

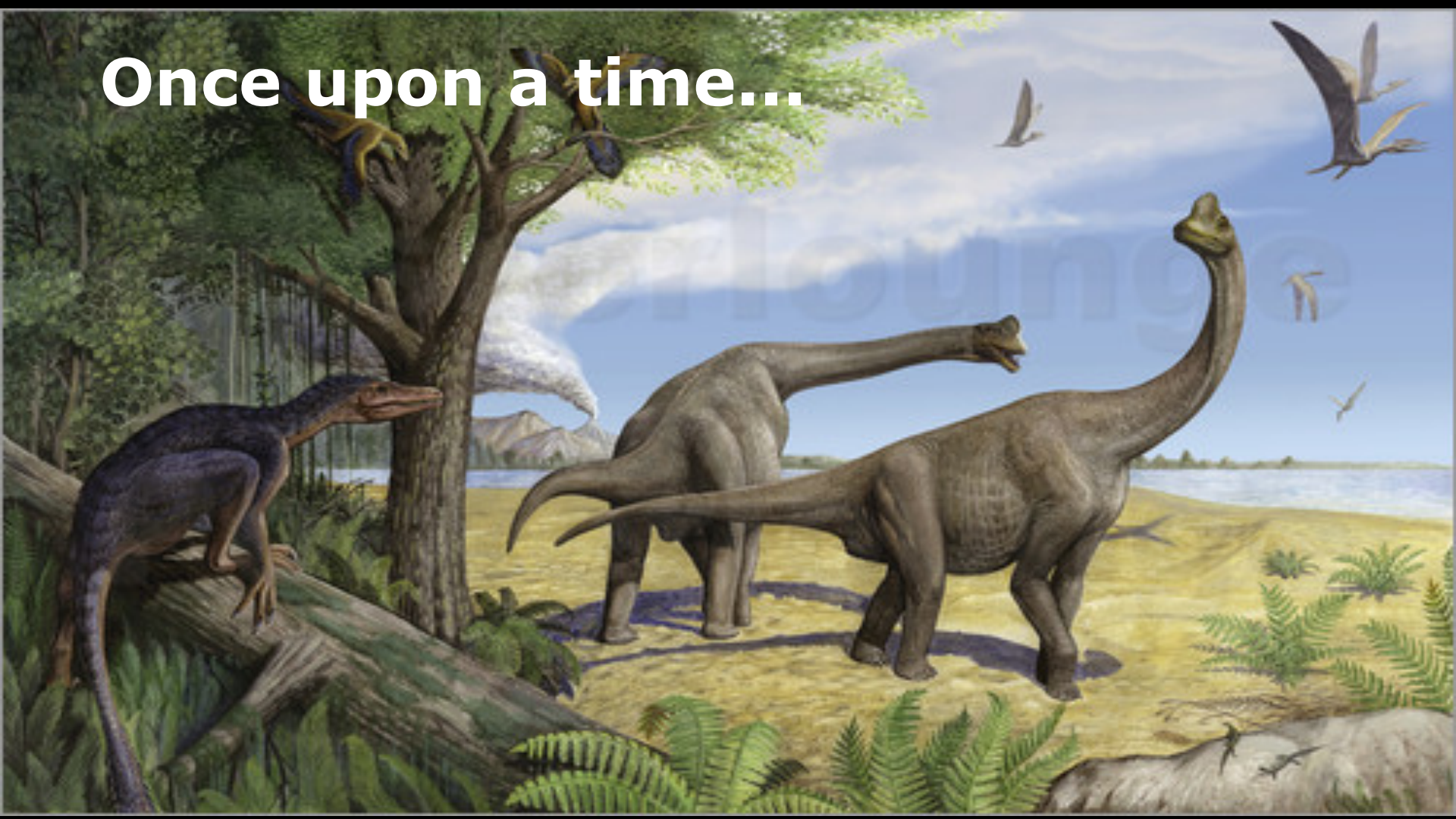
# **Avoiding the fate of the dinosaurs with the help of lawyers? Legal aspects of planetary defence**

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University of Nebraska-Lincoln

**NPOC Austria Plenary Event  
Vienna, 02-02-2017**

Once upon a time...





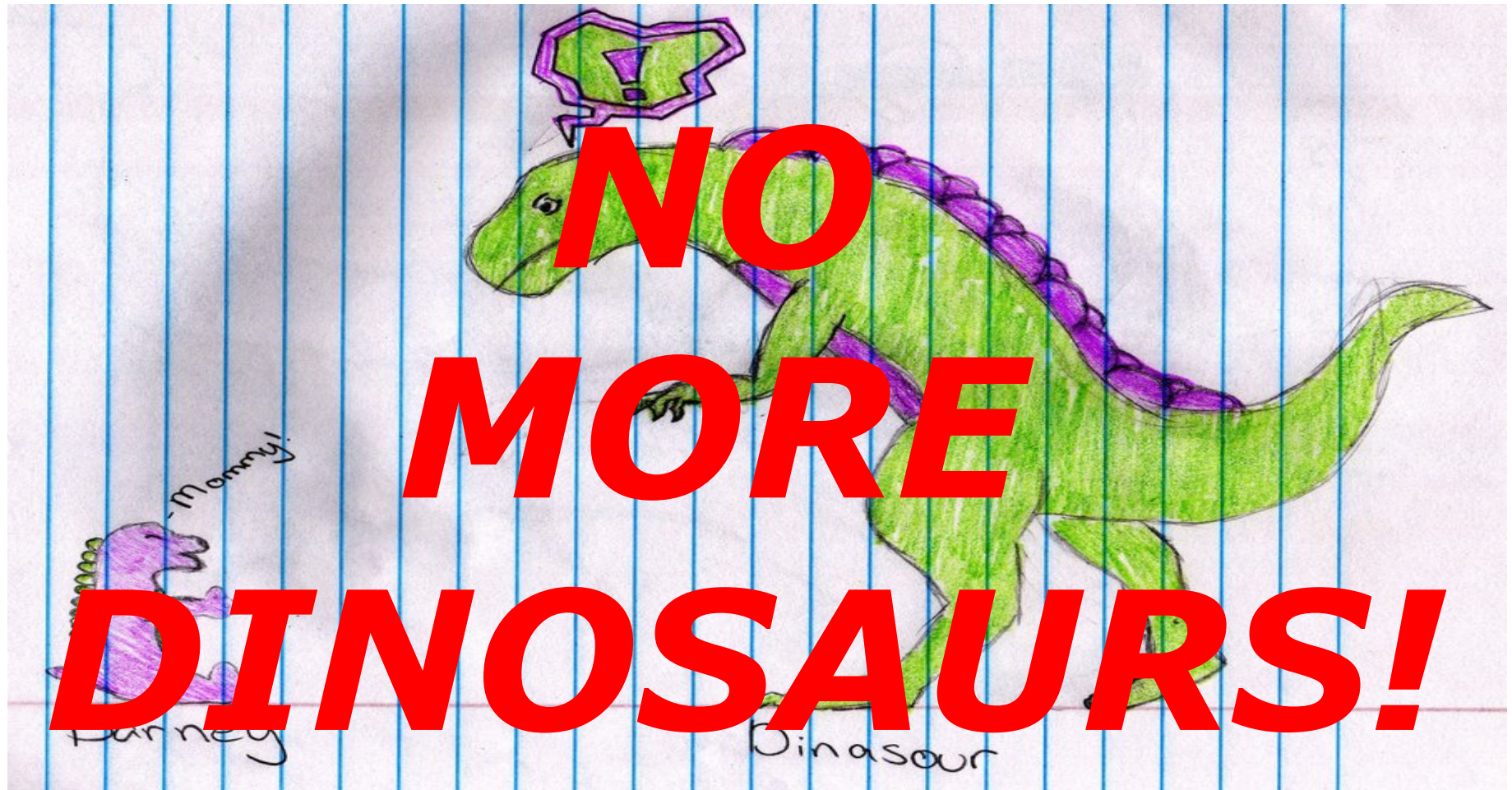
**...some  
65  
million  
years  
ago...**

**Nebraska Law**

*University of Nebraska*

***What on Earth was that???***





**NO  
MORE  
DINOSAURS!**

Mommy!

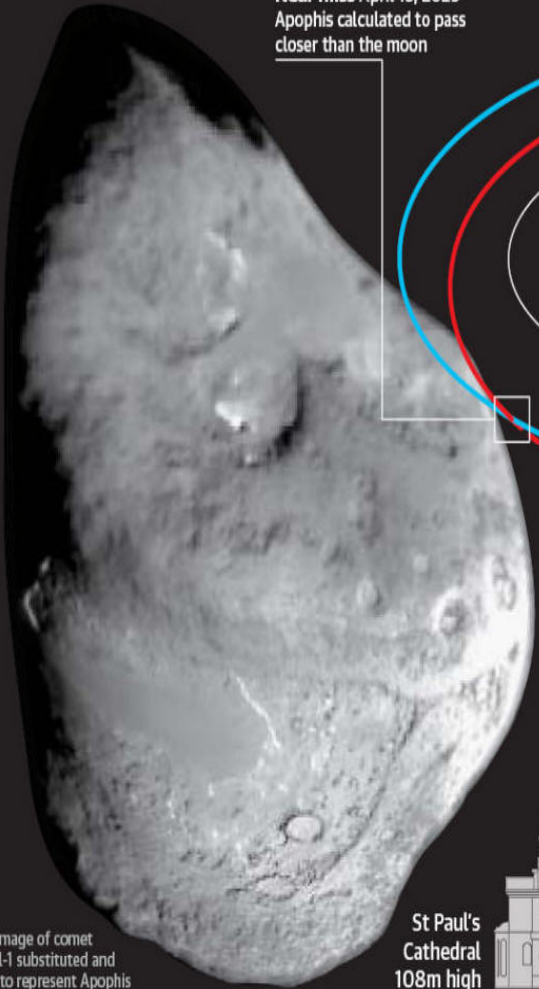
Barney

Dinosaur

# Fast forward to today:

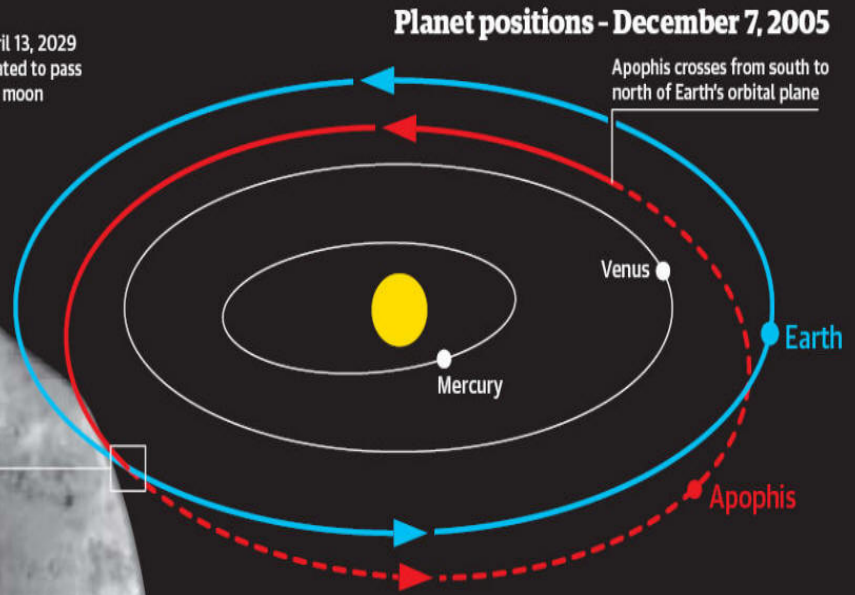


- ◆ Association of Space Explorers in 2005:
  1. Science available to detect asteroids long in advance
  2. Technology  $\approx$  available to mitigate threats
  3. International consultation & decision-making process *absent*



Note: Image of comet Tempel-1 substituted and scaled to represent Apophis

Near miss April 13, 2029  
Apophis calculated to pass closer than the moon



Planet positions - December 7, 2005

Apophis crosses from south to north of Earth's orbital plane

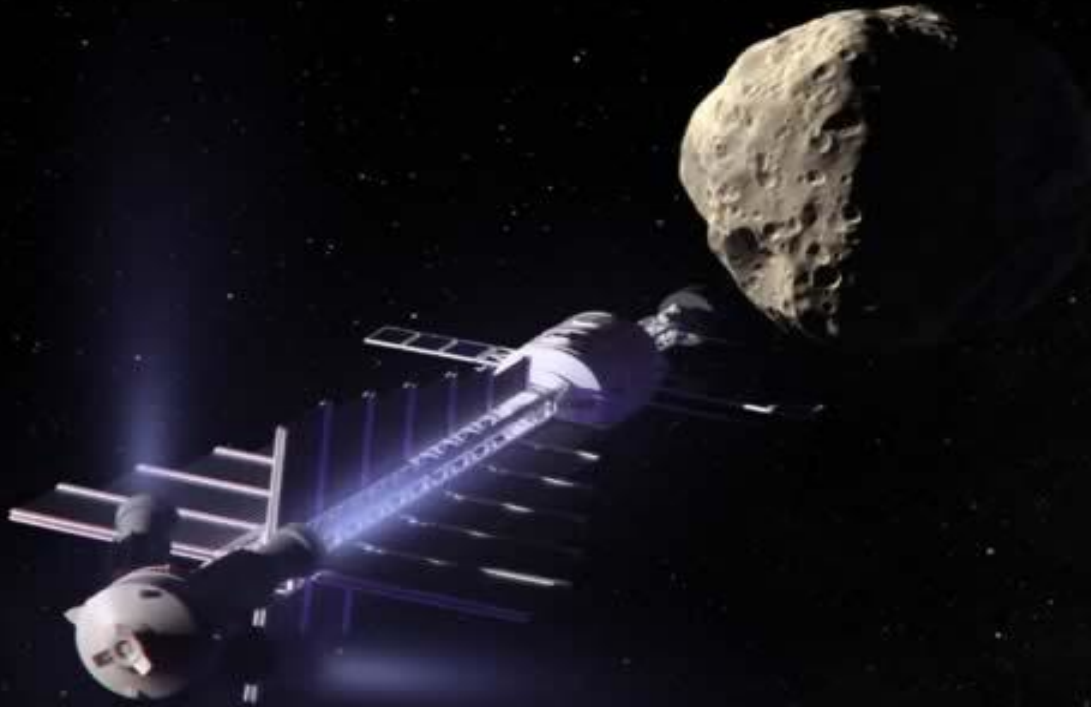


St Paul's Cathedral 108m high

- There have been very few sightings of Apophis, which orbits the sun once every 324 days, moving at around 30km per second
- It is thought to be about 390m wide, estimated from its brightness
- When the asteroid comes close to the Earth in 2029, it will be visible to the naked eye
- If Apophis hits the Earth in 2036, it would land somewhere in the eastern hemisphere and release around 1,600 megatons of energy. In comparison, the 1883 eruption of Krakatoa was roughly the equivalent of 200 megatons

# As for #1: Apophis 2005 - 2029??

**As for #2: 'Gravity tractor' ...**

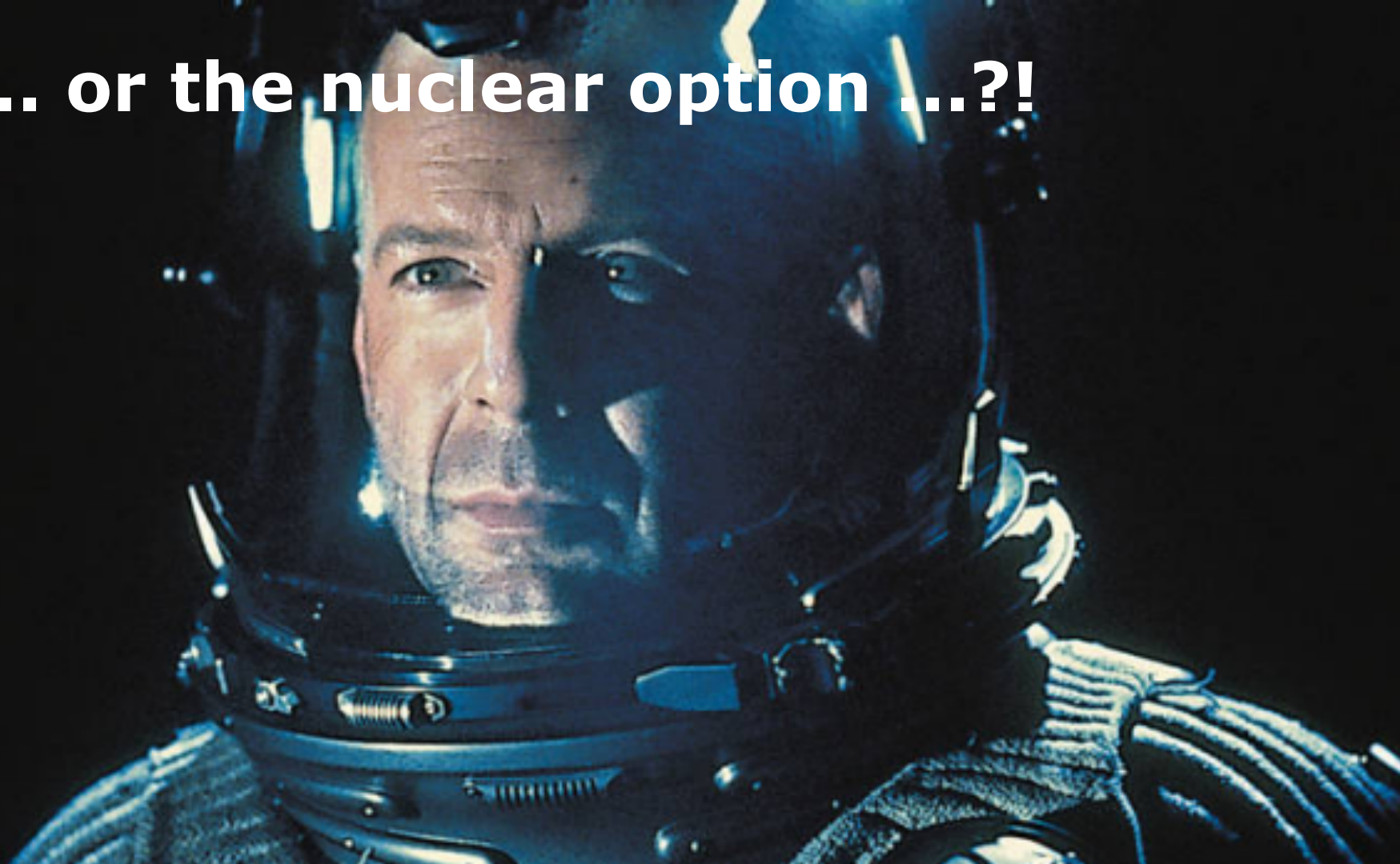




... or 'kinetic impactor' ...



**... or the nuclear option ...?!**



**As for #3: international approach...?**



# ASE PATM

- ◆ 2007: ASE established Panel on Asteroid Threat Mitigation, presenting report including key legal & institutional issues to be discussed & solved
- ◆ University of Nebraska-Lincoln acted as Secretariat



Association  
of Space Explorers

## ASTEROID THREATS

*A call for global response*

A proposal for  
an international  
decision-making  
program to protect our  
planet from  
Near Earth Object  
impacts.

Dealing with the  
Impact Hazard

Toward a Decision-  
Making Program for  
Asteroid Threats

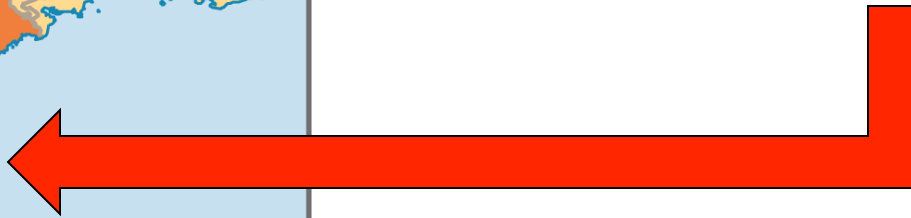
Recommendations  
on a Decision-Making  
Program for a  
Global Response  
to Asteroid Threats



September 25, 2008

# Legal issue #1

- ◆ General international responsibility to protect – also other states?



# Legal issue #2

- ◆ Liability if something goes wrong – even if part of an effort to help...?



# Legal issue #3

- ◆ Making sure institutional mechanisms exist to coordinate international action



# Legal issue #4

- ◆ Prohibition on nuclear explosions in outer space – even if necessary to save mankind?





# Legal issue #5

- ◆ Involvement private entrepreneurs ...?!



# Issue picked up in UN framework

- ◆ Committee on the Peaceful Uses of Outer Space
  - Scientific & Technical Subcommittee
  - Action Team 14 prepared for the next steps
  - Space Missions Planning & Advisory Group
    - *Mandate: to develop a strategy on how to react on a possible asteroid impact threat, coordinating technological knowhow of agencies to recommend specific efforts related to asteroid threats, including deflection missions*
    - Includes Ad-Hoc Legal Working Group

# Hoped-for result:



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