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Author: Mr. Olivier Faure  
Airbus DS GmbH, Germany, oliver.faure@airbus.com

M. Lamantea  
Thales Alenia Space, Italy, (*email is not specified*)  
Mr. Frank Bouckaert  
ESA - European Space Agency, France, Frank.Bouckaert@esa.int

THE ORION MPCV-ESM CONSUMABLES STORAGE SUBSYSTEM – PATH TOWARD ESM-1  
MISSION

**Abstract**

Airbus Defence and Space and Thales Alenia Space-Italia are part of a European consortium selected by the European Space Agency (ESA) for the design, development, qualification and supply to NASA of the European Service Module (ESM) of the Orion Multi Purpose Crew Vehicle (MPCV). This paper reports on the Consumables Storage Subsystem (CSS) part of the ESM and consisting of Water, Nitrogen and Oxygen storage and distribution to the Orion Crew Module. The activity is at the end of phase D and has seen the qualification testing in parallel of the acceptance activities from components up to sub-system level. The CSS has been designed taking into account the constraints of the Orion system, in particular the limited available volume, the need of mass optimization and the safety aspects of a system that has to support crewed missions. However, the testing and configuration for the first flight have been altered to meet the constraining schedule of this ESM-1 un-crewed mission. This paper provides an overview of the CSS architecture and design solutions as resulted at the completion of the phase C, along with the descriptions of the main challenges raised during phase D and the associated technical decisions taken to meet the ESM-1 schedule.