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Author: Ms. Mizuki Tani Hatakenaka  
Leiden University, The Netherlands, m.hatakenaka@umail.leidenuniv.nl

THE PROPOSED PUBLIC PROCUREMENT FOR PROJECTS TO ENHANCE INDUSTRIAL  
CAPABILITIES THROUGH JAPANESE LESSONS LEARNED

**Abstract**

This paper introduces the Japanese contractual practice of H-2A launch vehicles and of the public-private partnership (PPP) of H3. This will be compared with the NASA's Commercial Orbit Transportation Service (COTS), after which I will address a better framework to involve companies' innovative ideas.

In the past, the research and development (R&D) of H-2A was conducted by JAXA, and each manufacturer was responsible for delivery as required. After twelve launches, the operation was privatized to Mitsubishi Heavy Industry, Ltd. (MHI). Concerning H3, it is the first PPP in Japanese rocket history. At first, MHI was selected as a R&D contractor and a launch provider. JAXA created a mission requirement based on joint discussion with MHI, and MHI established the H3 rocket system specification and the R&D plan including costs under the mission requirement. MHI is responsible only for delivering the first vehicle to JAXA in 2020, and JAXA is still responsible for a total system including its launch pad and the H3 test flight. Such a framework gives MHI more creative freedom, but there can be a room for further clarification of the responsibilities.

Some points in NASA's COTS are similar to H3, but NASA's concept is different. NASA acts as an investor and an advisor to promote industrial capabilities. Meanwhile partners are responsible for all of the development and operation but they are not required to deliver their vehicles to NASA, contrary to H3. It allows for clear role allocation and companies' maximum creativity. A series of contracts of the Commercial Resupply Services (CRS) after COTS is also remarkable to promote private investment. For example, around half of the total RD costs is borne by private sectors. Also, a cost-up approach does not seem to be applied for the price setting.

The framework like H-2A is still necessary for high-risk R&D conducted by governmental agencies, but the following framework would be needed for projects to enhance industrial capabilities:

1. Select a contractor for not only R&D but also operation: Avoid demotivating partner.
2. Non-delivery (of spacecraft): Promote contractor's idea. A disruptive idea sometimes faces difficulty to be accepted by public sectors.
3. Non-cost-up approach: Involve with other industries. A cost-up approach enables governmental agencies to examine the contract amount, but in Japan, only defense and space industries are familiar with that approach.
4. Bulk purchase: Promote private investment. It would be also a key to eliminate cost-up approach.