

¡VAMOS! Viable Alternative Mine Operating System: A Novel Underwater Mining System

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ABSTRACT:

The 42-month ¡VAMOS! project (Viable Alternative Mine Operating System, Grant Agreement 642477, vamos-project.eu), co-funded by the European Commission's Horizon2020 programme, will enable access to reserves of mineral deposits by developing an innovative, safe, clean, and low-visibility underwater inland mining technique.

Through field-testing, ¡VAMOS! hopes to encourage investment in abandoned and prospective EU open-pit mines by providing a viable novel excavation process, ultimately aiming to reduce the EU's reliance on imports of strategically important raw materials.

The project will test the technological and economic viability of the underwater mining of inland mineral deposits which are currently economically, technologically, and environmentally unobtainable. If proven viable, ¡VAMOS! will enable access to deposits whose excavation has been historically limited by stripping ratio and hydrological and geotechnical considerations. Also, due to low noise and dust levels, and its road-transportable electric-powered system, ¡VAMOS! will be able to be applied safely in both urban-proximal and hard-to-access rural locations.

¡VAMOS! is defined by a remotely-operated underwater mining vehicle, adapted and improved from existing subsea mining technology. Operating in tandem with a remote-controlled sensory assistance-vehicle, the underwater miner will connect to a flexible riser through which mined material will be pumped from the mudline to a land-based dewatering pit via a floating mobile deployment-platform. On the deployment platform, a bypass system will be linked to production measuring equipment and a laser-induced breakdown spectroscopy system, enabling throughput monitoring and real-time grade-control.

Preparatory work has been carried out to assess the regulatory compliance of the project, its likely social and environmental impact, and the steps which need to be taken to reduce and quantify these during testing. Two community stakeholder workshops held in both England and Portugal have indicated that the public is receptive to the concept.

Following an official project design-freeze in October 2016, construction and integration of all components will conclude in June 2017. This will be followed by field-testing at a flood-

ed kaolin-granite quarry in Devon, England in October 2017, with further testing planned at a flooded iron mine in Vareš, Bosnia in June 2018.