

Project HamrOptSen

**Comenius University in Bratislava
Faculty of Mathematics, Physics and Informatics**

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Comenius University in Bratislava

Faculty of Mathematics, Physics and Informatics

1. The only higher education institute for complete A&A studies (Master, PhD) in Slovakia
2. Own Astronomical and Geophysical Observatory in Modra
3. Research, education and development in one place



Areas of interest

1. Solar Physics – Non-thermal energy distribution of particles in solar corona – satellites instruments
2. Small Solar System Bodies
 - Meteor project AMOS (All-sky Meteor Orbit System)
 - project ADAM (Automatic Detection of Asteroids and Meteoroids)
 - experiment DUSTER – stratospheric balloon sampling of fireball dust traces (cooperation with SOSA)
3. Space Debris – astrometric and photometric obs., cooperation with Univ. Bern (dr. Šilha)

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Development of a Supporting Optical Sensor for High-Area-to-Mass-Ratio Objects Cataloguing and Research (HamrOptSen).

The Prime Contractor is:

***Comenius University in Bratislava,
Faculty of Mathematics, Physics and Informatics***

bidder code is: 69005

The sub-contractor participating to the activity is:

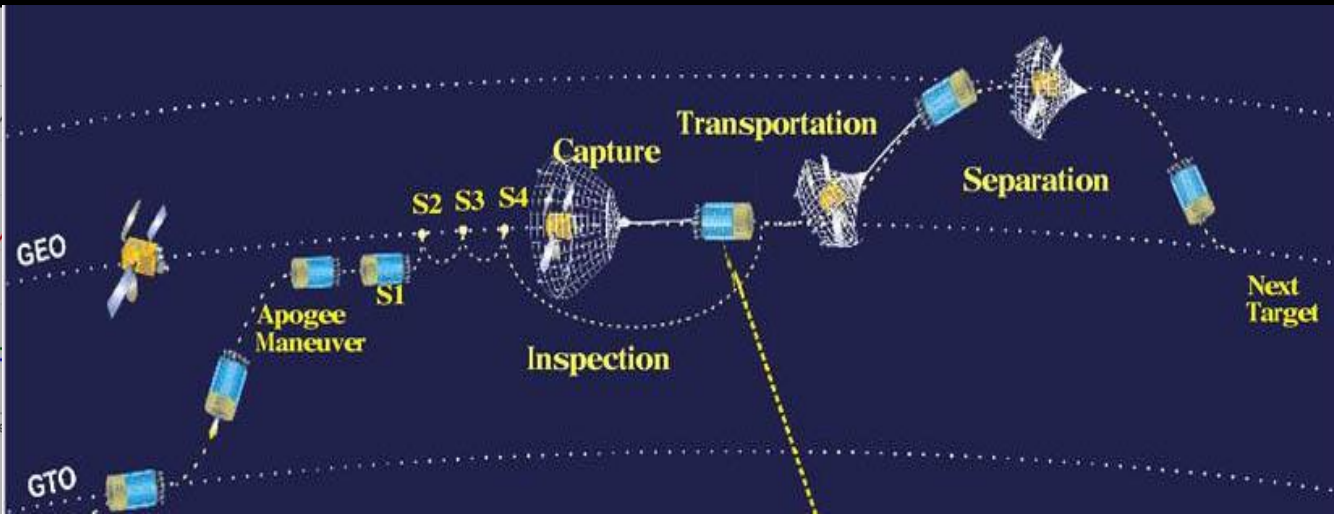
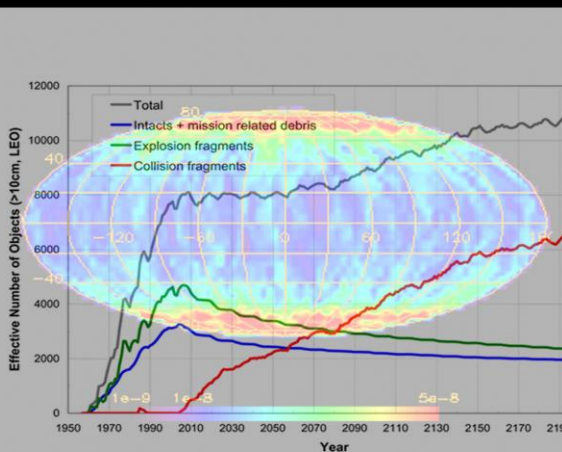
Astronomical Institute University of Bern

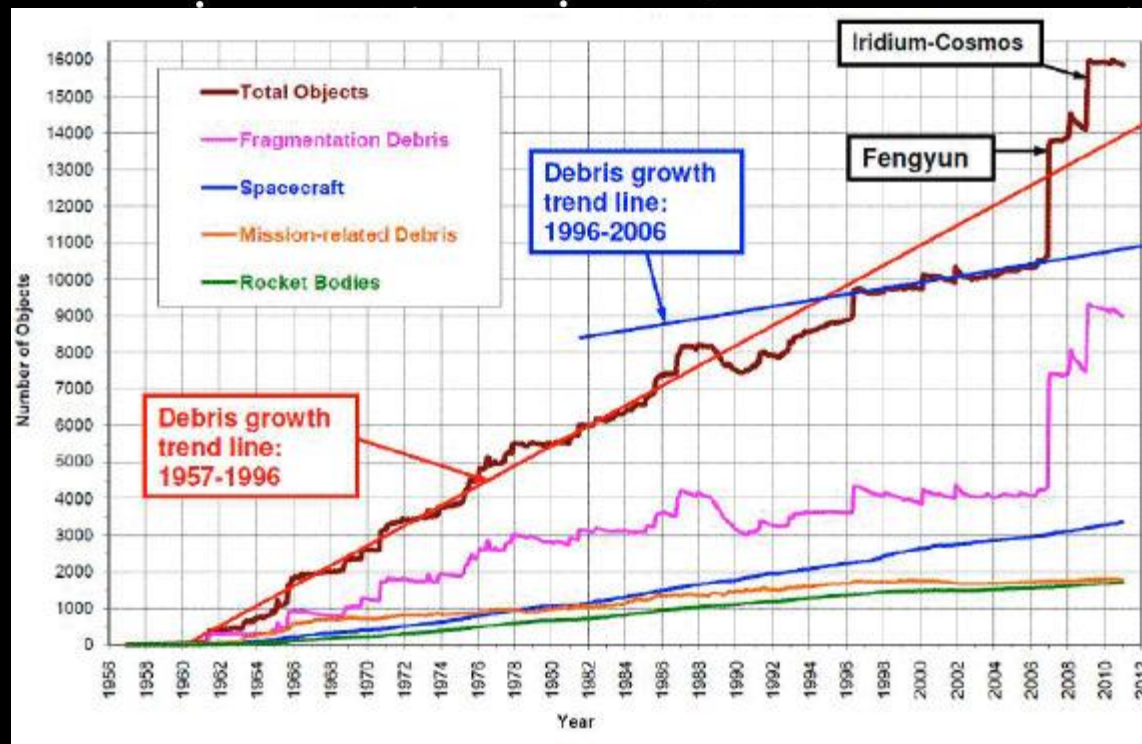
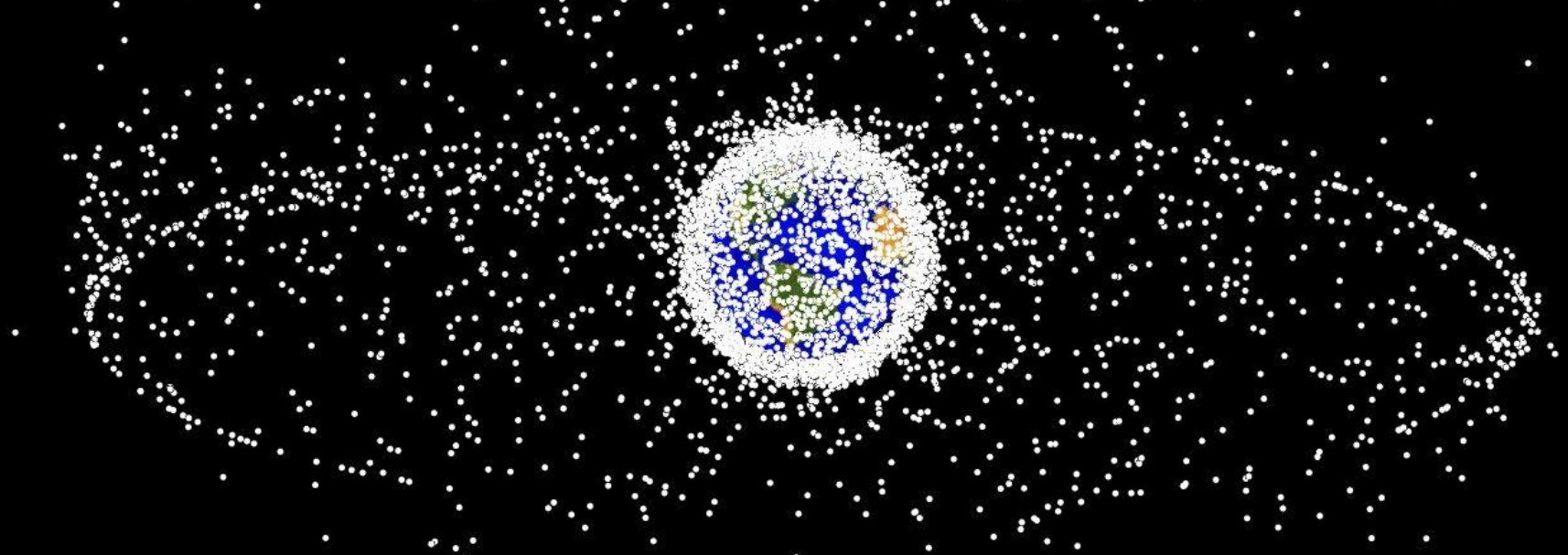
Amount requested: 191 347.00 Eur

Project duration: 24 months

What and why?

- Space/Orbital debris population rises (16,000+).
- New populations are discovered by optical telescopes.
- Theoretical (dynamical ways of transport) and laboratory studies implies sources of debris.
- Better construction of new satellites.
- Remediation of orbital debris.







Top and side views (day and night) of the MCAT telescope were taken by Leading Aircraftman (LAC) Hanna, Royal Air Force. All other photos were taken by NASA personnel and U.S. Air Force Research Laboratory contractors.



The

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at
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Houston, TX, USA

INSIDE...

FCC Issues New
OD Mitigation
Regulations 2

PINDROP - An Acoustic Particle Impact
Detector 3

Utilizing the Ultra-Sensitive Goldstone
Radar for Orbital Debris Measurements.. 5

Orbital Evolution of
GEO Debris with Very
High Area-to-Mass
Ratios 6

FUSE Satellite Releases Unexpected Debris

In early June 2004 NASA's Far Ultra-violet Spectroscopic Explorer (FUSE) spacecraft (International Designator 1999-035A, US Satellite Number 25791) was the source of nine debris large enough to be detected and tracked by the US Space Surveillance Network (SSN). The 1360-kg spacecraft was launched into a nearly circular orbit near 750 km on 24 June 1999 and continues to perform well. Early on 6 June 2004 FUSE temporarily entered a safe mode which resulted in the closure and re-opening of its four main sensor doors. Analyses by SSN personnel indicate that the new debris separated from FUSE at very low velocities about the time of the door closures.

A preliminary assessment suggests that the nine objects might be fragments of the multi-layer insulation which covers the majority of the spacecraft. The effects of long-term exposure to the space environment can lead to such insulation becoming brittle and susceptible to spacecraft movements or small particle impacts. If the new debris are pieces of insulation, then their orbital lifetimes might be considerably shorter than typical spacecraft, rocket bodies, and other debris at that altitude. Tracking data through the end of June supports this hypothesis. The investigation into this anomalous event is continuing. ♦



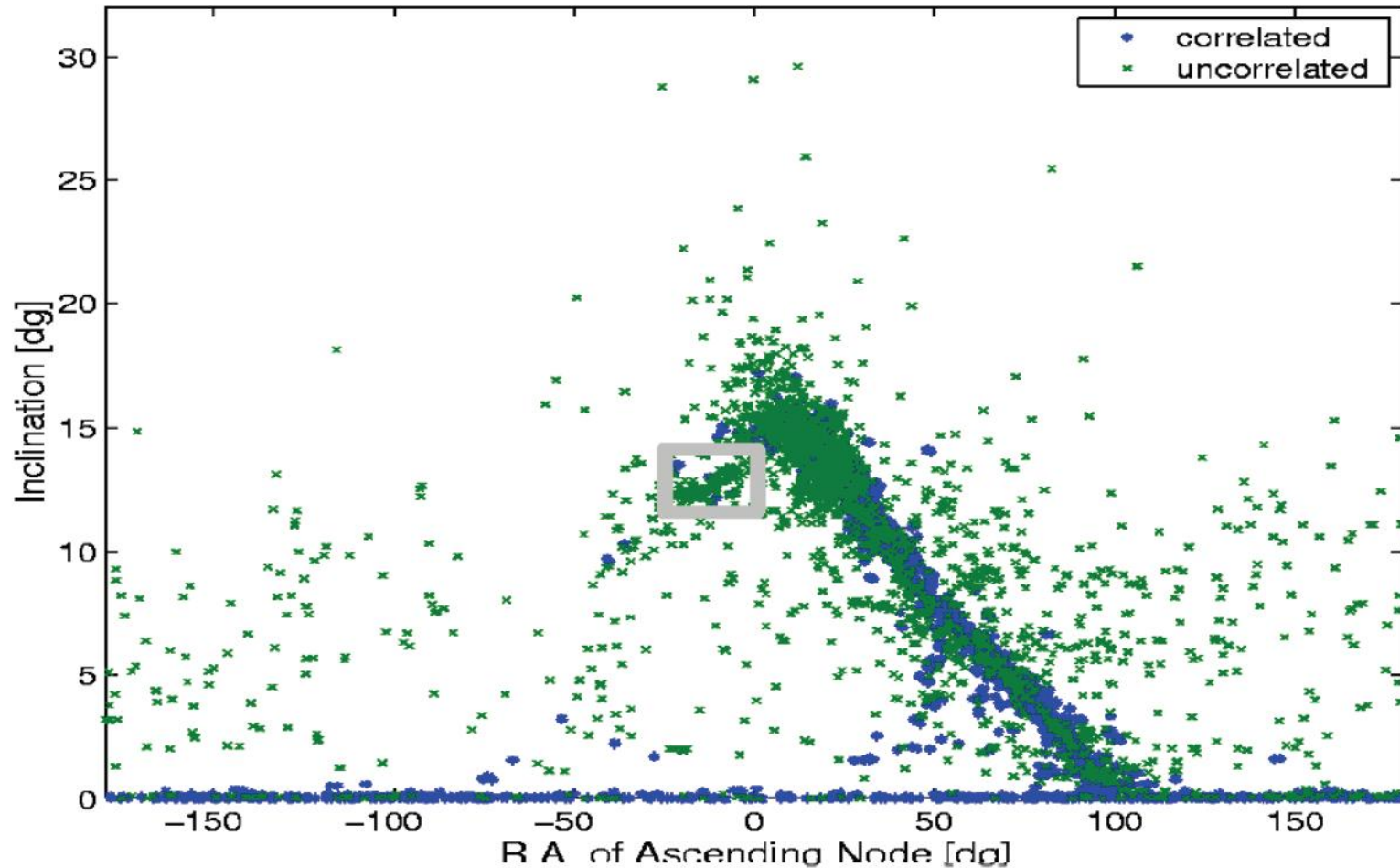
FUSE spacecraft being prepared for launch.

Publication of the 13th Edition of *History of On-Orbit Satellite Fragmentations*

The 13th edition of *History of On-Orbit Satellite Fragmentations*, JSC-62530, has recently been published. This document details the 173 known parameters of the parent object prior to the breakup, page format. The first page consists of information such as the physical characteristics and orbital parameters of the parent object prior to the breakup.

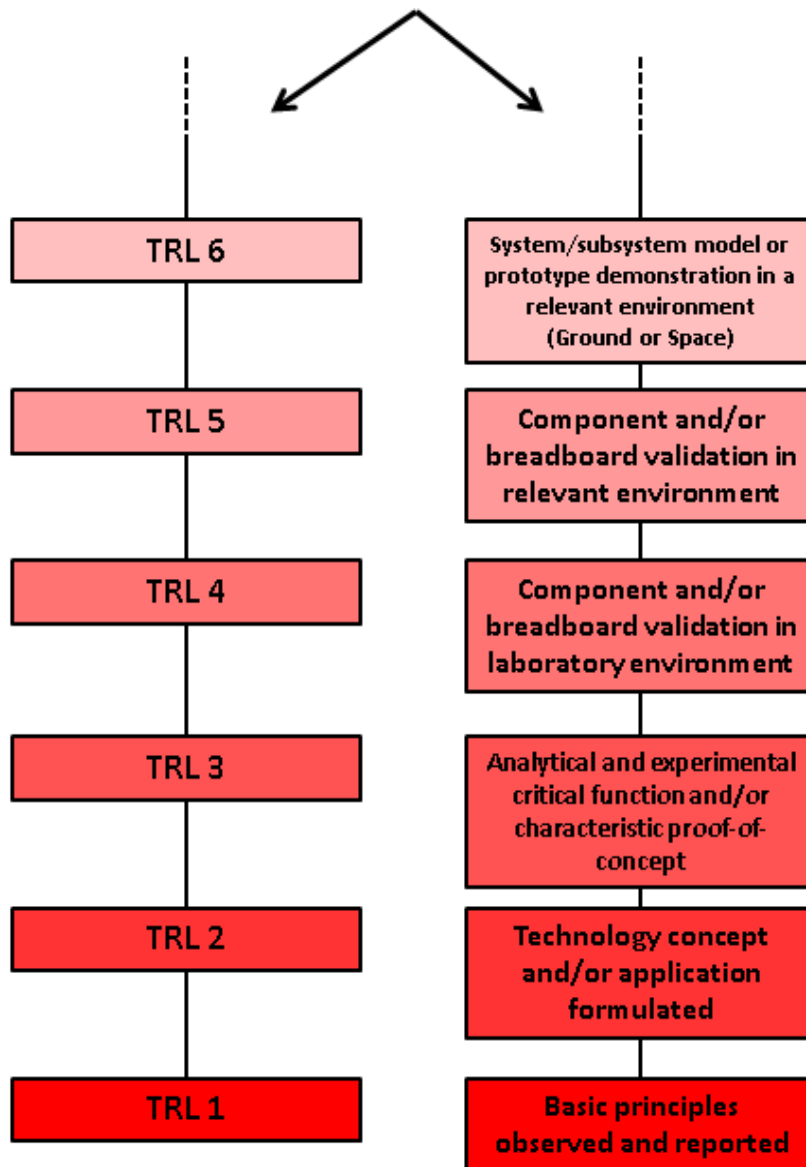
Detection of HAMR Objects

Detection by Schildknecht (2004):

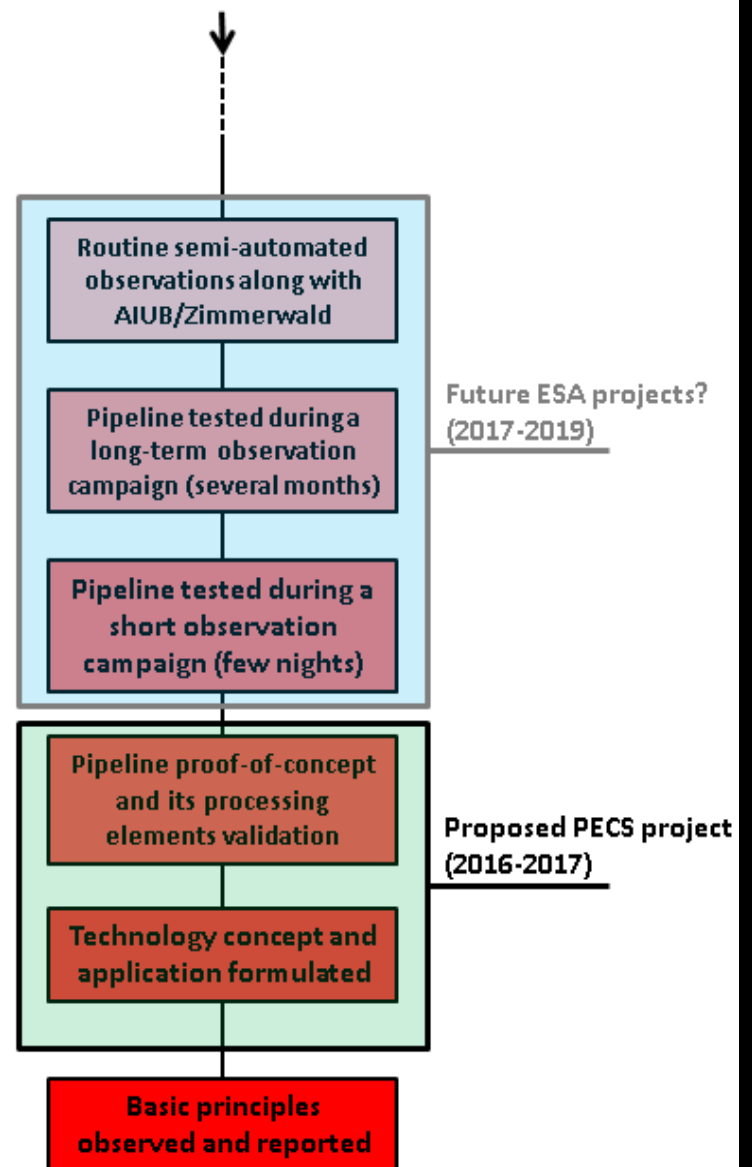


Orbits could only be fit estimating a high area-to-mass ratio (HAMR)!

Used ESA definitions for
Technology Readiness Levels



Proposed optical system
Technology Readiness Levels



Thank you!