

Space Situational Awareness

A new ESA programme

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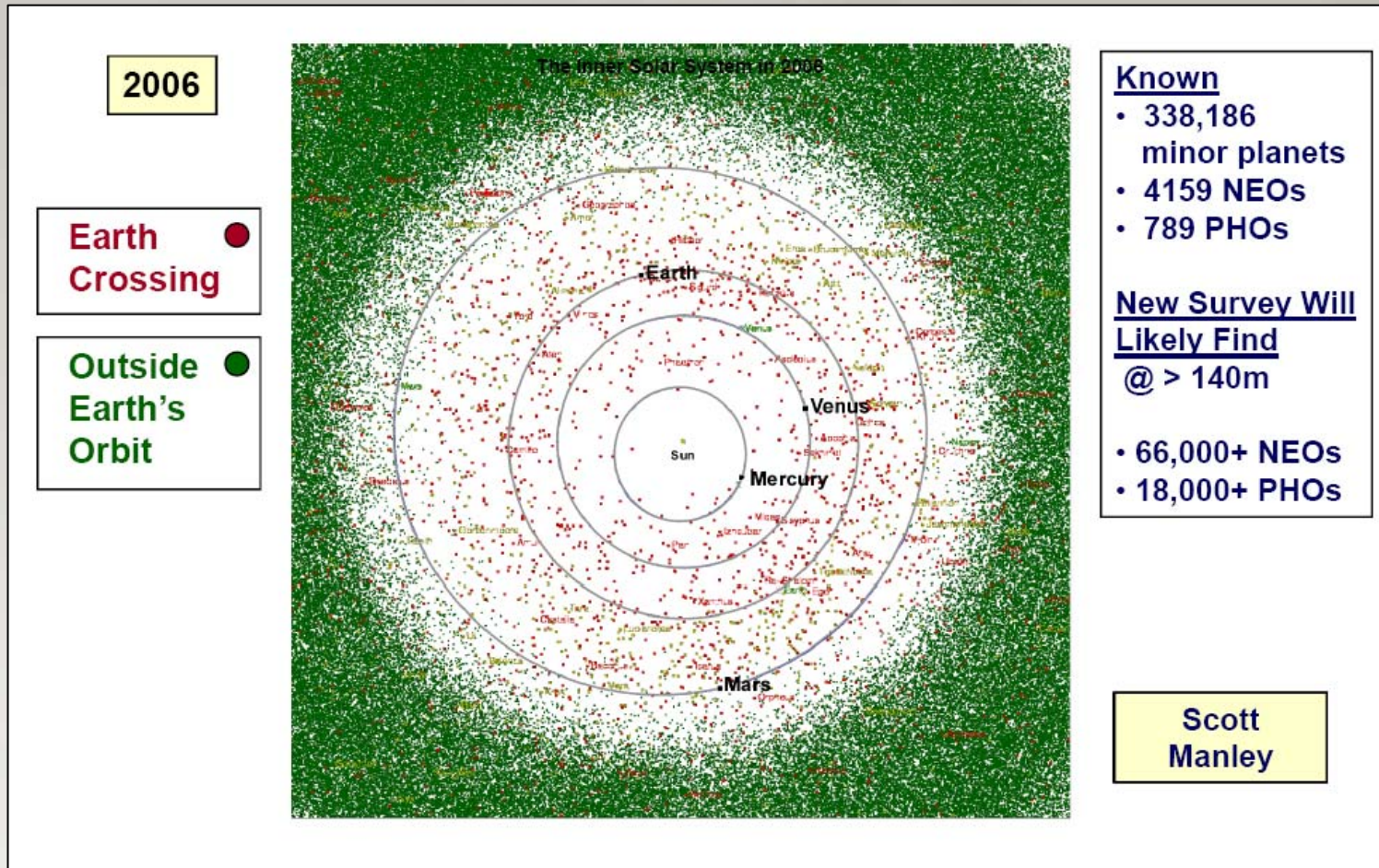


Rosetta Steins fly-by, press conference
Darmstadt, ESA/ESOC, 6 September 2008

Space Situational Awareness

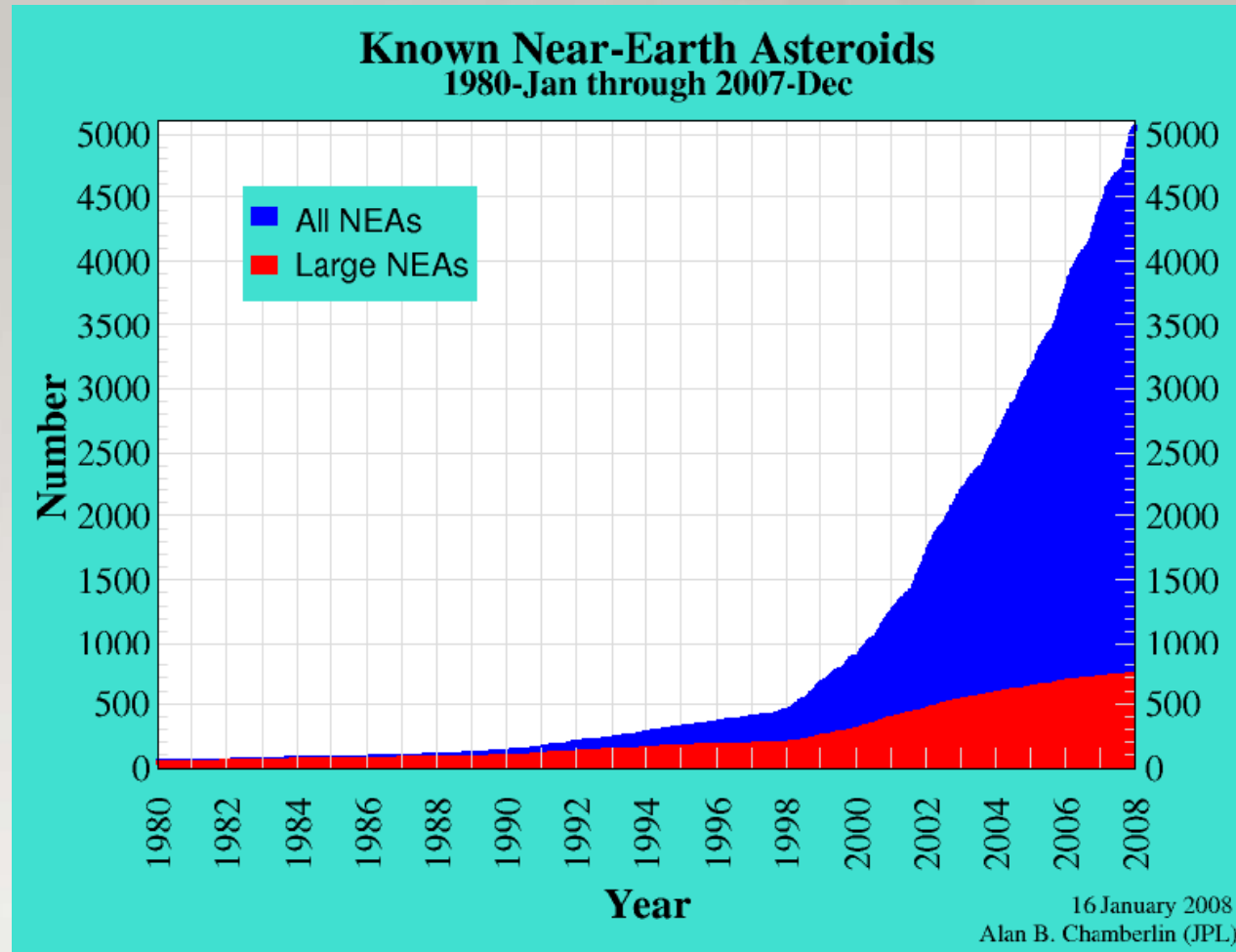
- Modern society is increasingly dependent on the availability of a well functioning space infrastructure
- A shutdown of even a part of this infrastructure would have major consequences for our day-to-day life
- The impact of an asteroid or comet on earth can have devastating effects on the ground
- ESA is preparing a programme whose objective is to increase knowledge about **Space Debris** and **Near-Earth Objects**. This will be achieved by federating and building an observation infrastructure and by pooling expertise in Europe:
Space Situational Awareness

Near-Earth Objects (NEO) Population



Source: NASA, 26 June 2008

Known Near-Earth Asteroid (NEA) Population



Source: NASA, 26 June 2008

Effects of asteroids collision with our planet

The impact of an asteroid on the Earth at a speed between 15 and 30 km/s has a devastating effect due to the release of an enormous kinetic energy:

blast waves, tsunamis, atmospheric and electromagnetic changes.

The amount of energy released can be significantly higher than that generated by the most powerful nuclear bombs. It depends on the size of the asteroid colliding with the Earth.

NEO diameter	MT*	Average interval
75 m	10 to 100	1,000 years
350 m	1,000 to 10,000	16,000 years
3 Km	1,000,000 to 10,000,000	1,000,000 years



* MT: Explosive power of 1 Mega Tonne of TNT
The Hiroshima bomb had an explosive power of 15 KT

Tunguska event in 1908 (Siberia)

The 1908 explosion in Siberia was most likely caused by the air burst of a large meteoroid or comet fragment at an altitude of **5 – 10 km** above the Earth.

The size of the object has been estimated at **50 – 80 m**.

Estimates of the energy of the blast are in the order of **10 – 15 MT**. This is 1000 times the energy released by the Hiroshima nuclear bomb!

An area of about **2000 sq. km** has been destroyed by this explosion.



Millions of trees laid down at Tunguska

ESA's plans for Asteroids and Space Debris monitoring

Currently the monitoring of **Asteroids** and **Space Debris** in Europe is not well coordinated. However, the level of competence and know-how is very high, for example in Italy, France, Germany, Sweden, Finland and UK.

An ESA initiative, the **Space Situational Awareness Programme**, will be discussed at the Ministerial Council (November 2008).

This programme addresses four main themes:

- **Surveillance and Tracking**
- **Imaging**
- **Space Weather**
- **Near-Earth Objects**

It will combine the existing observing facilities in Europe such as telescopes and radars (federation of assets) and will develop and procure the missing ones



ESA telescope in Tenerife