

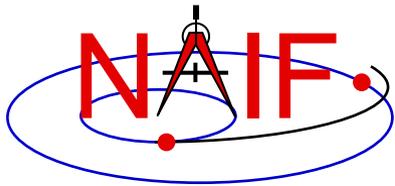


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Navigation and Ancillary Information Facility

# **Geometric Event Finding Programming Lesson (MPO)**

**February 2023**



# Geometric Event Finding: Overview

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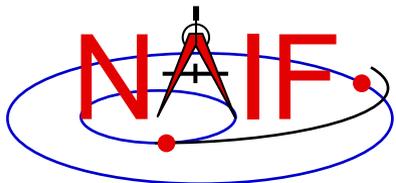
- **Problem statement:**

- **Determine when the BepiColombo Mercury Planetary Orbiter (MPO) is visible from ESA's New Norcia station, within the time interval**

**2027 JAN 03 TDB**

**2027 JAN 06 TDB**

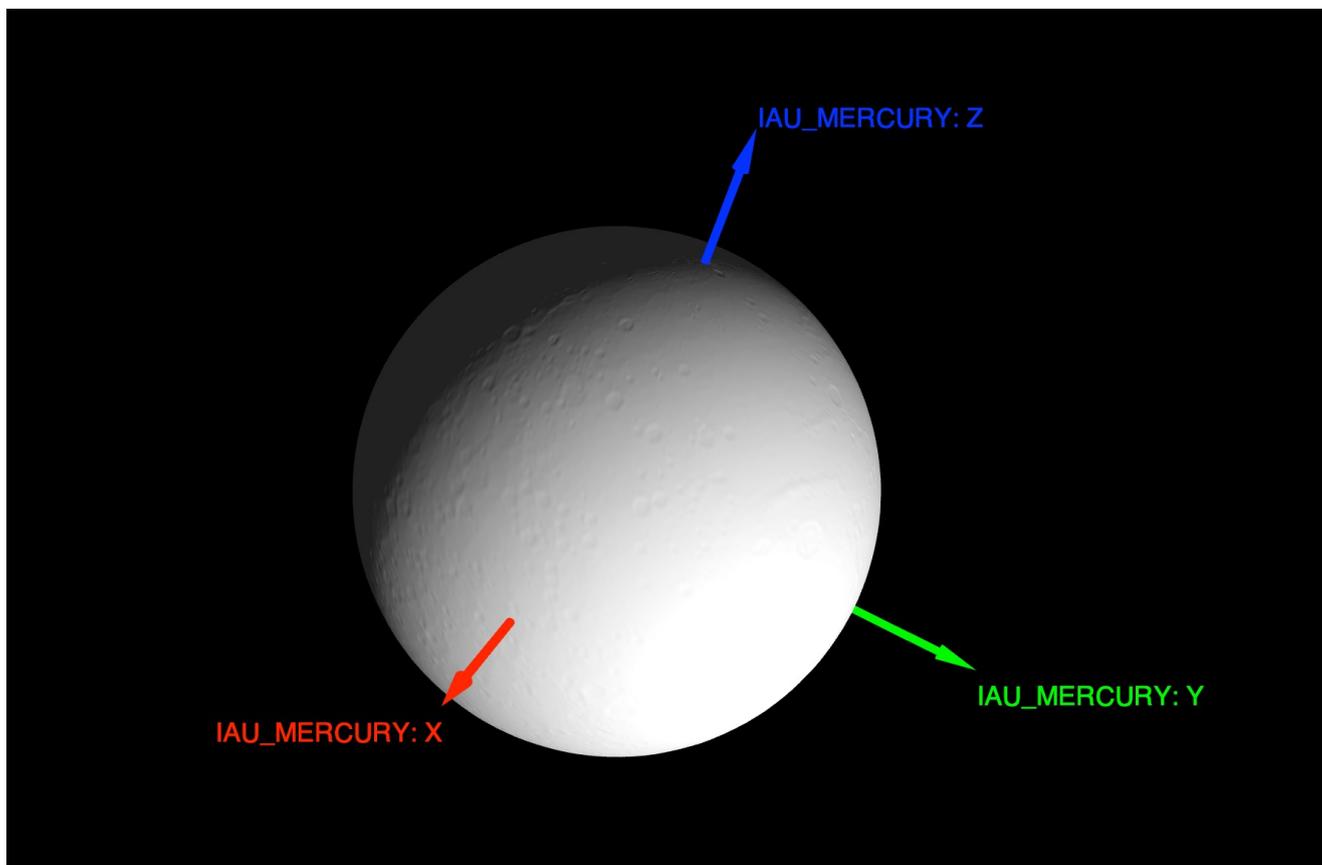
- **For the spacecraft to be considered visible, the apparent spacecraft position relative to New Norcia station must have elevation of at least 6 degrees in the station's topocentric reference frame NEW\_NORCIA\_TOPO.**
  - » **Use light time and stellar aberration corrections to compute the spacecraft position relative to New Norcia.**
- **Account for possible occultation of the spacecraft by Mercury, using an ellipsoidal shape model and a DSK shape model.**
- **Compute a SPICE window representing the visibility period.**
- **Display the start and stop times of each time interval in this SPICE window.**

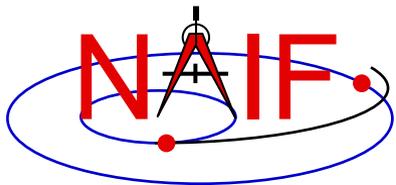


# Mercury Shape

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Spacecraft occultation ingress and egress times computed for Mercury modeled as a triaxial ellipsoid and as a triangular plate model provided in a DSK differ noticeably due to the Mercury topography differing from the ellipsoidal surface for some areas by many kilometers, as illustrated by the view below.





# Visibility Geometry

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