



# Near Earth Objects

osservazione prevenzione protezione

ettore perozzi

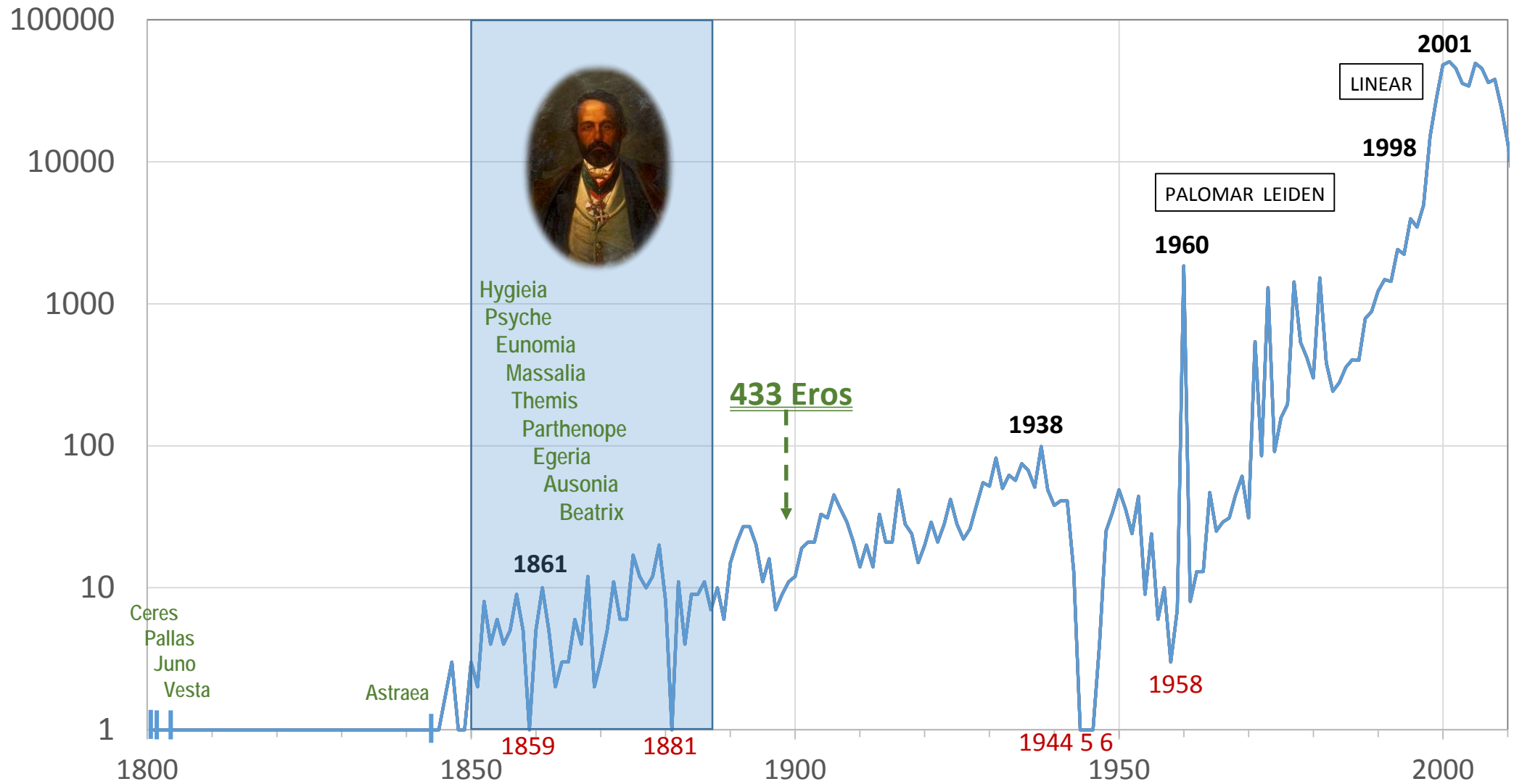


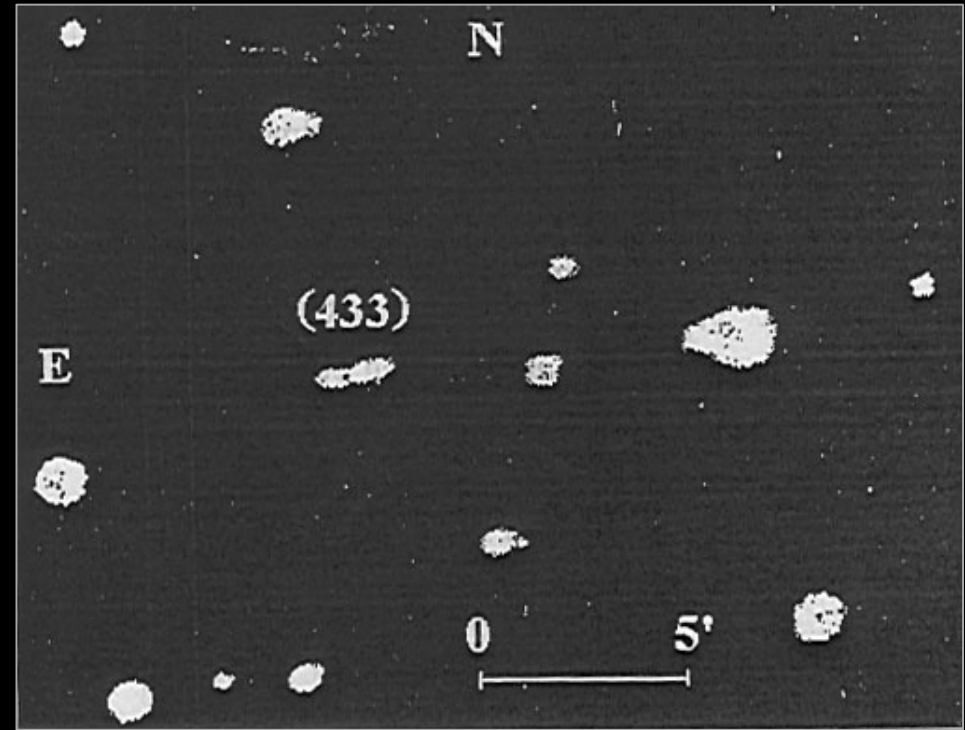
*la leadership italiana nello studio degli oggetti minori del Sistema Solare dall'inizio dell'Ottocento fino alle più recenti e future missioni spaziali*



Agenzia Spaziale Italiana

# asteroid discovery rate 1900-2016





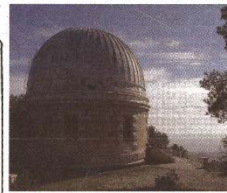
GENS  
D'ICI

## Charlois : l'astronome né à La Cadière, tué à Nice

**M**onsieur Charlois, monsieur Charlois !  
*Un télégramme pour vous !* - Un homme frappe avec insistance à la porte d'une petite maison, au 2 de la rue Guernatis à Nice, près de la promenade du Paillon. Sans attendre le dénommé Charlois se précipite et ouvre sans méfiance. Trois coups de feu retentissent dans la nuit. Il s'effondre sur le trottoir et meurt peu de temps après, à l'hôpital Saint-Roch.

Ce 26 mars 1910, Auguste Charlois, un des plus célèbres astronomes de son temps, vient de mourir. Aussitôt, du Figaro au Parisien en passant par Le Matin ou l'Aurore, tous les journaux s'emparent de cet incroyable fait divers, tandis que les revues scientifiques multiplient les hommages. Auguste Charlois est né dans le petit village de La Cadière dans le Var, le 26 novembre 1864, au n°2 de la Grande Rue, actuel n°3 de la rue Mars-Dormoy. Son père y est horloger et adjoint au maire. Auguste fréquente avec assiduité un observatoire récemment installé non loin du pensionnat, où il suit des études secondaires à Marseille. Il a la tête dans les étoiles. Elles le conduisent à 16 ans, jusqu'à l'observatoire de Nice, qui vient de s'implanter au sommet du Mont-Cros.

**Découvreur d'astéroïdes**  
Quatre ans plus tard, la revue L'Astronomie publie ses premières observations. Elles portent sur la comète d'Olbers, décrite pour



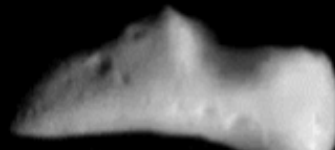
Une plaque, presque trop haute pour être lue, signale la naissance d'Auguste Charlois, à La Cadière. Sa tombe existe toujours mais son souvenir s'est éteint.

Ci-dessus, cette coupole de l'observatoire de Nice porte le nom de Charlois. On y étudia à présent les occultations d'étoiles par des astéroïdes.

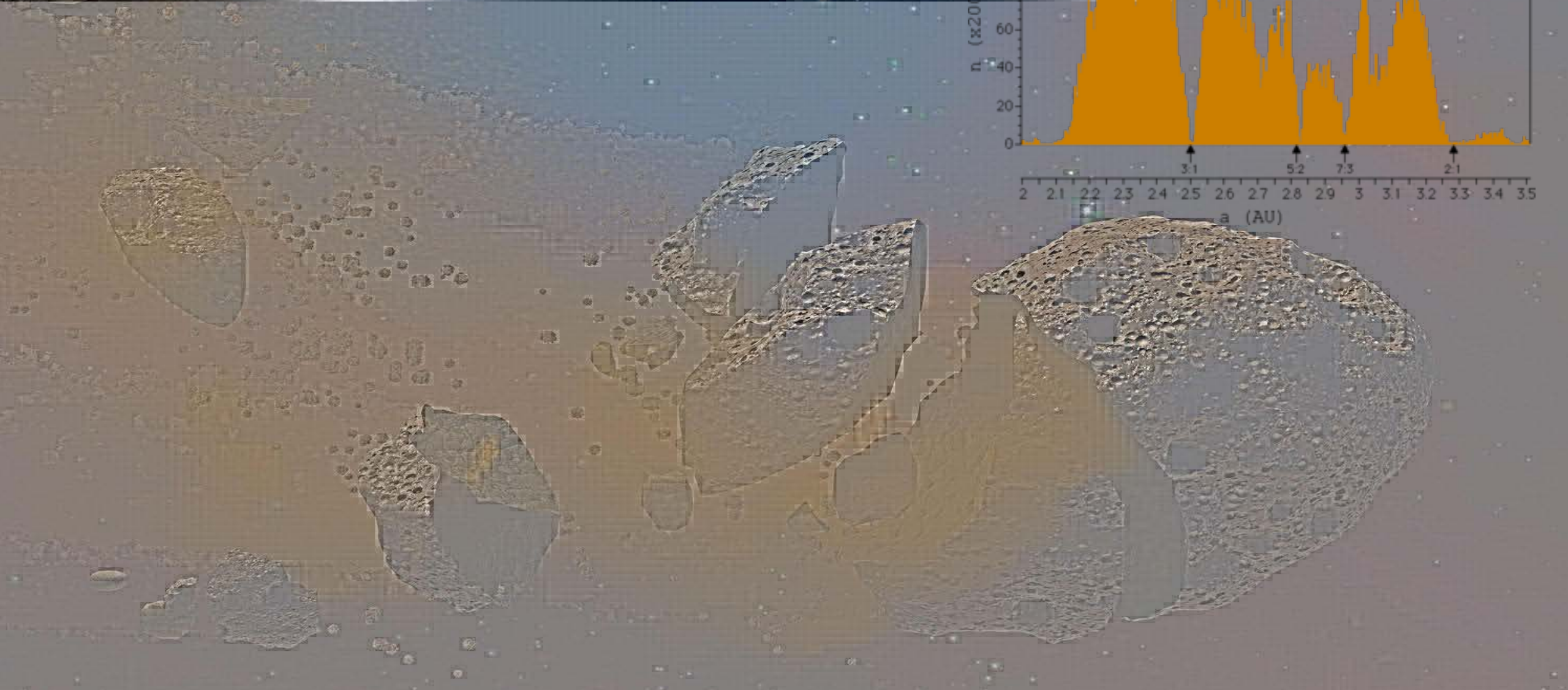
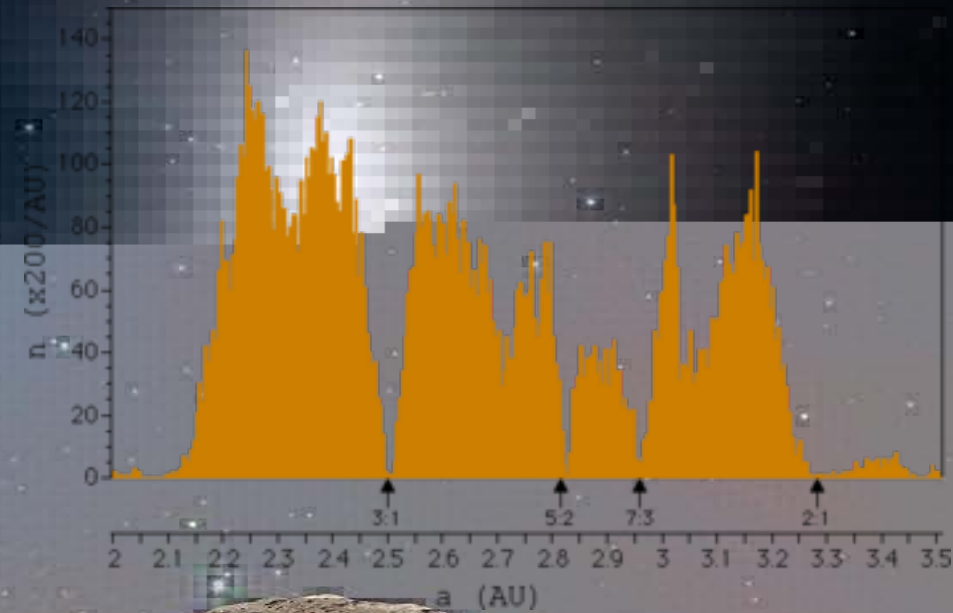
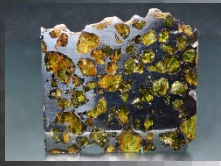


L'observatoire de Nice, en 1893, tel que l'a connu l'astronome assassiné.

NEAR — 433 Eros

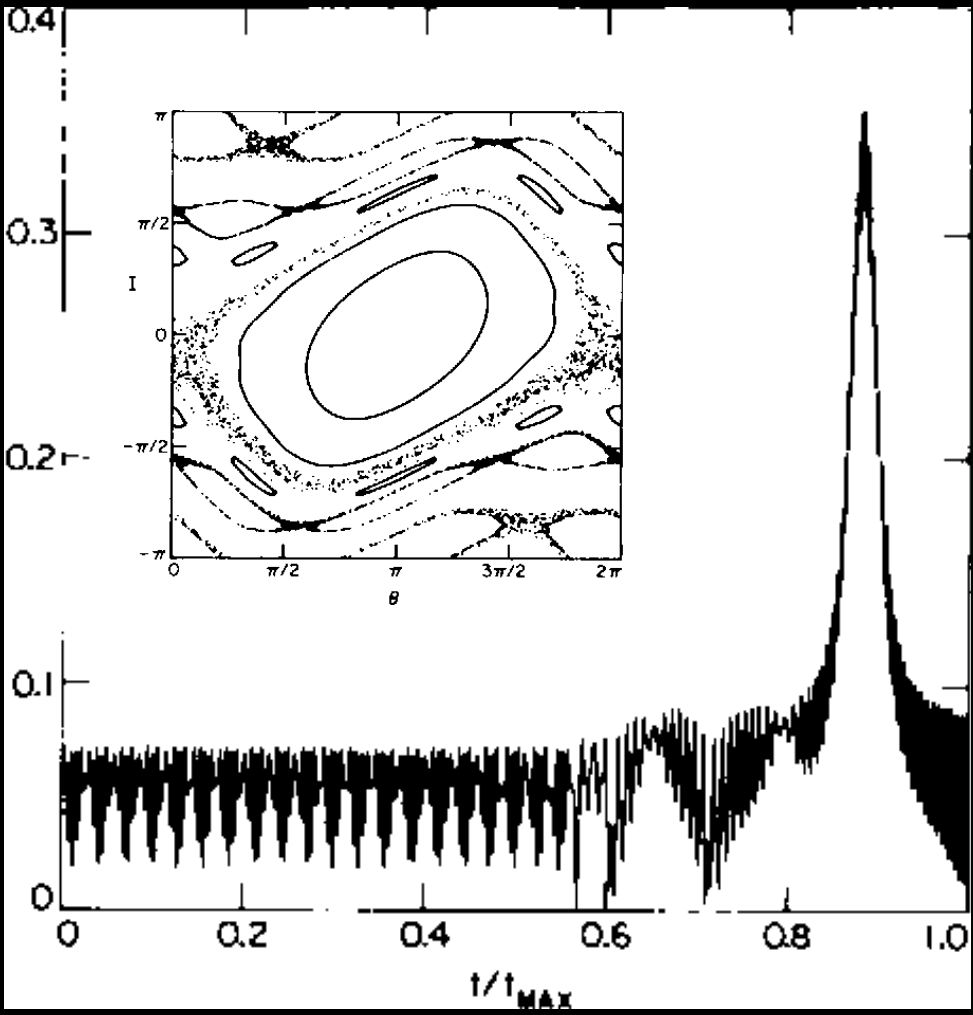


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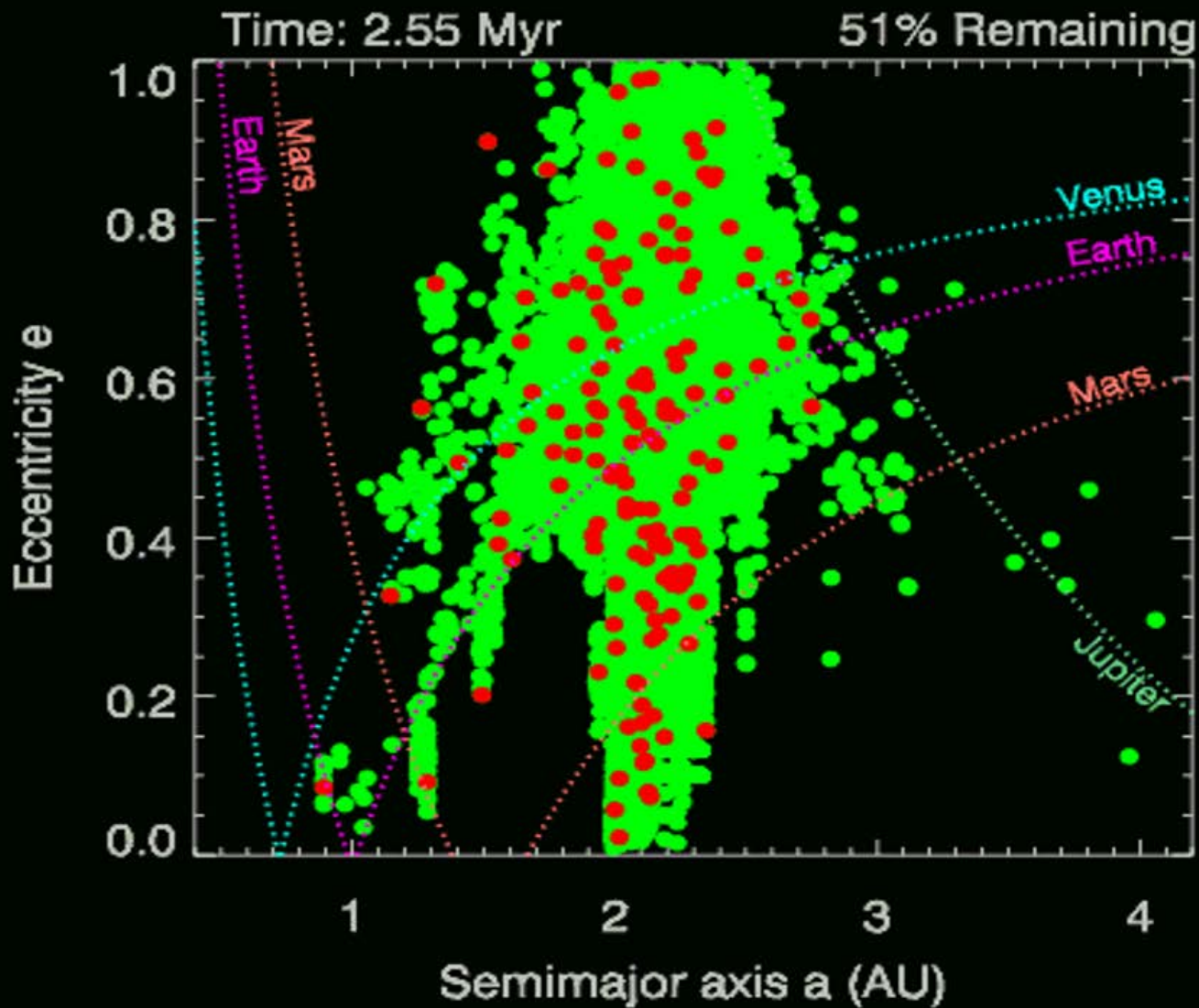


Published 1983

### Chaotic Behavior and the Origin of the 3 / 1 Kirkwood Gap JACK WISDOM



### UNDERSTANDING THE DISTRIBUTION OF NEAR EARTH OBJECTS: A. Morbidelli, P. Michel, W.F. Bottke, R. Jedicke



# I. O. YARKOVSKY AND THE DISCOVERY OF 'HIS' EFFECT

GEORGE BEEKMAN, Utrecht

## Introduction

Ivan Osipovich Yarkovsky (1844–1902, see Figure 1) was a Polish civil engineer working in Russia. By day, he was employed by the Alexandrovsk railway company Moscow–Brest. In his spare time, however, he went deeply into the physical sciences and searched for a “Grand Theory” of the physical world. In 1888 he described a subtle thermal effect that he believed would act on planets and smaller objects orbiting the Sun. This effect fell into oblivion; but about 1950 it was rediscovered and now this so-called Yarkovsky effect is a much-discussed topic in planetary astronomy. Yarkovsky himself, however, has remained completely unknown, as is the way by which he came to his discovery.

For millennia people have wondered about the unpredictable behaviour of comets in the sky. As far as we know, the German mathematician and geographer Peter Apian



FIG. 1. Photograph of Ivan Osipovich Yarkovsky, place and date unknown.

*La densità dell'etere  
luminifero e la resistenza che  
offre al movimento*

*Wiele znaczeniemi Jarka Witoldowi  
Czasnikowi na temat, o maszynach i przy-  
rodzie, a ktoremu zawsze powstawał dla niego*

**ПЛОТНОСТЬ** *сп. аэтер.*

*3/902.*

# СВѢТОВОГО ЭТЕРА

И ОКАЗЫВАЕМОЕ ИМЪ

А. ОБСЕРВАТОРИИ  
2818  
\* К. М. Д. \*

## СОПРОТИВЛЕНІЕ ДВИЖЕНІЮ.

Ученъ проф. В. К. Цораскаго

**И. О. ЯРКОВСКАГО**  
Инженеръ-Технологъ.

БРЯНСКЪ.  
Типографія Юдина.  
1902.



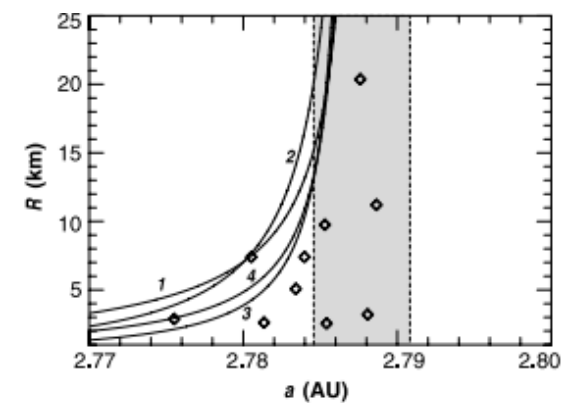
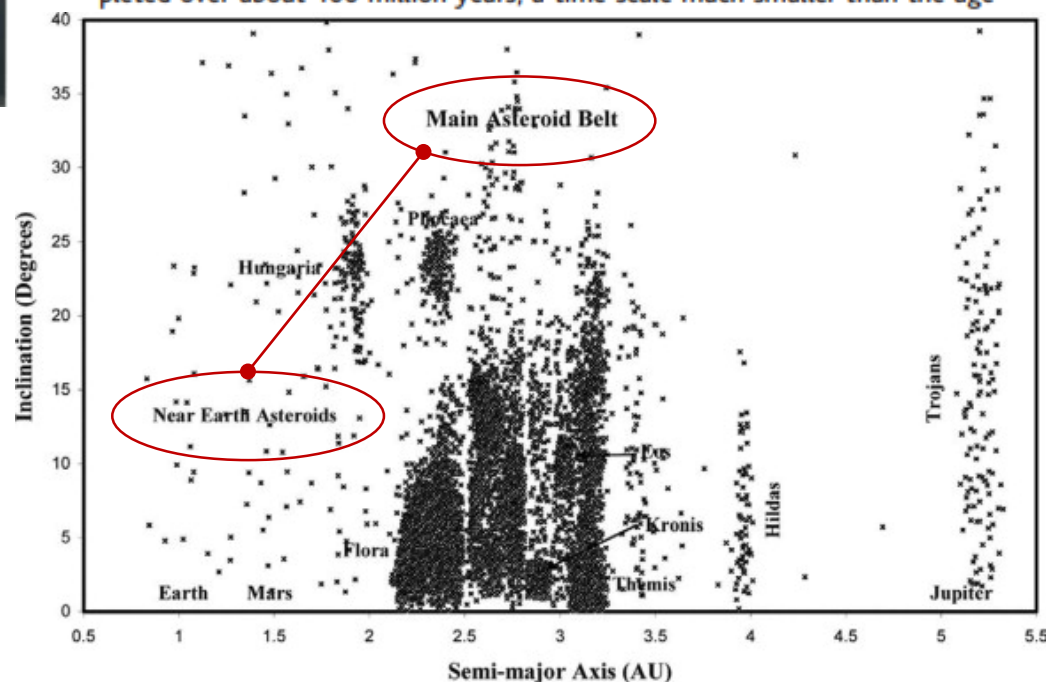
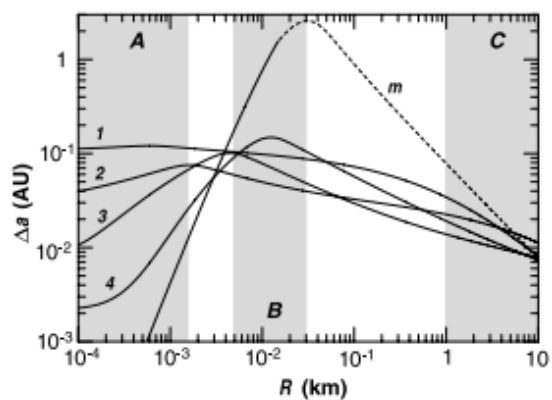
# Semimajor Axis Mobility of Asteroidal Fragments

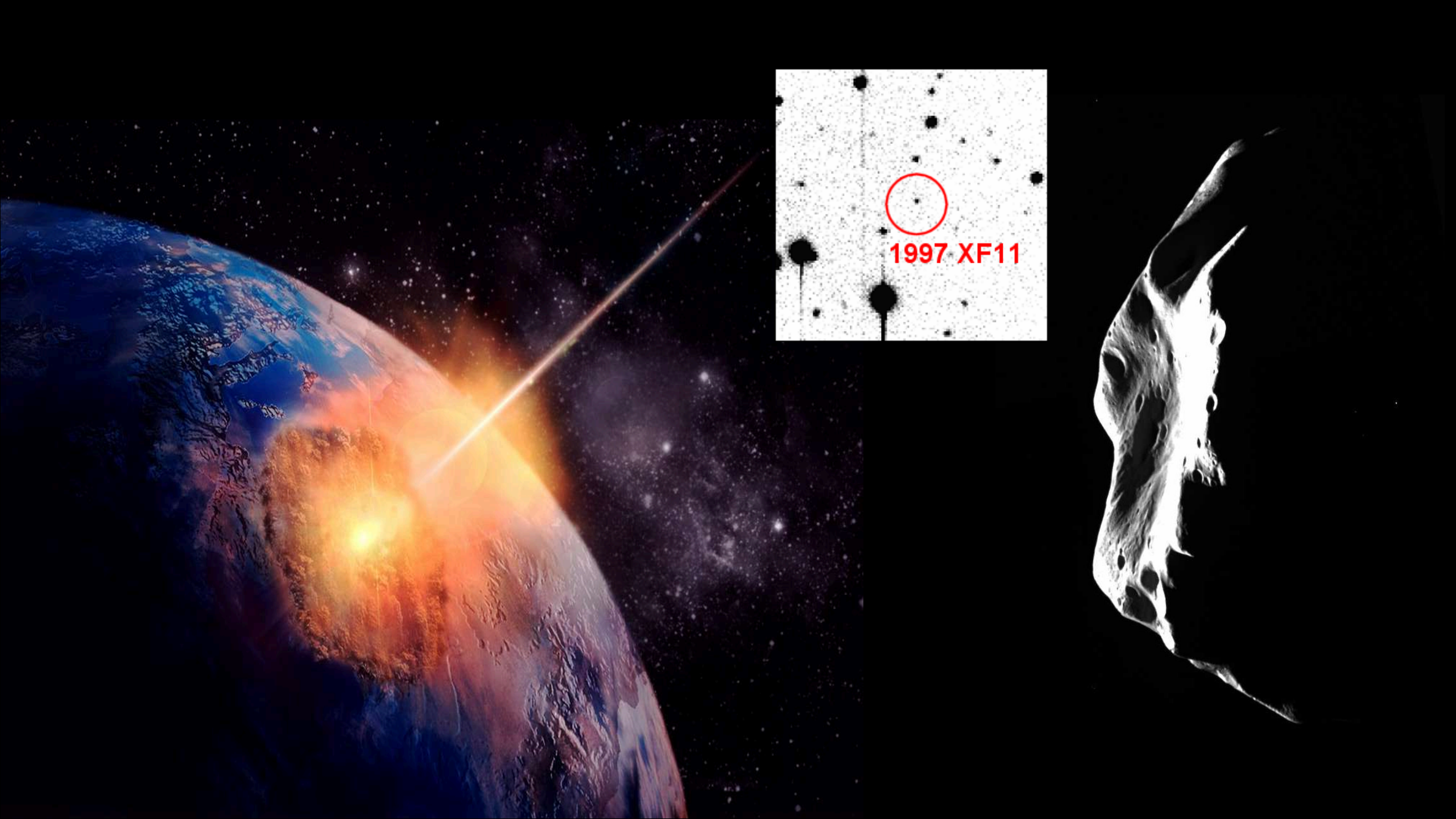
Paolo Farinella<sup>1\*</sup> and David Vokrouhlický<sup>2</sup>

The semimajor axes of asteroids up to about 20 kilometers in diameter drift as a result of the Yarkovsky effect, a subtle nongravitational mechanism related to radiation pressure recoil on spinning objects that orbit the sun. Over the collisional lifetimes of these objects (typically, 10 to 1000 million years), orbital semimajor axes can be moved by a few hundredths of an astronomical unit for bodies between 1 and 10 kilometers in mean radius. This has implications for the delivery of multikilometer near-Earth asteroids, because the Yarkovsky drift drives many small main-belt asteroids into the resonances that transport them to the Mars-crossing state and eventually to near-Earth space. Recent work has shown that, without such a drift, the Mars-crossing population would be depleted over about 100 million years, a time scale much smaller than the age



## The Farinella Prize

















1997 XF11



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Designation	H	PS <sub>max</sub>	TS <sub>max</sub>	Status	Camp. start	Camp. end	Notes
(29075) 1950DA 	17.1	-1.36	n/a	Special		2020-02-27	
(99942) Apophis 	18.9	-3.67	0	Special		2020-08-13	
(101955) Bennu 	20.6	-2.32	n/a	Special	2023-01-24	2025-10-16	
(410777) 2009FD 	22.2	-7.25	n/a	Special		2020-03-06	
2016WJ1 	21.4	-7.99	0	Observable		2020-02-20	
2019RT3 	25.2	-6.02	0	Observable		2019-11-23	
2019SQ8 	23.3	-9.15	0	Observable		2019-11-10	
2019TB 	27.2	-9.13	0	Observable		2019-11-13	
2019TF2 	26.5	-7.83	0	Observable		2020-07-10	
2019TJ5 	26.8	-9.10	0	Observable		2019-11-14	
2019UC14 	23.4	-4.77	0	Observable		2019-11-27	
2019UE4 	27.7	-6.17	0	Observable		2019-11-16	



## NEO Coordination Centre

### Precursor services

Please note that all SSA-NEO Services are under development

Last update: 2014-10-05 13:30:00 UTC

Current number of known NEOs:

**11468**

Current number of NEOs in risk list:

**454**

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### ESA's bug-eyed telescope to spot risky asteroids

22 Sep 2014



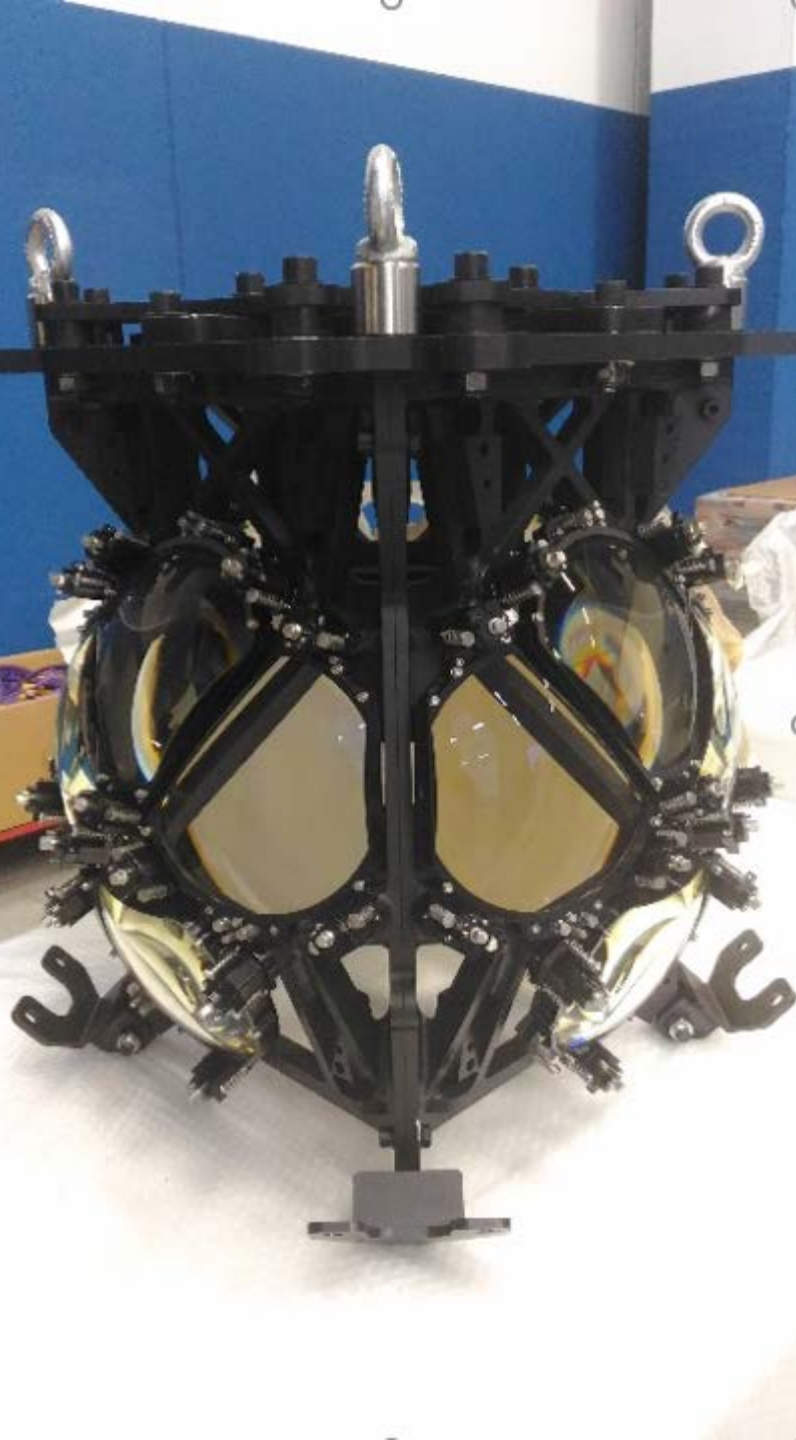
Spotting Earth-threatening asteroids is tough partly because the sky is so big. But insects offer an answer, since they figured out long ago how to look in many directions at once.

As part of the global effort to hunt out risky celestial objects such as asteroids and comets, ESA is developing an automated telescope for nightly sky surveys.

This telescope is the first in a future network that would completely scan the sky and automatically identify possible new near-Earth objects, or NEOs, for follow up and later checking by human researchers.

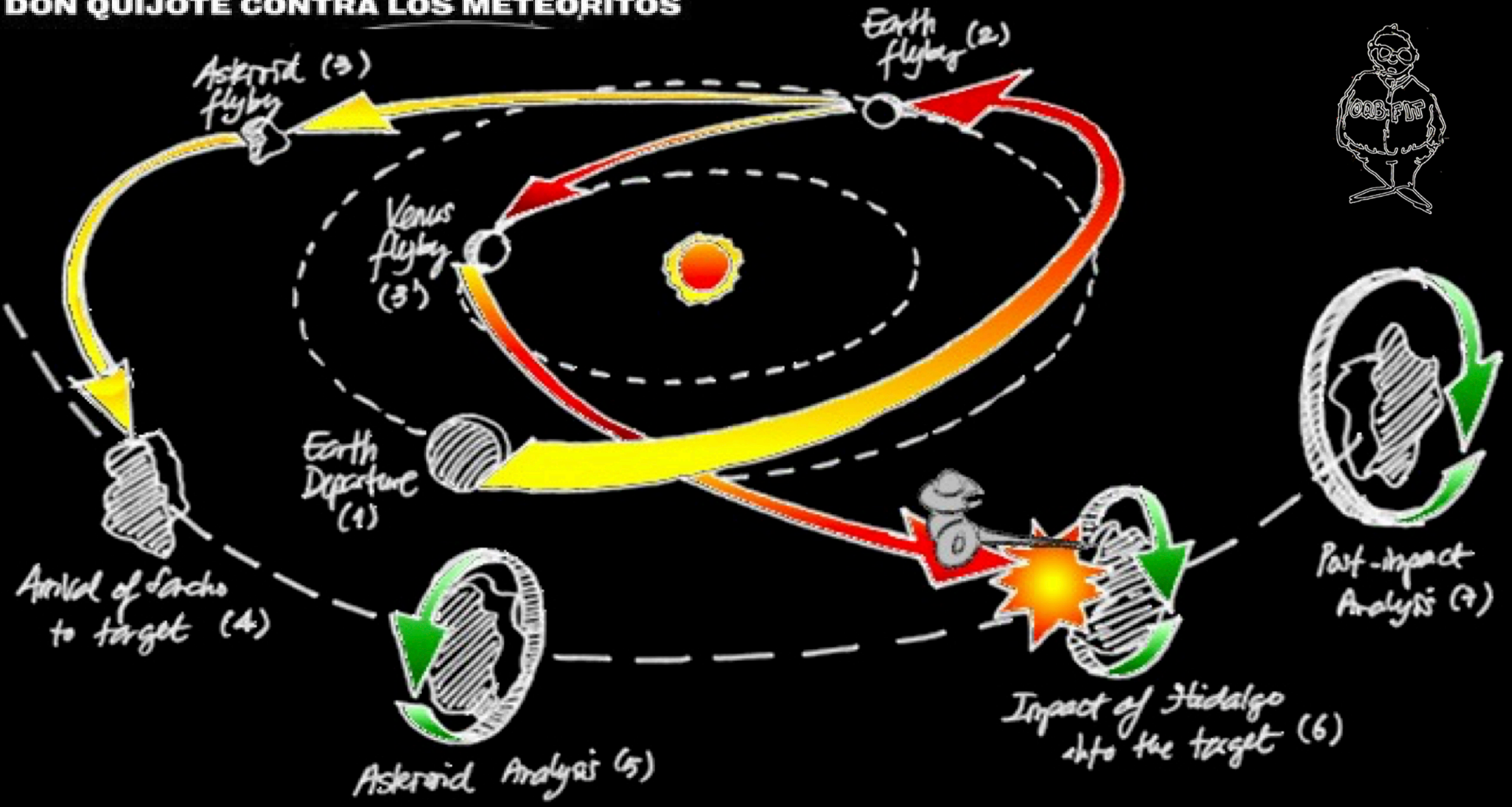
But a web of traditional telescopes would be complex and expensive because of the number required. Adding to the problem, the system must be able to discover objects many times fainter than the naked eye can perceive.

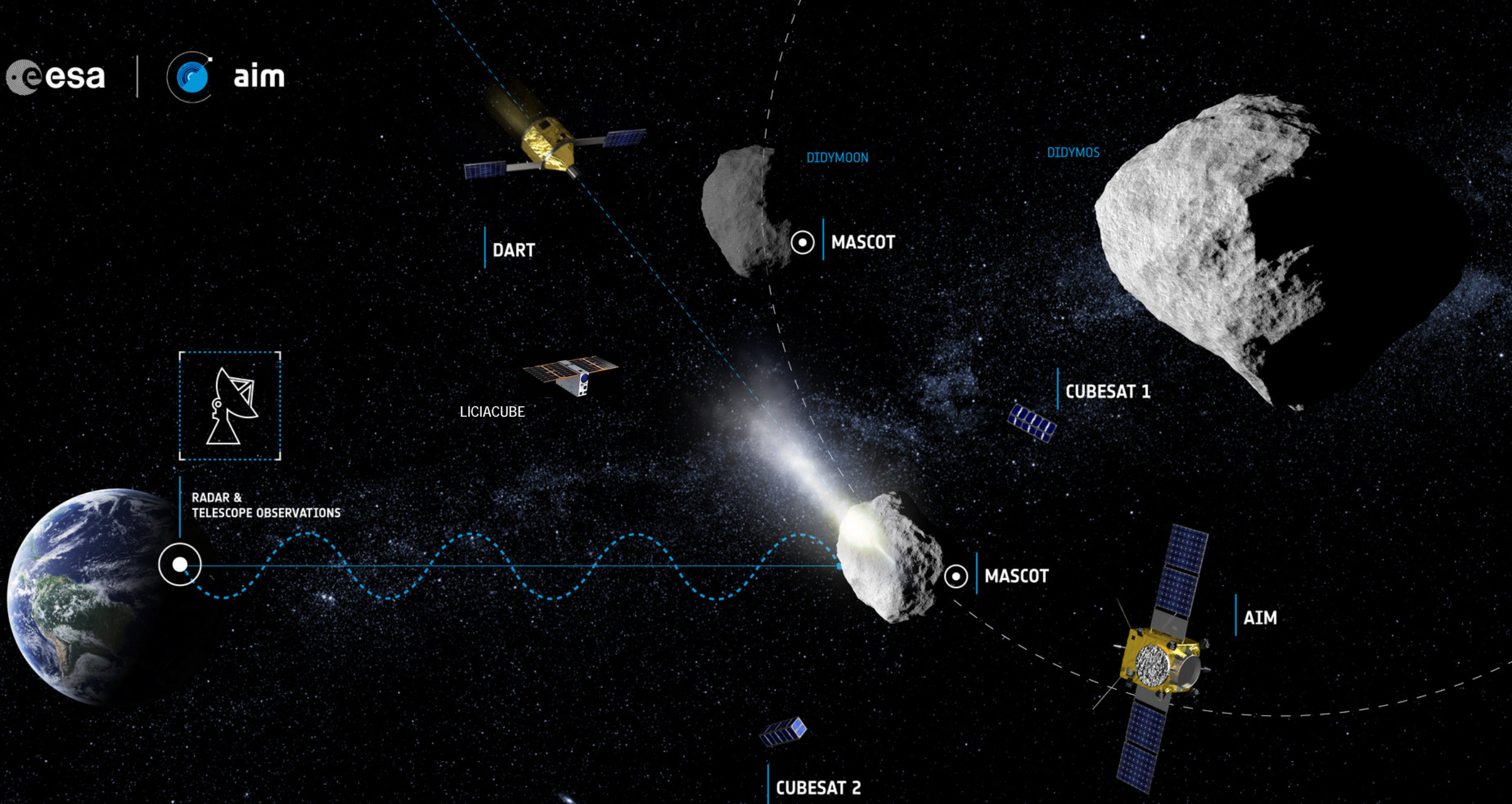
While no network can spot all potentially hazardous objects, under favourable conditions it should detect everything down to about 40 m in diameter at least three weeks before impact.





# DON QUIJOTE CONTRA LOS METEORITOS





RADAR &  
TELESCOPE OBSERVATIONS

DART

LICIACUBE

DIDYMOON

MASCOT

DIDYMOS

CUBESAT 1

MASCOT

AIM

CUBESAT 2

# Asteroid (9934) CACCIOPPOLI: what's in a name?

ETTORE PEROZZI

*Telespazio, Roma, Italy*

*DESPA - Observatoire de Paris Meudon, France*

Every name tells a story - whatever sad or happy: no wonder that the question posed by poor Julietta in trying to escape her fate - *what's in a name? that which we call a rose by any other name would smell as sweet* - has quickly become a standard quotation from Shakespeare. Going through the list of asteroid names is therefore an intriguing exercise, and while doing so some time ago, it hit my mind that I knew a name telling a story, sad *and* happy, which deserved a place in the sky. With the kind support of Ted Bowell (Lowell Observatory), who generously offered an asteroid discovered by himself, the proposal to name CACCIOPPOLI asteroid number 9934 (provisional designation 1985UC) was sent to the International Astronomical Union by the end of March 2001. Here is the story behind the name.

The Caccioppoli family has roots in Vico Equense, a small town close to Naples. Among the many branches of the family that can be traced, a peculiar connection is found: at the beginning of the 20.th century the family got related on one side to the well-known russian revolutionary Mikhail Bakunin, while on the other to the head of the italian fascist party, Achille Starace. In between these extrema two distinguished scientists were born: Renato and Francesco Caccioppoli.



Renato Caccioppoli 1904-1959



Michail  
Bakunin  
1814-1876



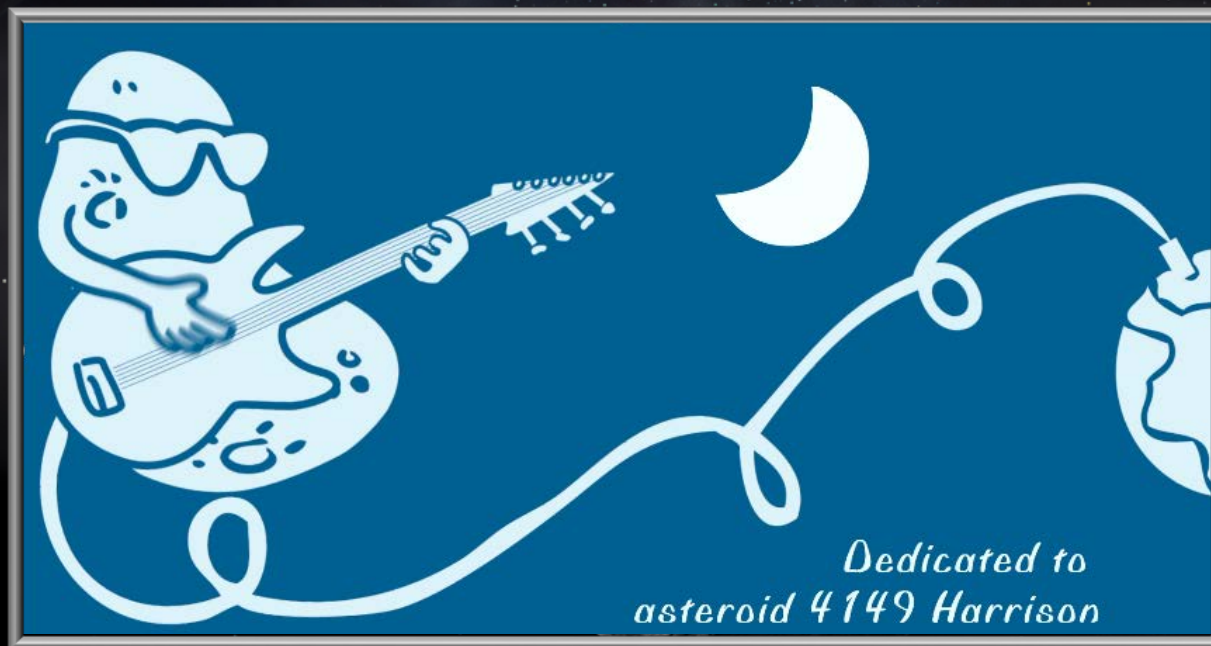
Francesco Caccioppoli 1855-1904



# Near Earth Objects

osservazione prevenzione protezione

ettore perozzi



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