

Title: New Insights for Enabling In Situ Resource Utilization (ISRU)

Mr. Mathias Link (Presenter)
Luxembourg Space Agency

Mr. Gary Martin
Luxembourg Space Agency

This presentation highlights recent results from two Luxembourg Space Agency sponsored activities. The first highlights are the results from a year-long study evaluating the ISRU Value Chain. The second highlights are the conclusions of the first annual Mining Space Conference held last fall in Luxembourg.

In line with the vision of Luxembourg's SpaceResources.lu initiative, the Luxembourg Space Agency conducted a study to identify potential markets and the most promising value chains for using space resources in the next few decades. In addition to an extensive literature review, data was collected from a large number of interviews with community experts in space agencies, private companies, and universities. This data supported an extensive analysis of the demand side of ISRU by considering all possible applications of space resources, as well as, an in-depth look at the supply side and cost-profiles of space resources missions. The analysis assessed the technical aspects and socioeconomic benefits of this promising new industrial sector, and confirmed the enormous opportunities that appear on the horizon. Different kinds of technologies are required across the value chain. The technologies have been classified in the following groups: prospecting technologies, mining technologies, transport and supply technologies, refinement technologies, manufacturing technologies, supply (storage) technologies, and ISRU support technologies.

Last fall, the Luxembourg Space Agency organized the first Mining Space Summit. More than 140 experts from over 17 countries participated in the one-day invitation only workshop. They represented stakeholders from multiple industries (e.g. oil and gas, terrestrial mining, space, finance, and government) with interests that included ISRU and terrestrial mining. The workshop consisted of a plenary session in the morning with keynote presentations designed to provide attendees with background information about space resources utilization business models, technological approaches, and operations. In the afternoon, there were six topic-specific parallel breakout sessions for participants to engage directly on how the space and Earth mining communities can collaborate or learn from one another. The three business oriented sessions discussed multiple areas of interest including: Market and Dynamics; Investment and Financial Planning; and Role of Government and Regulators. In parallel, discussions in the three concurrent technical sessions covered: Prospecting – Proving Value; Extraction – Creating Value; and Enablers – Optimizing Value. A concluding plenary in the afternoon capturing the results of the discussions and rounded out the event.

This paper will provide results of these two activities that offer new insights on the areas most promising in the near-term for ISRU investment and areas where the terrestrial mining companies and space ISRU companies can learn from each other.