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Corresponding author: BIARD Arnaud  
e-mail of corresponding author: arnaud.biard@cnes.fr  
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### Title

## CALLISTO – Flight Worthiness Process: how to prepare the tripartite go to flight decision?

### Authors

Arnaud Biard <sup>1\*</sup>, Hauke Martens <sup>2</sup>, Yoshimasa Tajima <sup>3</sup>, Yasuhiro Saito <sup>3</sup>, Christophe Chavagnac <sup>4</sup>, Alain Mauries <sup>1</sup>

*\* Corresponding author*

<sup>1</sup> CNES Space Transportation Directorate, 52 rue Jacques Hillairet 75612 Paris Cedex France,

<sup>2</sup> DLR, Robert-Hooke-Str. 7, 28359 Bremen, Germany,

<sup>3</sup> JAXA R & D Directorate, 2-1-1 Sengen, Tsukuba, Ibaraki Prefecture 305-8505, JAPAN,

<sup>4</sup> ArianeGroup, 51-61 route de Verneuil, 78130 Les Mureaux France

### Abstract

The CALLISTO vehicle (for Cooperative Action Leading to Launcher Innovation in Stage TOss-back) is a flight demonstrator for future reusable launcher stages. The program involves three countries and their space organizations: CNES for France, DLR for Germany and JAXA for Japan. The first tests will be conducted in 2024 from the CSG, Europe's Spaceport for commercial launches. The challenge is to develop, all along the project, the skills of the partners. This knowhow includes Products and Vehicle design, Ground Segment set up, and post-flight operations for Vehicle recovery then reuse.

For standard launch systems worldwide, a Flight Readiness Review is conducted at the latest before final operations clearing GO/NO GO for flight. Among the inputs for this review, the project team provides a summary of all activities completed since the beginning of the program: from initial product requirements compliance down to qualification testing period. In particular, this summary records all shortcomings that result in deviations to the launch system design-to-requirements, and especially the analysis proving that the residual risks of mission loss are acceptable.

In the case of CALLISTO program, this basic approach is applied and tuned according to top peculiarities of CALLISTO: project governance and its “three head decision making” (JAXA, DLR and CNES), single demonstrator vs. commercial launch especially. Then and according to culture and background of three aerospace Agencies that may differ with each other, it was decided to implement and agree a bespoke Flight Worthiness process and its resulting output the Flight Worthiness Report [1].

Moreover and for avoiding possible misunderstandings for such “GO/NO GO for flight” key event very late in the program, it was decided to conduct a kind of dry run of Flight Worthiness process much ahead of (first) flight(s) itself: as soon as the System Critical Design Review (aka CDR-S). To do so, the CDR-S will include a status of the Flight Worthiness [1].

After a brief overview of the Flight Worthiness process, the paper will describe the steps up to the last Reviews before the combined ground facility and vehicle tests, and finally before the flights themselves. It will then focus on the practical means the project team plans to use to issue the Flight Worthiness Report.

### References

[1] M. Illig, S. Ishimoto, E. Dumont, “CALLISTO, a demonstrator for reusable launchers - 9th European Conference for Aeronautics and Space Sciences” (2022)

### Keywords

Reusable, Demonstrator, CALLISTO, Review, Project organization, Mission, Risk management, Deviations