MAJIS WG2 report

Task: Come up with operational scenarios to fulfil the science requirements of MAJIS

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Tools:

Spice Kernels (inc. WebGeoCalc)

MAJIS internal custom tools for pointing & radiometric performance model

Update since previous STM

- **Level 0 analysis completed for the whole Jupiter tour**

→ Generic DV and observation strategies for all object classes & S/C events along tour

→ Did not include distant observations of Io, MB, Europa, rings which we have identified and *will* request

- Detailed analysis for the Europa flybys and one Ganymede flyby carried out before last STM

- Study of the Ganymede orbital phase under way (→ *see also F. Tosi talk*)

- Since iPDR, now have updated MAJIS power + data volume + browse products optimization
    → *See other talks for latest values*

- Unchanged assumption: 1.4 Gbit/day average without DSN

- S/C jitter & pointing accuracy: may be on the order of a HR MAJIS swath: difficulty in programming specific targeting of ROI if no improvement during flight.

Objects under investigation

- Icy satellite surfaces from flybys

- Ganymede surface from orbit (GEO & GCOs)

- Distant observations of other satellites: Io and irregulars
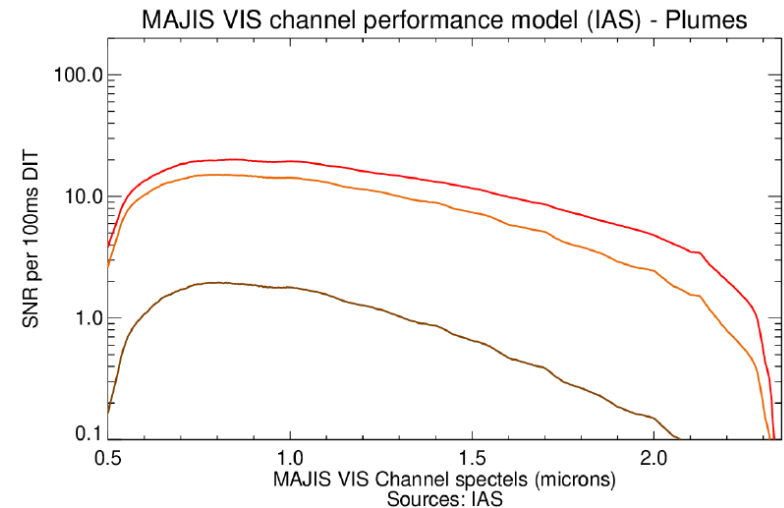
- Jupiter rings

- Galilean satellite plumes

Plumes

MAJIS *should* be able to detect scattering of the solar radiance by the dust component in a plume. It may further be able to detect the composition of the grains (more difficult).

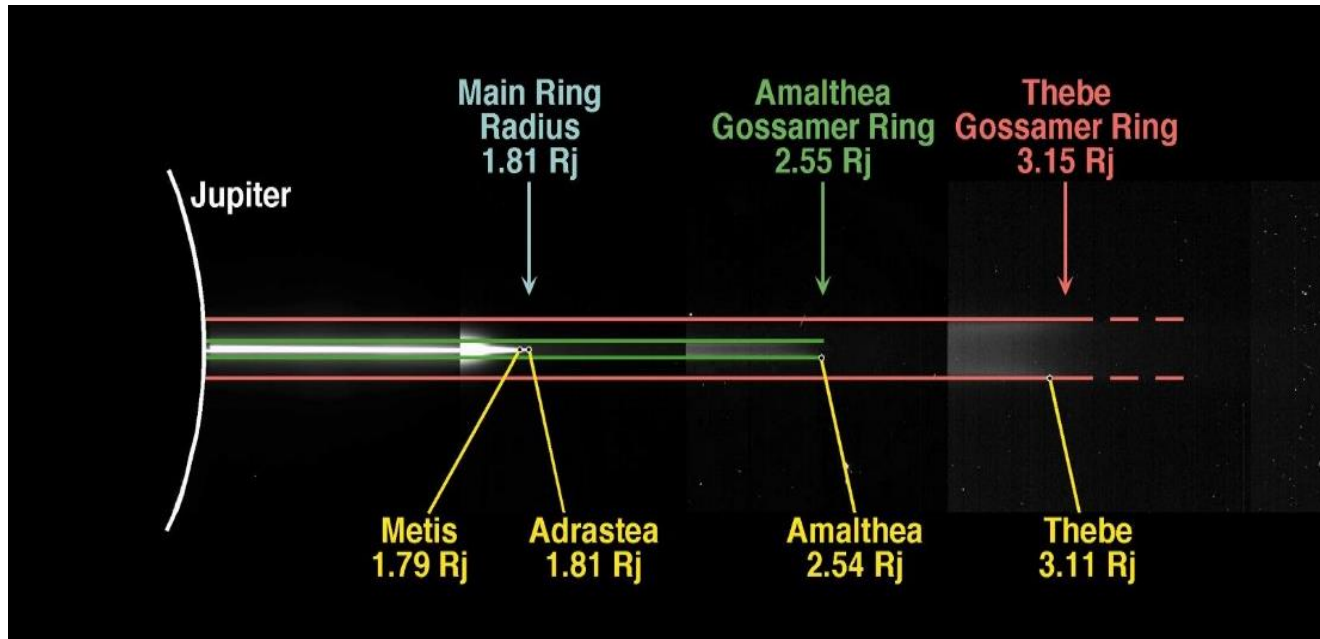IAPS model. Forward scattering
→ *See talk by Emiliano D'Aversa*
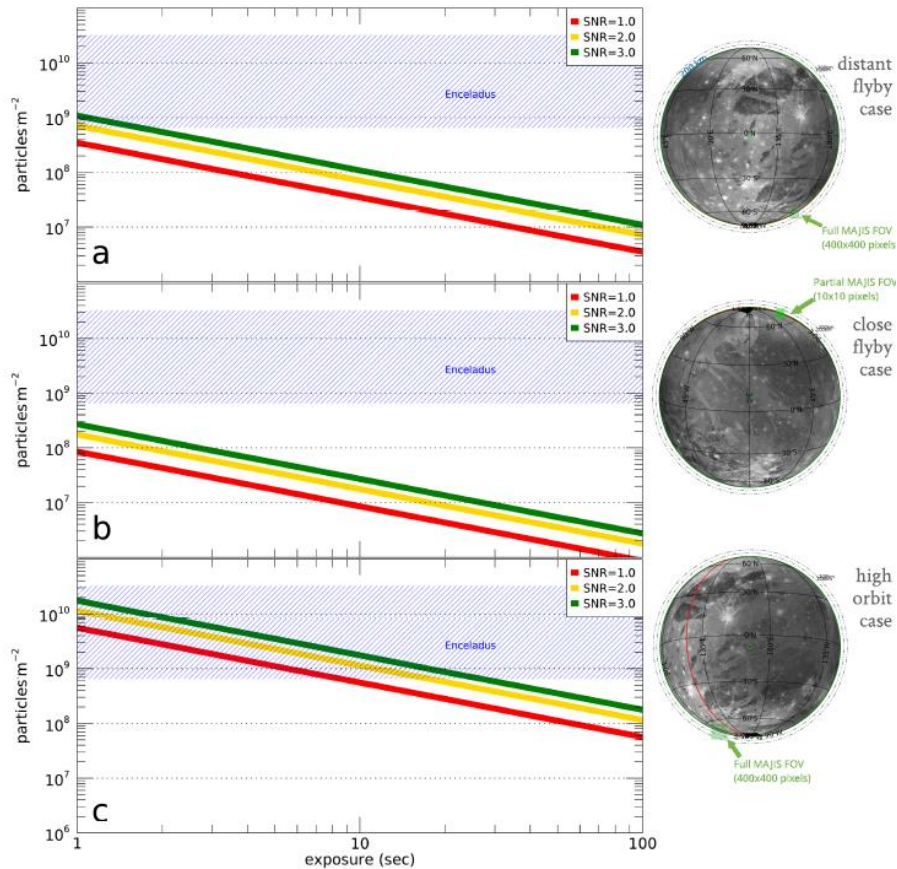
IAS model. Scattering
Tau 0.04-0.002

Future work: more systematic & coordinated efforts to optimize plume observational strategies

Ring observations

Planning underway (*see talk by François*), including many geometries & pointing opportunities

- Trade-off between observations that are best to understand structure & composition VERSUS observations that maximize weak signal to MAJIS

- +++ Synergy with JANUS is foreseen

Flybys

- Typical sequence is unchanged since the last STM

- Detailed investigation done on one generic Ganymede Flyby
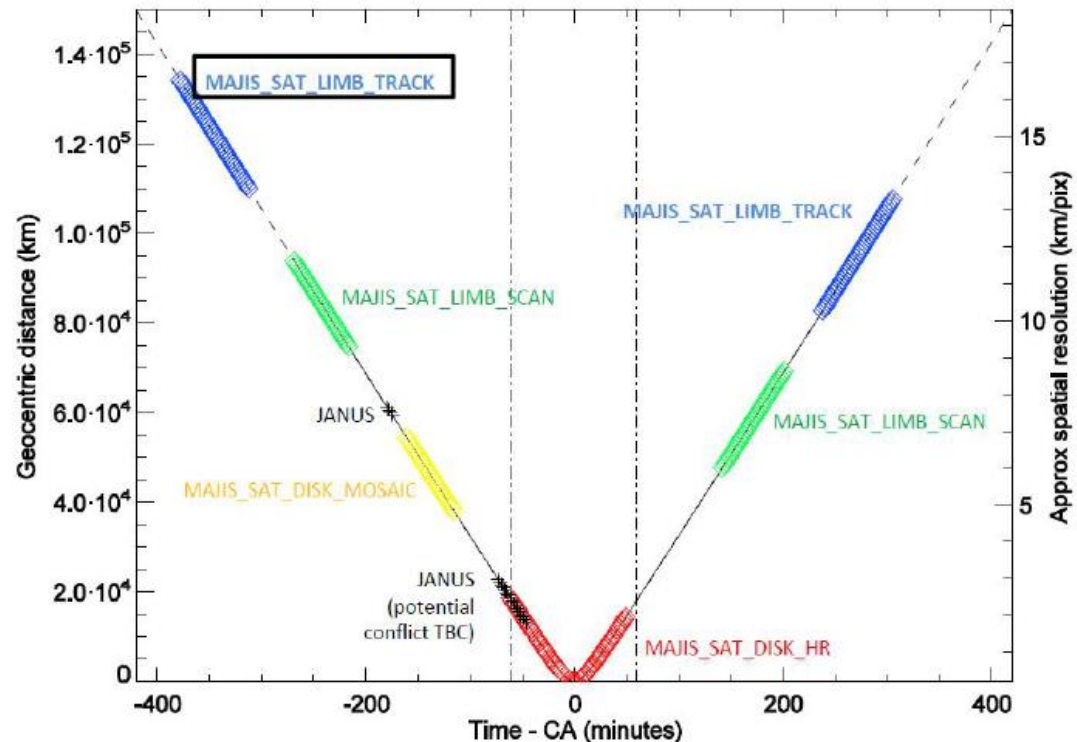
To do in the future:

- **Need to prioritize some flybys**: several are redundant subprobe lon/lat and/or nightside (Callisto, Ganymede) → *But we need a consolidated trajectory of the Jupiter tour.*

- Up to now, we implement very **generic pointings for the exospheres:** scanning or staring in limb, slit is tangeant or perpendicular to surface → *other ideas?*

Other objects

We are foreseeing observing **Io dayside + nightside** whenever we are close enough:
MAJIS resolution < 100 km/pix, best is 45 km/pix) → Activity (hot spots, plumes) & composition.

New Horizon

MAJIS sim
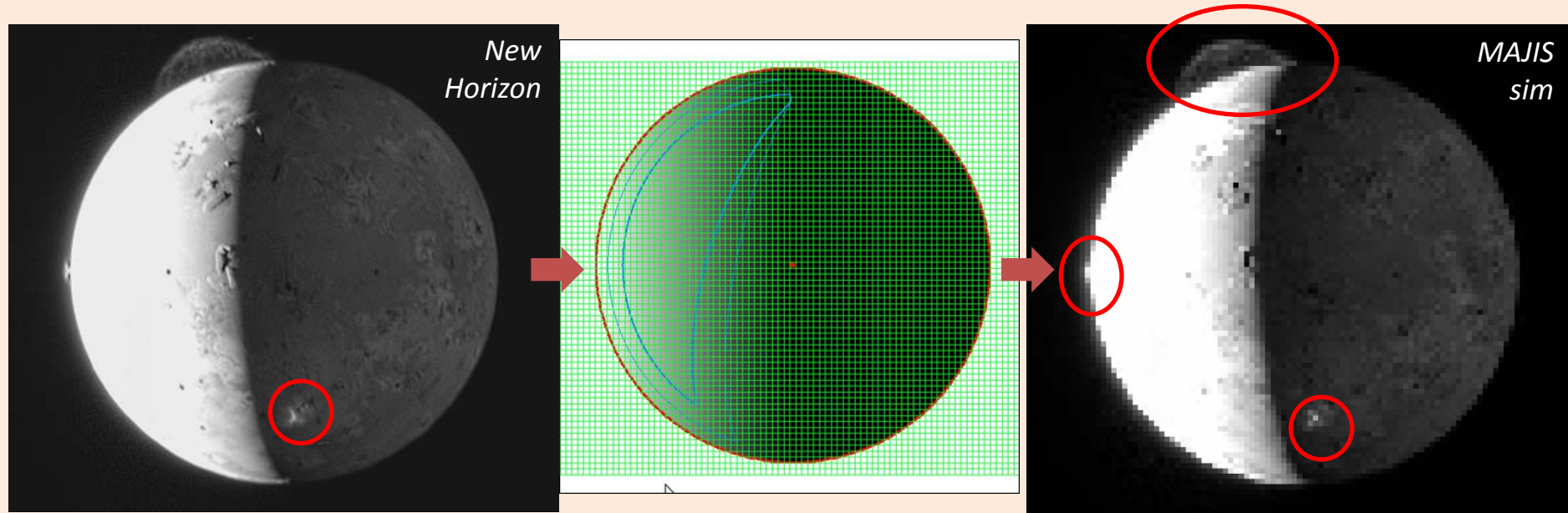
Several minor bodies are foreseen when resolved (> 1 pix)
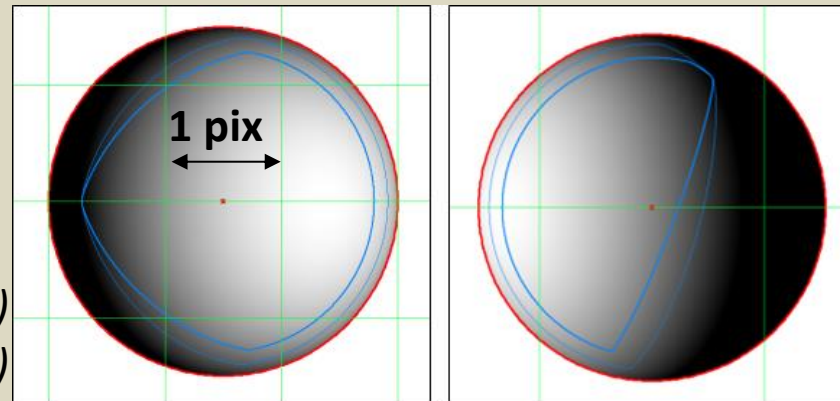We can do other things, *e.g. un-resolved but at a range of phase angles*
… if this is carefully jusitified by you

Feedback needed

1 pix

Amalthea (left)
Thebe (right)

Ganymede Orbital phase

This is the next phase we are planning with ESA

❖ GEO+GCO-5000 are for global to regional mapping at the 100s m/pix to km/pix scale

❖ GCO-500 offers HR targeting of ROIs down to 75 m/pix over 30km x 8.7km patches
   → *S/C jitter issue TBC*
   → *Low illumination conditions*
   → *Negociation with project for more frequent non yaw steering (pushbroom) waivers*

❖ GCO-500 also offers potential for exospheric plume observations (TBD!)
   → *Loosely discussed as once every couple of orbits (8 orbits per day, but 8hrs downlink)*

→ *See talk by F. Tosi*

Feedback from you

- **Now is the time to think about <u>novel observations</u>:**

- Target, S/C geometry, instrument setup, timing, etc.

- **We are heavily constrained by the project in terms of:**

- Data Volume

- Power

- Observation slots timeline

- Attitude & pointing

- Balance between science goals and between instruments

The earlier they are investigated, the more likely we will be able to accomodate them