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# THE ITALIAN POSSIBLE PARTICIPATION IN THE NASA ASTEROID REDIRECT MISSION (ARM): AN UPDATE

**Abstract**

As part of its Journey to Mars strategy, NASA announced the Asteroid Redirect Mission (ARM) program, composed of the Asteroid Redirect Robotic Mission (ARRM) first and then the Asteroid Redirect Crew Mission (ARCM). In the ARRM the Asteroid Redirect Vehicle (ARV), powered by advanced Solar Electric Propulsion (SEP), is deployed to rendezvous with a large NEO, being 2008 EV5 the current reference asteroid target. The ARV will characterize the asteroid, descend, and capture a boulder from the asteroid surface. Once the boulder is captured, the ARV will perform a planetary defense test, by applying the enhanced gravity tractor technique, and then fly back towards Earth to take the boulder in

a stable Lunar Distant Retrograde Orbit (DRO), as the DRO that Orion, launched on SLS, will target in Exploration Mission 1 (EM-1) scheduled for 2018.

In May 2016 NASA and the Italian Space Agency (ASI) announced the agreement to conduct a joint feasibility study on potential cooperation opportunities during the robotic segment of NASA's Asteroid Redirect Mission (ARM), ARRM. Options include payloads and instruments to be accommodated on the ARV (such as a stereo camera and VIS-NIR spectrometer dedicated to the asteroid surface and asteroid boulder characterization, and a sounding radar to study the internal structure of the asteroid), and trajectory analysis to provide low thrust trajectory analysis of ARRM. This paper will give an update on the ASI activity connected to ARM in general and with special focus on ARRM.