

Commission X-2 annual report 2022

During 2022, optical observers and data processing centers (MPC, NASA, ESA, NEODyS) continued the consolidation of the adoption of the ADES format. MPC is continuing the migration to a cloud system that gives the possibility to scale up the available resources, when a higher data flow is expected from new generation surveys, such as Vera Rubin, NEO Surveyor, and Fly-Eye.

In 2022, JPL delivered updated satellite ephemeris files. NEP101 includes updated orbits for irregular Neptunian satellites and Nereid. URA116 includes irregular satellites of Uranus. JUP345 includes 15 new Jovian irregular satellites. JPL is also working on updating the orbits of the Moon, Mars, and Jupiter for upcoming flight missions.

Over last year, IMCCE worked on the improvement of their planetary ephemerides data, while in 2021, the astrometric observations of asteroids obtained with the GAIA DR2 were implemented in INPOP19a for linking the INPOP reference frame to the Gaia DR2 frame.

In 2022 the IAA - Russian Academy of Sciences (IAA-RAS) studied how the solar wind affects spacecraft ranging observations and published a paper with the findings [1]. IAA-RAS is continuing the research on the dynamical model of the Moon and LLR observations, and another project related to asteroid shape determination.

IAA-RAS is also continuing to research on the dynamical model of the Moon and LLR observations, and another project related to asteroid shape determination, but these results are not published yet. Moreover, RAS submitted a proposal for an IAU GA Focus Group meeting dedicated to lunar science for 2024.

In 2022 the DART NASA mission successfully deflected Dimorphos, secondary asteroid of the Didymos binary system, and measurably changed its orbital period.

IAWN conducted an observational campaign to observe asteroid 2005 LW3 during its November 2022 close approach to Earth. The goal of the campaign was to assess the timing accuracy of astrometric observations, which is useful to improve the astrometry error model and better assess the asteroids orbits and ephemerides.

The James Webb Space Telescope was used to observe comets, e.g., Hale Bopp. This new generation space telescope is a great asset to observe faint solar system bodies. In particular, if an asteroid has a non-negligible chance of hitting the Earth and is too faint for ground-based telescopes, JWST may provide additional positional measurements, which can rule out or not the impact occurrence.

The Small Body Assessment Group's Special Action Team compiled a report on the Apophis close approach to Earth in 2029 to discuss the effects of the encounter, scientific observations and observation strategies, and hazard assessment for spacecraft contact with the asteroid.

[1] <https://academic.oup.com/mnras/article-abstract/514/3/3191/6613528>