

TOWARDS ANGULAR AND ROTATION TRACKING OF APOPHIS IN 2029 WITH A CITIZEN SCIENCE TELESCOPE. IS IT FEASIBLE?



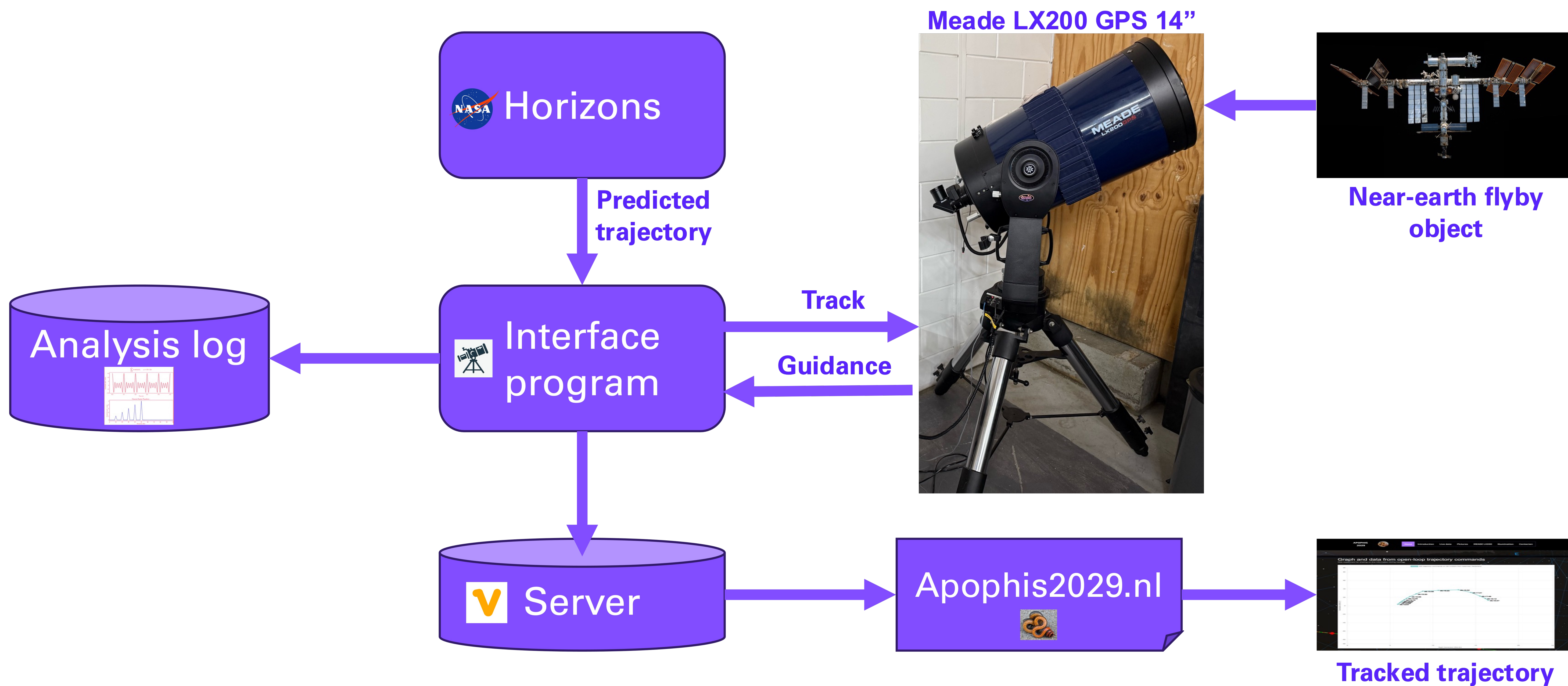
Willy Siegel, Hugo de Jong and Nahum Melamed

Enabling deep-sky telescope to track flyby objects

- Building* s/w-shell to follow predicted RA-DEC path, retrieved from NASA's Horizons program
- Manual delta AZ-EL adjustments
- Integrate camera (ZWO 30F4) for:
 - Visual tracking
 - Light brightness recording for **rotation** analysis
 - Astrometric post-processing

Measure Apophis rotation from brightness variations when observation t (3-5 hr) \ll period T (± 30 hr)

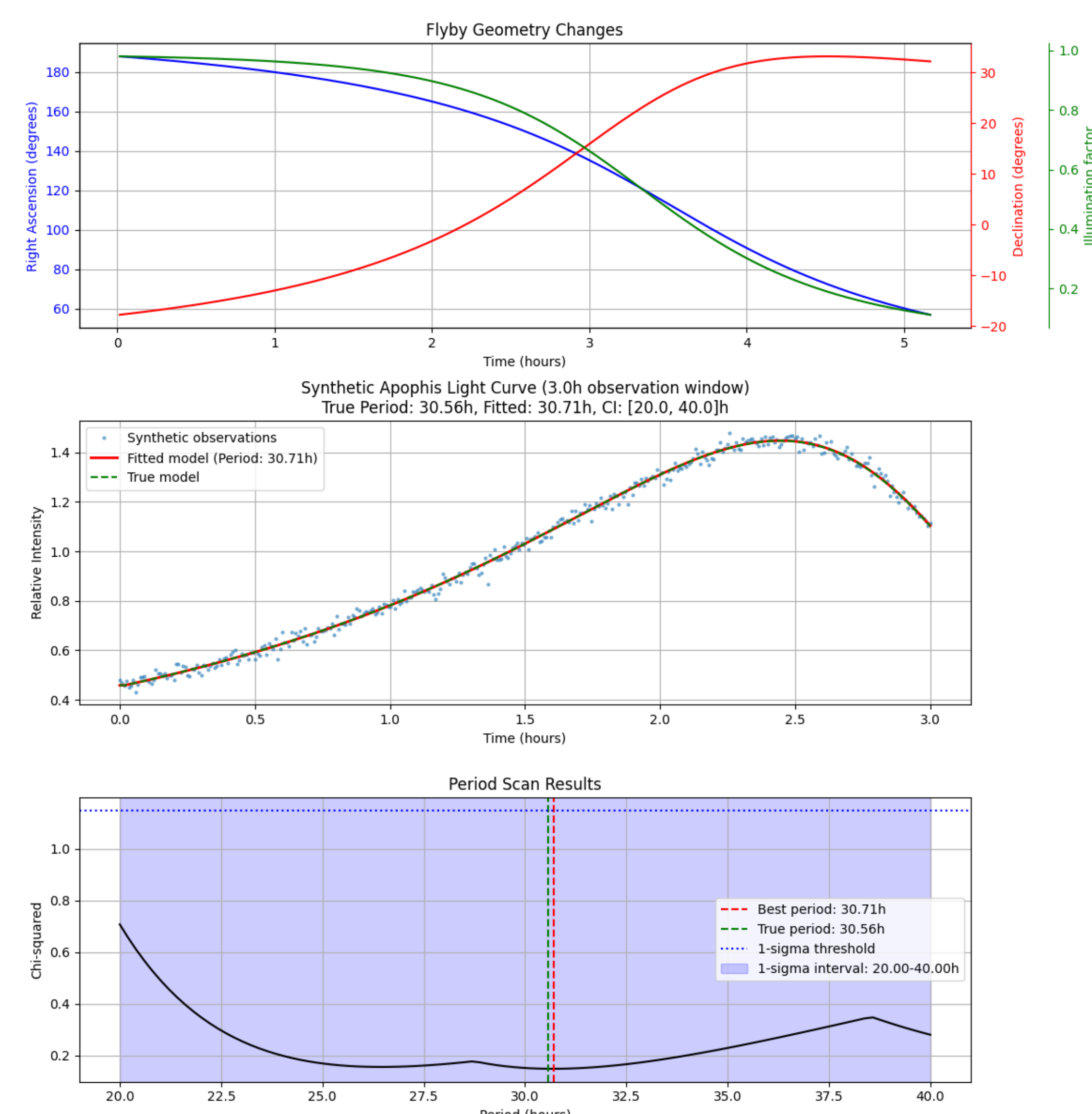
- Apparent brightness modelling* of Apophis:
 - Solar illumination angle
 - Cross-sectional area. Assuming:
 - Apophis = triaxial ellipsoid (340m \times 170m \times 170m) (Brozović et al., 2018)
 - Pole orientation in ecliptic coordinates ($\lambda=250^\circ$, $\beta=-75^\circ$) (Benson et al., 2023)
 - Surface albedo variations
 - Distance from observer



Building* Apophis2029.nl for on-line watchers:



Simulation* results:



Next steps: Lab tests and planet/moon/ISS tracking to ...

- Tryout and enhance the whole concept
- Estimate expected precision & feasibility for rotation

* S/W has been developed with help of AI tool Claude (Anthropic)