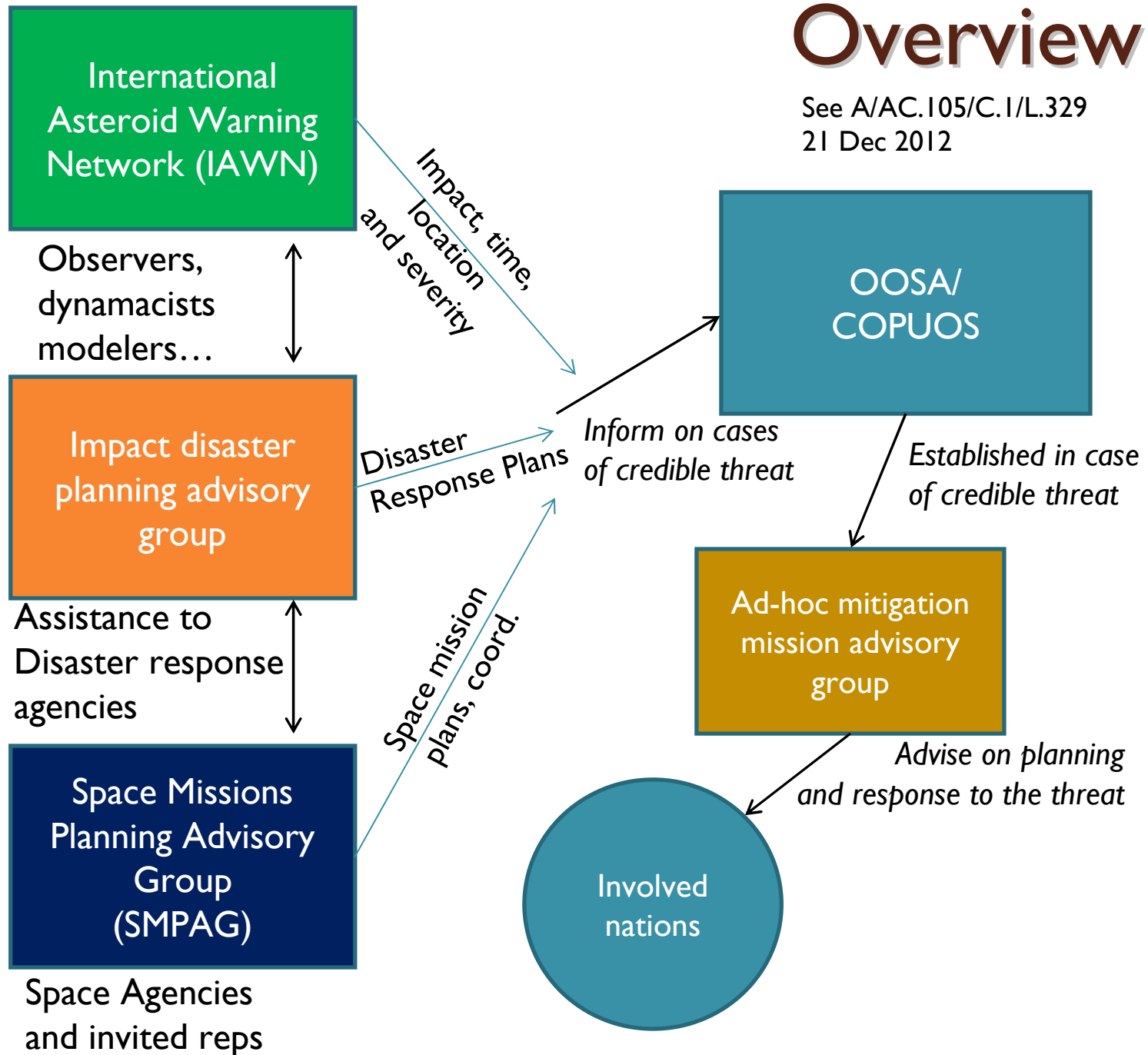


# Introduction

- Many experts and assets already exist
  - For Detection, Tracking and Characterization:
    - Minor Planet Center, NASA, ESA and other telescopic surveys, follow-up observatories, optical and radar observations for characterization, space missions, impact effects modeling...  
*see T. Spahr's MPC/IAWN presentation*
  - For Deflection mission options:
    - Technology studies (space agencies; NEOShield...)  
*see L. Drube's NEOShield presentation*
- The proposal of the Action Team on NEOs for an impact threat response is based on utilizing what already exists as much as possible
- Other nations and entities with assets encouraged to join with these efforts

# Overview

See A/AC.105/C.1/L.329  
21 Dec 2012





## International Asteroid Warning Network (IAWN)

Observers,  
dynamacists  
modelers...

Impact, time,  
location  
and severity

# Overview

See A/AC.105/C.1/L.329

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# International Asteroid Warning Network (IAWN)

## Tasks

- Discover, track and observe NEOs, coordinated internationally
- **Find them as early as possible**
- Process the observations, provide orbit predictions and any potential impact warnings
- Prepare public communications
- In case of credible impact threat:
  - Ensure that more information on object is gathered expeditiously
  - Inform COPUOS,

Predicting impact probabilities:  
JPL NEO Program,  
NEODyS, Uni Pisa



Survey telescope,  
Catalina Sky Survey  
Arizona



Designation	H	P	A	T	Status	Camp. start	Camp. end	Notes
(101955) 1999RQ36	20.8	-1.52	n/a	Special				Risk estimated with a mass from physical observations
2007VK104	22.0	-1.61	1	Possible recovery	2014-03-24	2014-05-13	Big telescopes needed	
2009FD	22.1	-1.90	n/a	Possible recovery	2014-02-14	2014-04-09		
2013CT82	18.2	-2.08	0	Observable				
2013BP73	20.2	-2.65	0	Observable				
2008CV0	25.2	-3.07	0	Possible recovery	2017-09-23	2017-09-28	Possible accidental recovery	
2016RF12	28.4	-3.11	0	Possible	2022-07-20	2022-07-21	Big telescopes needed	

# International Asteroid Warning Network (IAWN)

- **Members**

- Observers, astrodynamics experts, object characterization modelers
- Assistance by public communications experts

- **Organization**

- Network of existing assets, experts
- Steering group as focus point
- Yearly summary report to COPUOS



Survey telescope,  
Optical Ground Station,  
Tenerife

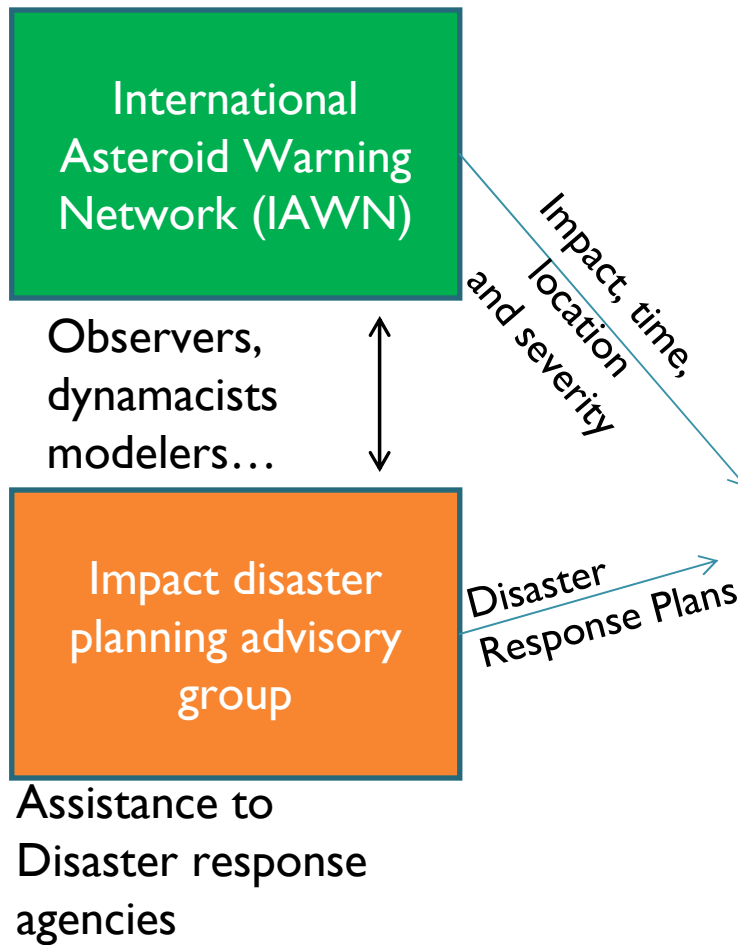
Study of Shape, Size, Motion and mass of  
near-Earth object 66391 (1999 KW4)



# Overview

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# Impact Disaster Planning Advisory Group

## Tasks

- Review lessons learned from other large-scale natural disasters
- Prepare coordinated response plans and exercises to address both predicted and unpredicted impact disasters
- Recommend and promote research related to the topic
- Develop representative timelines and procedures for evacuations



Carancas – a 1-m impactor creates a 14-m sized crater in Peru, 2007

Siberia – a ~40-m object explodes in the air and flattens 2000 km<sup>2</sup> of forest, 1908



# Impact Disaster Planning Advisory Group

- Members
  - Representatives to existing national and international disaster response agencies
- Organization
  - Initiated by IAWN
  - Coordinated with UN-SPIDER, UN-ISDR, OCHA, other relevant international and regional entities

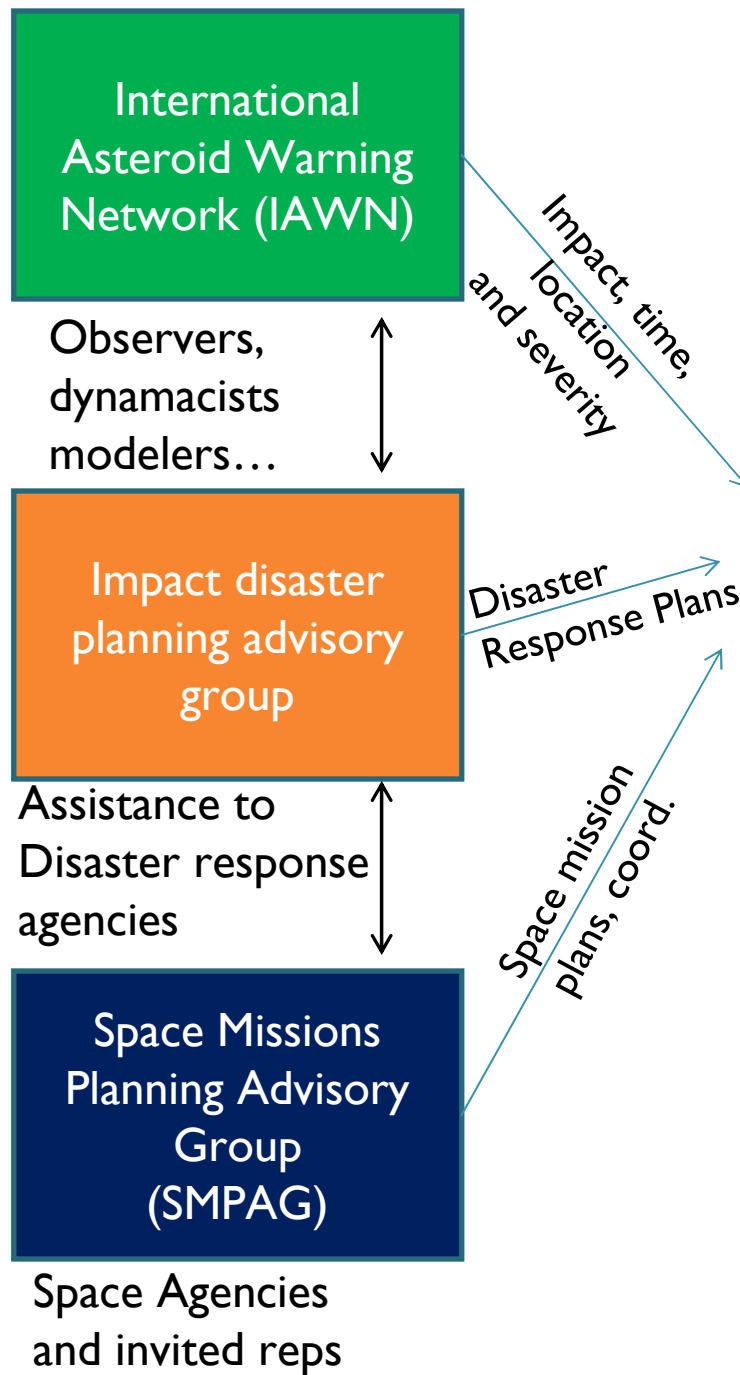


Tsunami effects in  
2004

# Overview

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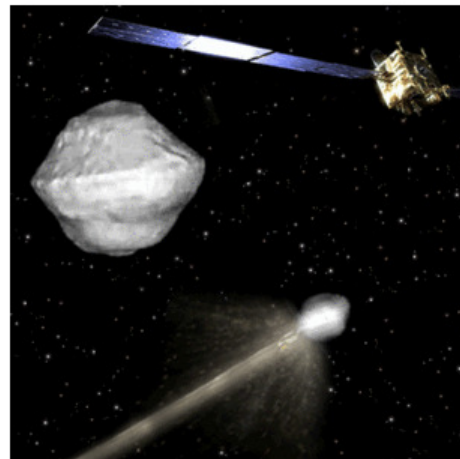
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# Space Mission Planning Advisory Group (SMPAG)

- Tasks
  - Recommend and promote mitigation mission-related research and studies on an international and cooperative level
  - Develop and adopt a set of reference missions – both on technical detail and operational level
  - Develop applicable decision criteria/thresholds and timelines

## ASTEROID IMPACT & DEFLECTION ASSESSMENT (AIDA) STUDY

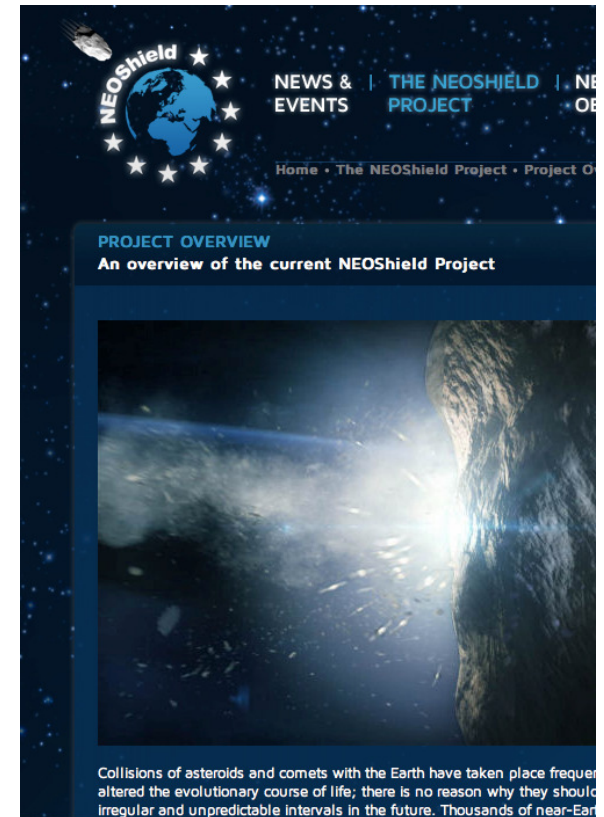


AIDA mission concept



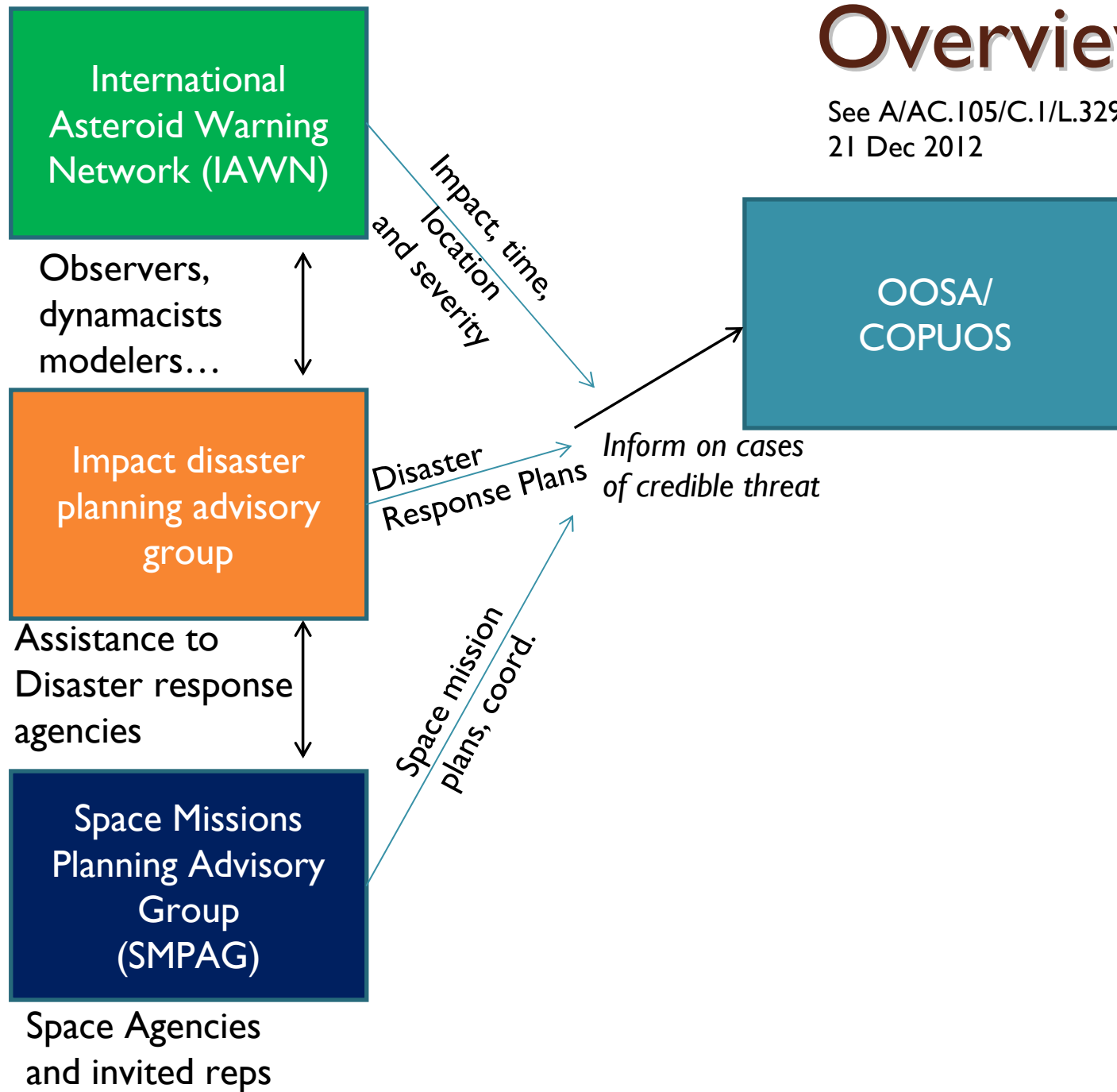
# Space Mission Planning Advisory Group (SMPAG)

- Members
  - Voluntary representatives of space-faring nations
  - Technical experts and other relevant entities as needed
- Organization
  - Meet once per year linked to an international conference
  - Similar in operation to the Inter-Agency Space Debris Coordination Committee
  - Yearly summary report to COPUOS



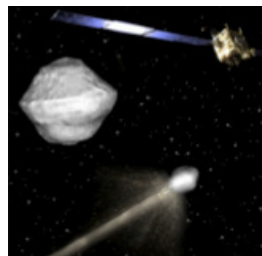
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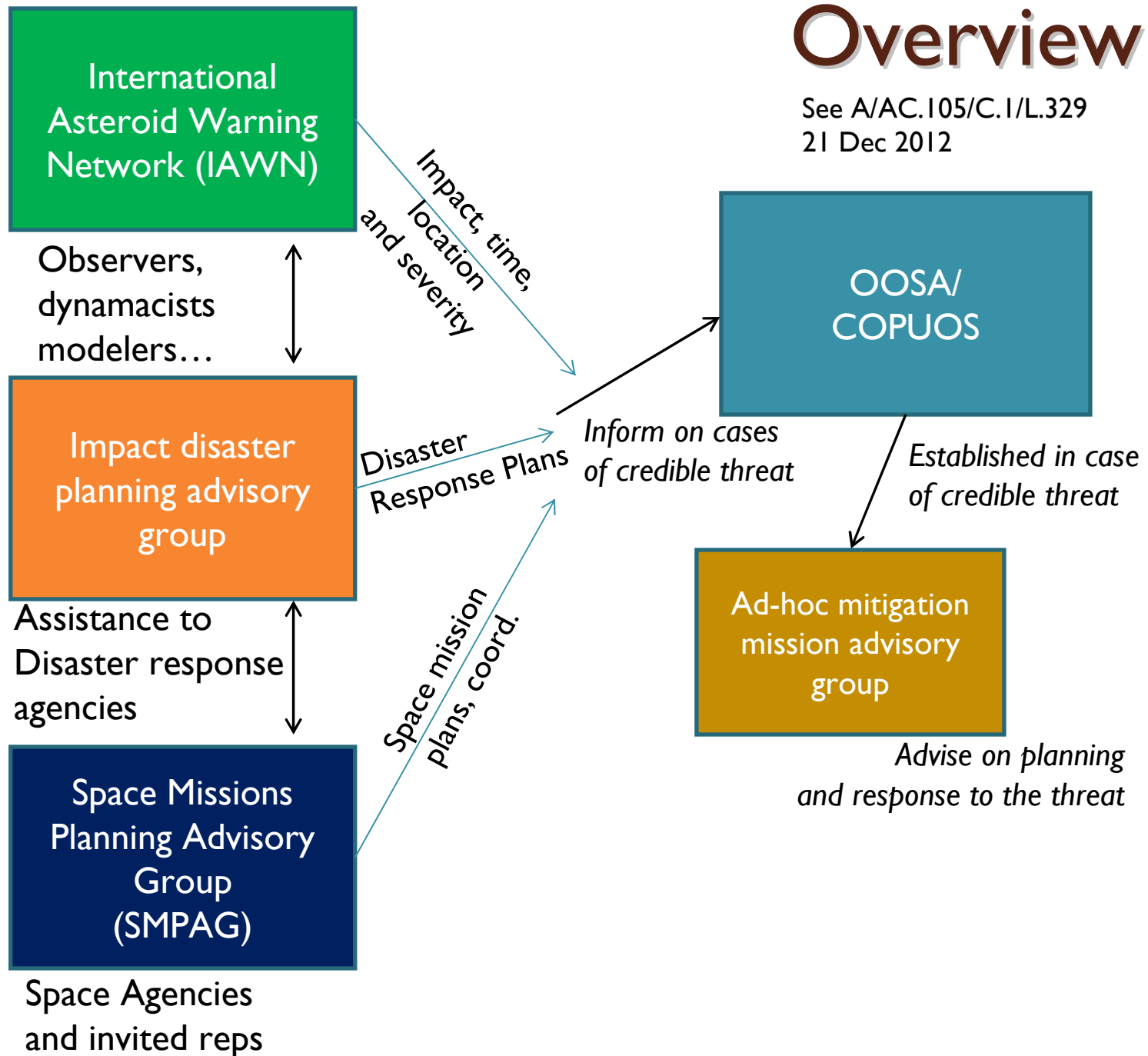
# Response to Credible Impact Threat

- IAWN provides all available information and updates to COPUOS by way of the UN Office of Outer Space Affairs
- Impact disaster planning advisory group works with disaster response groups in nations that would be affected
- SMPAG coordinates space mission planning among space-capable nations
- COPUOS may choose to appoint ad hoc mitigation advisory group to work with response teams



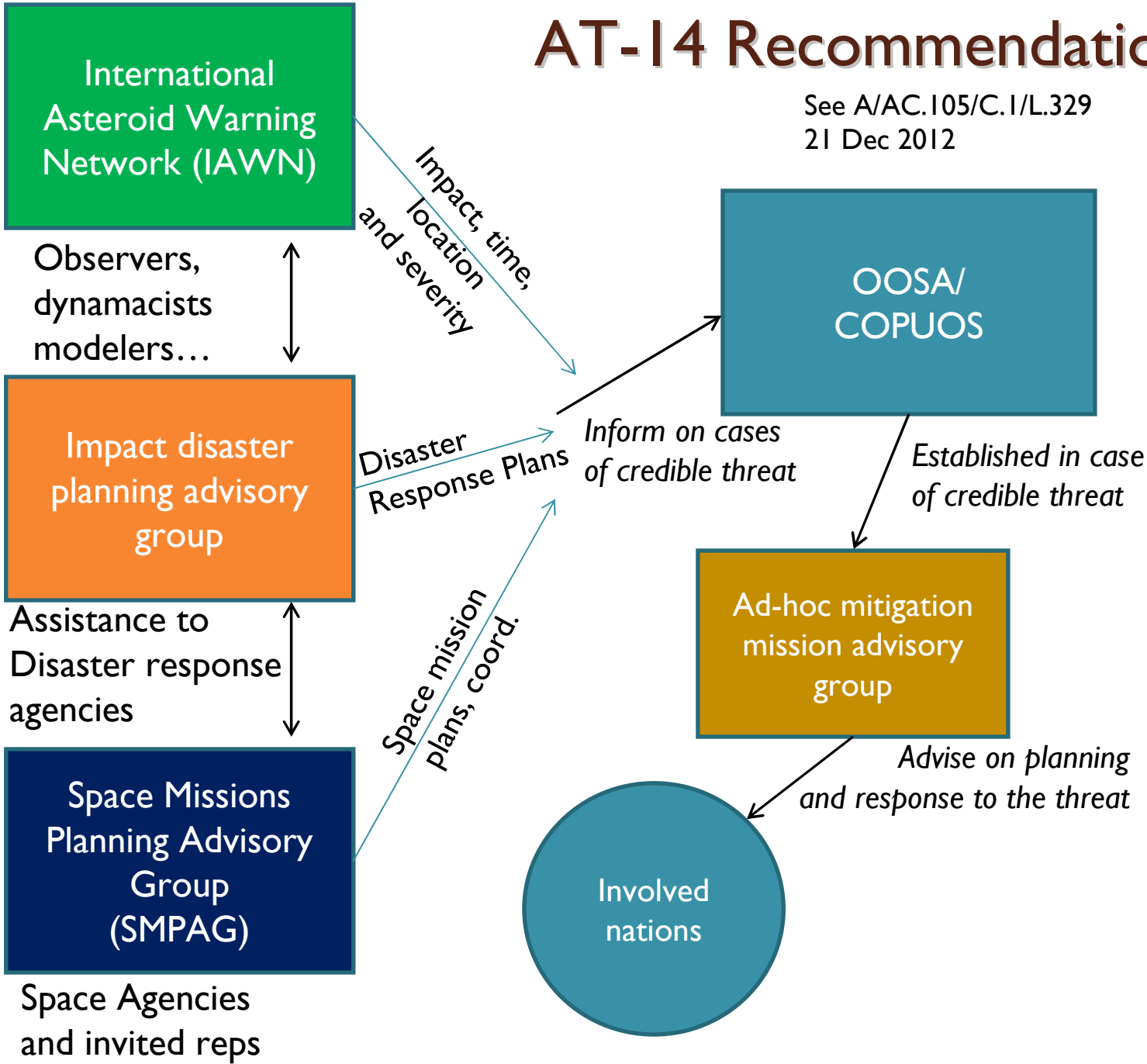
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# AT-14 Recommendation

See A/AC.105/C.1/L.329  
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# Future Work

- Finalize establishing IAWN steering group
- Set up Impact disaster planning and advisory group functionality
- Establish SMPAG
  - Draft of Terms of Reference (ToR) is available
  - Meeting to finalize ToR at June 2013 COPUOS
- Action Team #14 can support establishment of these groups