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ZEFIRO 40: DEVELOPMENT AND QUALIFICATION OF VEGA C 2ND STAGE SOLID ROCKET MOTOR

Abstract

About ten years ago Avio S.p.A. set up a self-financed program to define a series of functional requirements for a 40 tons Solid Rocket Motor (SRM), called Zefiro 40, to be used as a technological demonstrator to develop new technologies to be introduced on VEGA evolutions. A first PDR was held in May 2013.

The European Ministerial Conference held in 2014 defined the main elements of the first evolution of VEGA, called VEGA-C: this new launch vehicle should be based on a first stage common to Ariane 6 (P120C), and Zefiro 40 should be used as a 2nd stage SRM. Therefore, Zefiro 40 evolved from the initial concept of technological demonstrator to the new status of flight module. Following this decision, and after activities performed at System level, a Delta PDR was held between July 2015 and March 2016.

The first (DM) Static Firing Test (SFT) was successfully performed in March 2018, followed by the CDR held in September 2018. The second (QM) SFT was successfully performed in May 2019, confirming the soundness of the SRM design. The Ground Qualification Review process started in November 2019 and was concluded in May 2020, declaring the Z40 flight worthiness for VEGA C and allowing starting the manufacturing of the SRM for VEGA C maiden flight.

VEGA C Maiden Flight is planned to take place in Q2 2022. This will be also the Z40 Maiden Flight. The integration campaign on the launch vehicle is foreseen in April.

The paper will present the main technical characteristics of Zefiro 40 and will provide an overview of the Development and Qualification process, the milestones, the achievements and the overall Programmatic Management up to the final Ground Qualification. Finally, the main results of Zefiro 40 Maiden Flight will be presented.