

A suggestion by ISAS to make international collaboration in future ISAS-led missions smoother

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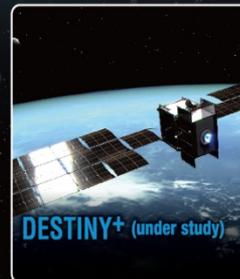
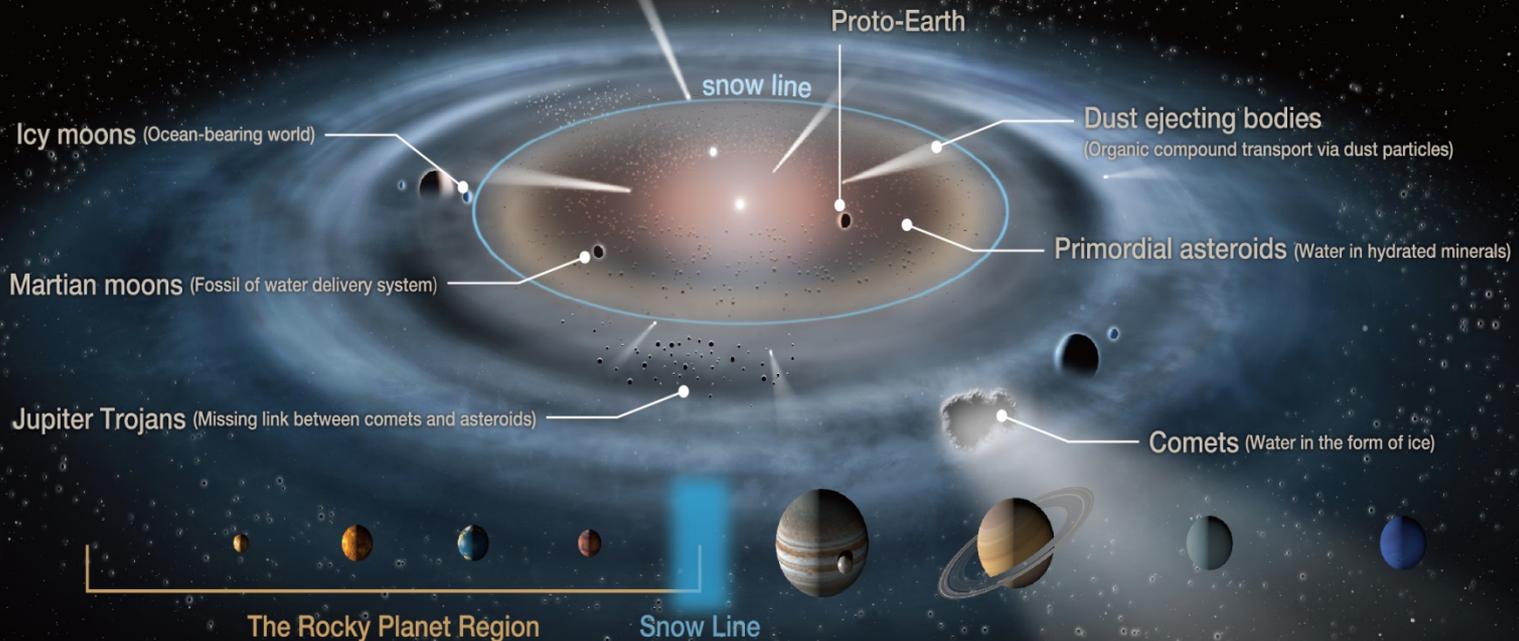
- L-class to be launched by H-IIA/III.
Cadence=three in a decade.
- M-class to be launched by Epsilon.
Cadence=one every other year.
- Opportunities for grand missions to be led by foreign agencies.
Guidance by ISAS according to its strategic plan.
- S-class opportunities, including those onboard suborbital and ISS programs.
AO every year.

This enabled ISAS
(or, made ISAS realize the need)
to define the nice roadmap of
small body exploration.

ISAS Small Body Exploration Strategy

Many small bodies are born outside the snow line. These are initially comet-like but can evolve to show a variety of faces. By delivering water and organic compounds, these small bodies may have enabled the habitability of our planet.

When, who and how?



The fleet of ISAS small body missions explores these questions

Need for strategic placement of L and M missions

A roadmap is certainly nice to have: Not only for small body exploration but for any branch in space science, or,

strategic planning of the ISAS space science.

A roadmap, however, means something only when it is backed-up by a strategy (a through line).

Who, with input from the community, would be the coordinator of the strategy?

Need for international collaboration in **both** L and M classes

L-class: It has to be a very good mission.

M-class: Requires a good idea that fits within
the severe constraints.

→ Both have good reasons to **go international,**
for nice instruments available abroad,
and/or
for broader discussion to shape-up mission ideas.

Who should be the coordinator for the communication?

Recent cases: OK ones

- **MMX (L)**
 - Among the three instruments of the highest priority, one will be from US and another is from France.
 - “Dedicated AO” approach: GRNS@US, NIRS@FR
 - The conversation (between NASA, CNS and ISAS) started very early, at least compared to the ISAS practice in the past.
- **DESTINY+ (M)**
 - The coordination for in-situ dust composition analyser@DE was completed at the very last leg of PrePhaseA.
 - It certainly was smoother if the conversation (between DLR and ISAS) had started earlier.

Recent cases: The NG one

- **Solar-C (L)**
 - JAXA-led, but needed heavy involvements (>100M each) by both ESA and NASA to be aligned in a timely way.
 - Taken off from the short list for the ~2025 launch slot when it did not pass the selection at ESA.
 - The JP solar community wandered around (literally!) for a while not knowing what else to do.
 - In June 2016, NASA, JAXA, and ESA chartered a Next Generation Solar Physics Mission (NGSPM) Science Objectives Team (SOT) to study and report on a multilateral solar physics mission concept.

- The NGSPM-SOT recommendation is that Sol-C like mission (the study of fundamental physical processes at high spatial/temporal resolution from the photosphere to the corona) is still THE NEXT mission.
- Multiple proposals trying to recover a part of the science by smaller missions are under ongoing competitive processes.

- The combination of ongoing efforts , however, will **NOT** fulfill the NGSPM-SOT report requirements: The part that requires a large (~1m) telescope cannot be accommodated on small missions.
- The NGSPM-SOT report made the situation clear, the next **L**-class proposal opportunity (for a launch in early 2030's) will be in several years, there is the clear need to re-propose **a Sol-C like** mission, but:

Without the new mechanism to make the path smoother (*but yet keeping the competitive baseline the same*), will they be in the right mood for it?

We learned lessons, how about you?

ISAS is in the process of establishing the way to run its space science program.

To facilitate the opportunities available via ISAS-led missions for our US colleagues, a new mechanism to promote early phase conversation between US and JP communities should be desired, in order to

- Shape the ISAS missions in a better shape (especially for **M that are launched every other year**)
- Have a better idea for potential instrument AO to be onboard ISAS missions (especially for **L**)
- Construct a better path of marching towards a possible large scale collaboration (lessons from **Sol-C**)

We suggest that this could be mentioned in coming *Decadal Survey* or other documents of a similar purpose.