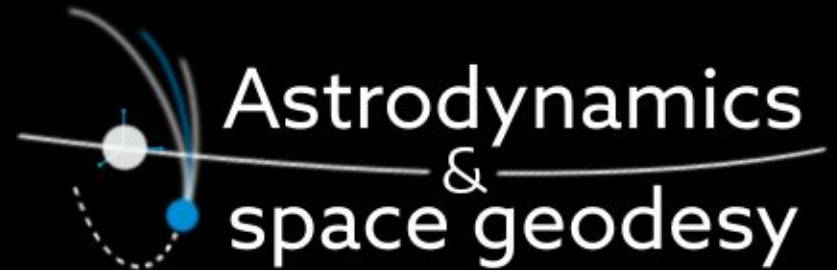




**Astronomical Institute**  
of the Czech Academy of Sciences



Cooperation activities of  
Astrodynamics & Space Geodesy (ASG) group

<http://planets.asu.cas.cz/>

Josef Sebera & Aleš Bezděk

[sebera@asu.cas.cz](mailto:sebera@asu.cas.cz)

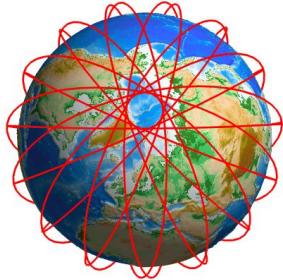
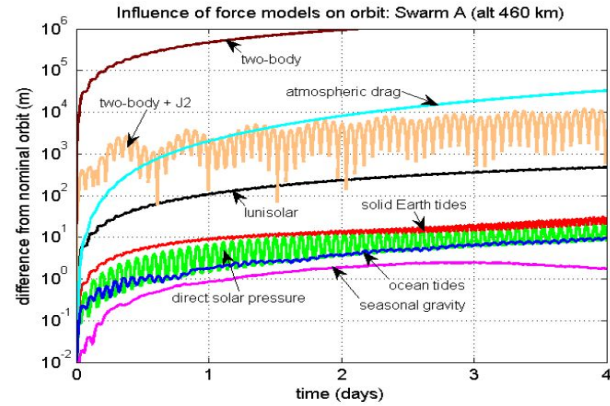
STRATEGY **AV21**

Top research in the public interest

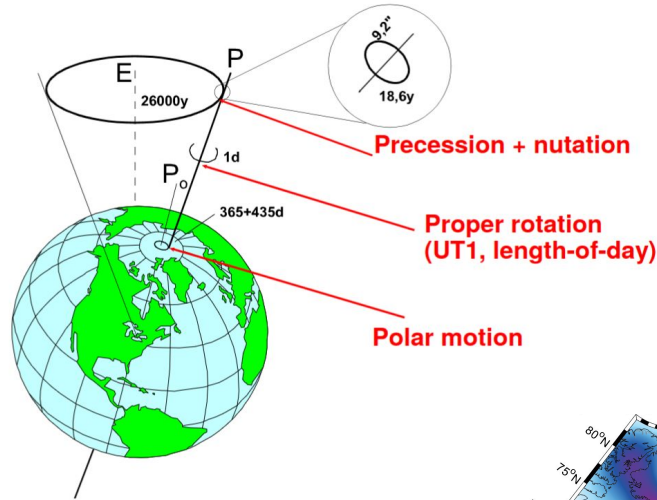


# ASG scientific activities

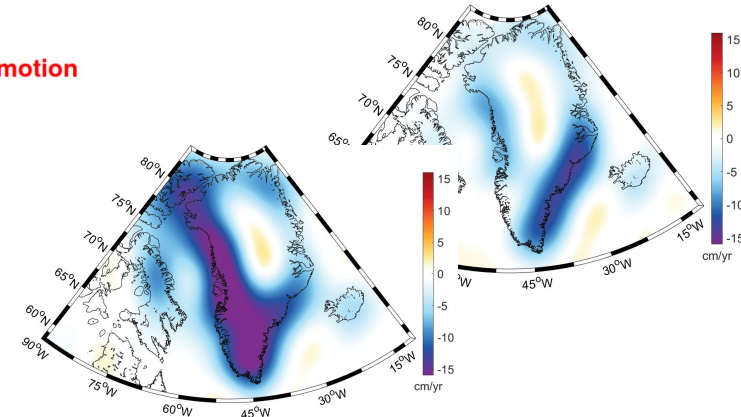
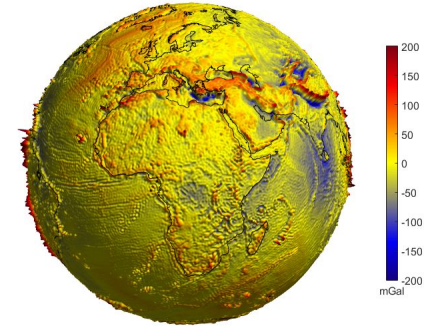
## I. Satellite gravimetry, satellite dynamics & orbits, accelerometry



## II. Earth rotation and Earth orientation parameters, archeoastronomy



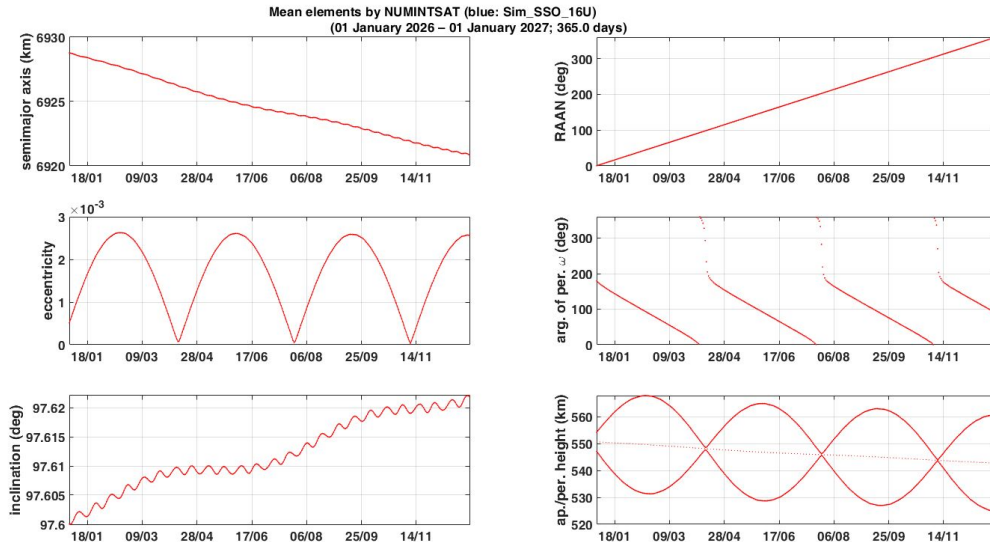
## III. Geopotential field modelling and interpretation



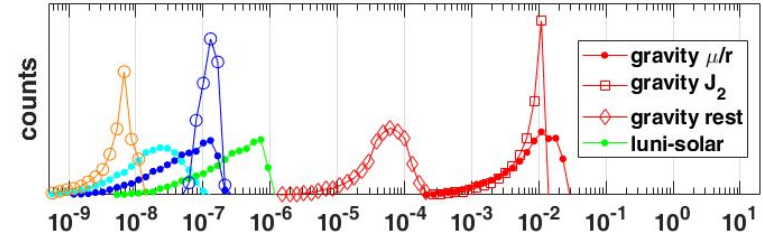


# Astrodynamic services - acc/forces to be experienced by S/C

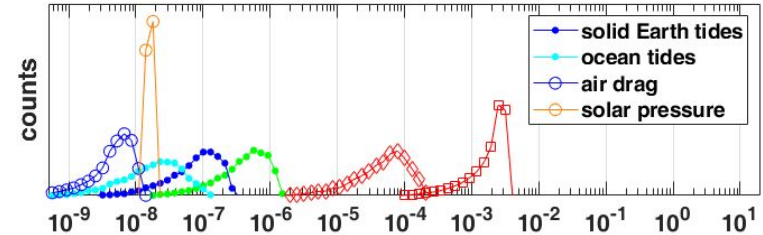
- Example for TOLIMAN (Telescope for Orbit Locus Interferometric Monitoring of our Astronomical Neighbourhood, Uni of Sydney)
- To be launched in 2026, 550 km altitude sun-syn. LEO
- Time evolution of the orbit & expected accelerations (perturbations)



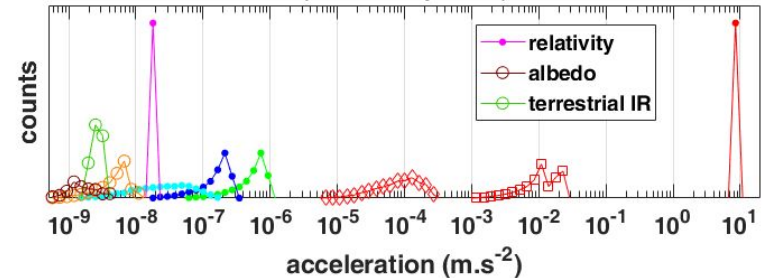
Histograms of perturbing accelerations: Sim\_SSO\_16U (2026; 550 km)  
(along-track component)



(cross-track component)

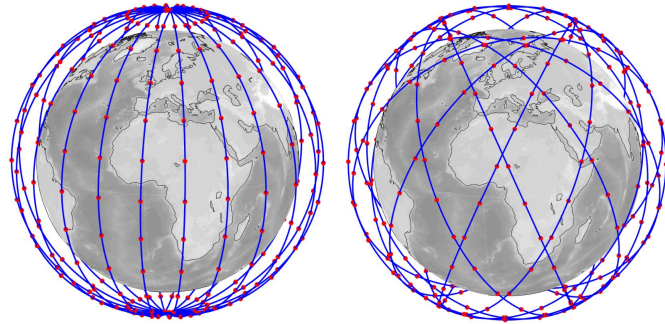


(radial component)



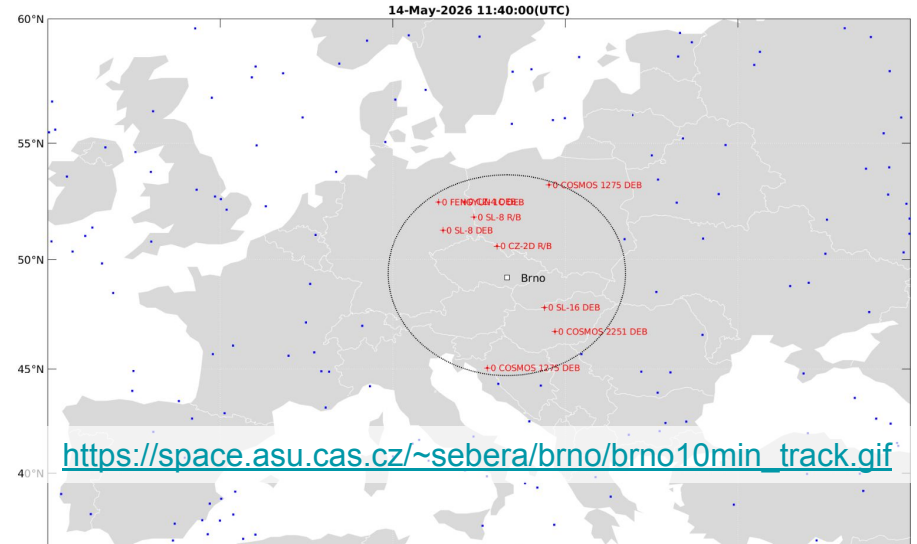
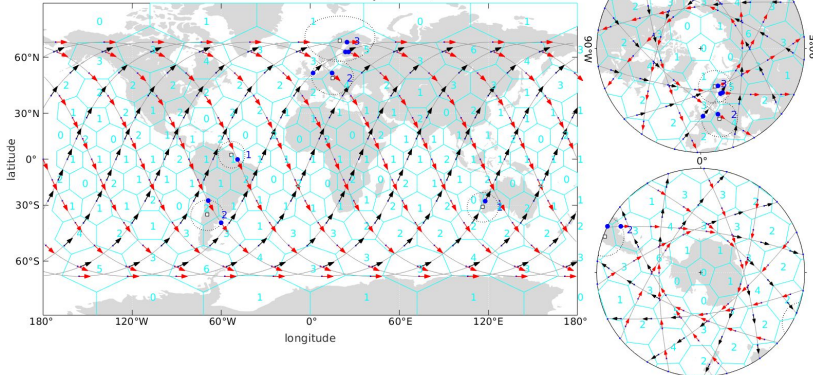
# Astrodynamic services - simulations, geometry, visibility, ISLs...

- Semi-analytic integrator: in-house routines/algorithms validated in our research activities
- SGP4: constellations, visibility, ISLs analyses, space debris ([space-track.org](https://space-track.org), cca 10k DEB, R/B LEO objects)
- Shown IRIS<sup>2</sup>(264 sats) and space debris visibility

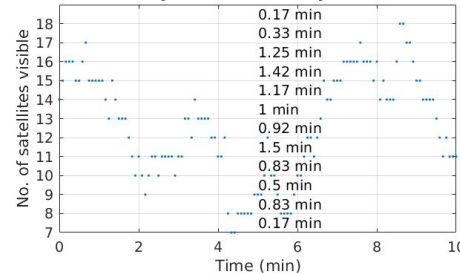


## Possible EU IRIS<sup>2</sup> configurations

Walker delta: 264 sats(24s\*11p,l=66.5°)



Period/day fraction visibility of 1+: 100%



Total length of time windows: 127.417min

