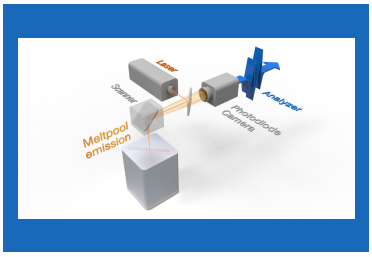
PLATORM 1: DIGITISATION OF ADDITIVE MANUFACTURING

Data-analytics will be used to evaluate sensor data obtained from Additive Manufacturing (AM), part finishing and injection-moulding processes. This will include data on raw material properties, from process sensors (ie. power and temperature) as well as from in-situ metrology and final part inspection. Materials modelling, data analytics, and control theory will be applied in order to achieve significantly enhanced AM processing efficiency for both metals and polymers.

Industry-critical issues to be addressed including unpredictable loss of dimensional accuracy in fabricated AM parts, the incorporation of thermal stress and porosity, as well as lack of control over final microstructure orientation and composition. Novel in-line AM process-monitoring and control techniques will be developed, thereby achieving higher levels of process control. The data from these new types of monitoring techniques will be correlated and combined with data from existing sources, such as gas flow, process melt pool region temperature, laser power, powder flow, part mechanical properties and x-ray tomography monitoring.

OBJECTIVES



Design and develop an Open SLM system, for testing and development of in-situ monitoring, materials and process control algorithms;
Develop, test and gather data on how variations in AM feedstock powder impact final part performance;
Optimise methods for the surface finishing of AM components;
Develop and evaluate novel methods for in-situ AM process monitoring;
Examine AM produced conformal steel die mould case studies and structure-borne vibration sensors in novel Smart Sensor process monitoring;
Develop and test both static and dynamic AM control.