

THE STATUS ON THE DEVELOPMENT OF LM10-MIRA LOX-LNG EXPANDER CYCLE ENGINE IN THE FRAME OF LYRA PROGRAM

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In the frame of the LYRA Program, funded by the Italian Space Agency in order to assess the possible evolutions of the Vega launch vehicle, one of the main target is the development of a new innovative LOX-LNG engine (LM10-MIRA) powering the LYRA 3rd stage. The LM10-MIRA engine has a vacuum thrust of 10 metric tons and is driven by an expander cycle using natural gas as turbine working media. The engine is developed by a joint Avio-KBKhA propulsion team in the frame of a dedicated ASI-Roscosmos inter-agencies agreement.

Critical technologies needed to develop the flight engine have been identified and a full scale demonstrator test campaign has been set-up. To reach this important milestone all the design milestones have been achieved and component tests have been performed; in particular testing on injector head, sub-scale and full-scale thrust chamber have been performed; in addition a completely new methane turbopump has been developed and his components have been tested.

Finally the logic of development, planning and remaining milestones is presented.