

APPLICATIONS AND MARKET SECTORS

Sectors that could benefit from the project results include aerospace, automotive, power generation and energy, shipbuilding, railway, machinery, construction and the creative industries.

Three demonstration cases will be run to validate the hybrid manufacturing approach developed by the project:

- Waterproof covering modules for tunnels.
- Aluminium metallic back and front frames for a car.
- A manufactured mock-up of a Pininfarina car design.

PROJECT NAME: KRAKEN

TITLE: Hybrid automated machine integrating concurrent manufacturing processes, increasing the production volume of functional on-demand using high multi-material deposition rates.

DURATION: October 2016- September 2019

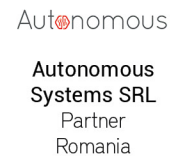
BUDGET: €5.947836 (30% dedicated to SMEs)

PROGRAMME: Horizon 2020 - Factories of the Future

CONSORTIUM: 15 partners from 8 European countries.

WEBSITE: www.krakenproject.eu

Partners



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You can find us on:



The future of industrial
additive and subtractive
manufacturing

www.krakenproject.eu

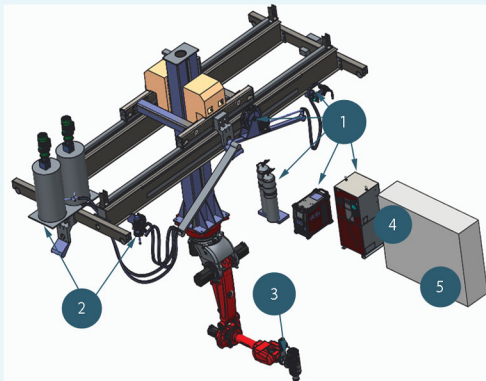


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723759

ABOUT THE PROJECT

The KRAKEN project aims at developing an automated/robotic machine for hybrid multi-material manufacturing, combining both subtractive and novel additive technologies, for the production of functional parts up to 20 m long with high accuracy and quality. The parts will be made in aluminium, thermoset or a combination of both materials. The KRAKEN concept (ceiling machine) will also decrease the shop-floor space needed for the same number of products.

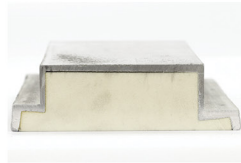
The project will contribute to the consolidation of the hybrid manufacturing value chain by linking research results to technological needs in the fields of software, monitoring, automation, materials, standardization and end-users.



1. Additive Metal Equipment
2. Additive Polymer Equipment
3. Subtractive manufacturing head
4. System controller
5. High level control interface

MAIN FIELDS OF ACTION

The KRAKEN partners will work on the following new developments:



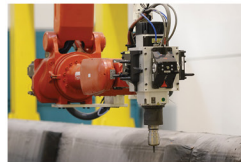
Multimaterial 3D printing

Hybrid manufacturing with aluminium grades, up to 10 kg/h deposition rates using Additive Metal Hybrid Technology + Hybrid manufacturing with new polymer-based materials (PUR resins) reaching 180 kg/h.



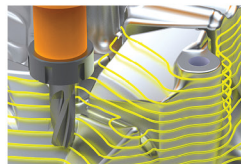
Subtractive manufacturing

Fast and precise milling for large parts based on climb-up methodology specially designed for the planar layer-by-layer and direct 3D freeform production strategies.



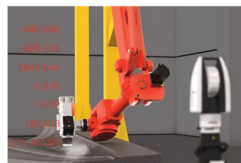
Robotics

Manufacturing tools manipulated by a 6 DoF anthropomorphic assembly robot on a 3 DoF crane able to cover a large workspace (20x6x5 meters).



CAM systems

Create new CAM algorithms for hybrid manufacturing, including planar horizontal layer strategies and new direct 3D freeform approaches.



Real-time control

Laser tracking based real-time control of tool absolute position and orientation (6DoF). Control of tool interaction force and speed. In-process inspection of accuracy, shape deviations, and quality control of final part.

EXPECTED IMPACT

40% faster

High deposition rates.
Integrated milling and finishing.

25% more productive

Real-time production management.
No additional stations needed.
In-process geometry inspection.

30% less expensive

Savings on raw materials and energy.
Automated measurement and control.

90% less shop-floor space

Less workplaces for the same number of products.
Use of ceiling installation.



The project demonstration cases include the development of part of the BIW of an Alfa Romeo 4C.