C³HARME – M4 PRESS RELEASE

UNIVERSITY OF BIRMINGHAM

€8M EU funding to research innovative materials for hypersonic flight

As the aerospace industry advances towards hypersonic flight, the quest for new, ground-breaking aircraft concepts has begun. For a vehicle to be considered hypersonic, it must travel at Mach 5 or above. Mach 5 is five times the speed of sound, or approximately 3,800 mph; that's fast enough to travel from London to New York in under an hour.

High-speed aviation brings many challenges, one being the materials used ensure the aircraft and rockets travelling at hypersonic speed arrive at their destination safely. The materials need to be able to withstand extreme temperatures and harsh environments.

Thermal protection systems for space vehicles flying at Mach 7 must withstand extreme temperatures and intense mechanical vibrations at launch and re-entry into the Earth's atmosphere. Rocket nozzles of solid or hybrid rocket motors must survive harsh thermo-chemical and mechanical environments produced by high performance solid propellants. The combination of extremely hot temperatures, chemically aggressive environments, and rapid heating and cooling is beyond the capabilities of current materials.

Scientists at the University of Birmingham have come together with European partners to design, develop and manufacture materials which will combat the problems caused by hypersonic flight. The new class of materials developed will need to be reliable, cost-effective and scalable. They must also be capable of in-situ repair of the damage caused during operation in severe aerospace environments.

The consortium, C³HARME, (next generation ceramic composites for combustion harsh environments and space), contains experts from Birmingham, Italy, Germany, Portugal, Ireland and Spain. It merges a critical mass of scientific expertise and excellence in key areas of materials science, engineering, process technology, material modelling and processing, and industrial scale-up.

The 4-year project (1 June 2016 – 31 May 2020) has obtained EU funding under the EU Horizon 2020 Framework Programme for a total of €8,033,035. The project results could be easily extended to the energy, medical and nuclear environments.

Reference: http://www.birmingham.ac.uk/schools/metallurgy-materials/news/innovative-materials-hypersonic-flight.aspx