

CRM Group will be partner of a new research project coordinated by QinetiQ Space and funded by [the European Space Agency \(ESA\)](#). This new project aims to assess, characterize and prove two use cases for joining Additive Manufactured (AM) hardware.

A first selection of use cases has been identified, both for existing and future hardware applications, that are suitable AM candidates and that would have clear benefits when combined with joining techniques. A trade-off will be made to select two most interesting use cases, to investigate two different materials and preferably two different joining techniques. One of the materials will be an aluminum alloy.

Based on the experience obtained in previous projects, the need for a well-defined gradual test plan is a key factor to understand all aspects and converge efficiently to the final design:

- Material characterization, to confirm uniform properties on the building plate;
- Validation of the joining techniques in a simple configuration, to allow quick testing of relevant parameter variations and to compare results with conventional materials; validation of the joining techniques on more complex samples;
- Verification of these results on the final breadboard configuration.

Validation of the full scale breadboards, including NDI on the joined elements shall increase the Technology Readiness Level (TRL) of joining technologies on AM up until TRL5.

Belgian Partnership

A dedicated, Belgian consortium is built up to address the technical tasks of this activity. The consortium involves a well-balanced participation of research and industrial partners with strong, complementary expertise in AM, joining technologies and complex space applications, covering all critical aspects of this study:

- **QinetiQ Space** will coordinate JAMP and is an engineering company for development and construction of turnkey satellite systems and platforms, satellite equipment, space mechanism and structures, instruments for scientific research in microgravity in the fields of biology, material and fluid sciences, as well as delivery of downstream services and solutions.
- **SIRRIS** is a research center mainly active in 4 core technological domains: Materials, Advanced Manufacturing including AM, Mechatronics and ICT. Sirris is involved in AM since 1990 and has acquired an important know-how in AM processes dedicated to

polymer, metal and ceramic materials. The specialised labs in Gosselies and Seraing for development and testing purposes are available nowhere else in Belgium

- **Raytech** is specialized in the production of high precision, complex components by applying several laser technologies. The activities of Raytech can be divided into two main departments; subtractive laser technologies & additive laser technologies. When it comes to Additive Manufacturing, Raytech is mainly focusing on the production of precision components with a strong focus on post-processing.
- **CRM Group** will principally use its extensive material characterization know-how, the available conventional and advanced welding technology and the expertise in AM related aspects (sample testing, post-processing, DED etc.) in this project. In recent years CRM has contributed to various ESA projects i.e. from DED of aluminum alloys (LIRAM) and the development of new metallic alloys for AM to solid state welding of AM to wrought parts (AMFT) and surface processing of AM parts (SCAMP).