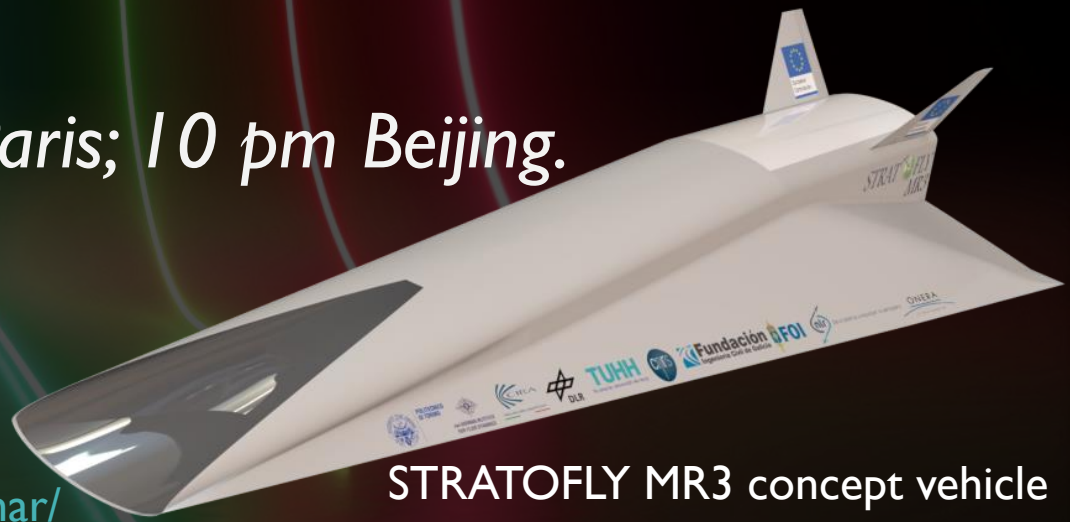
COMBUSTION WEBINAR

High Speed Propulsion for Civil Transportation

Speaker: Prof. Christer Fureby, Lund University
Time: *August 22, 2020*
10 am EST; 4 pm Paris; 10 pm Beijing.
Meeting: *Zoom*

Registration (required):
Check https://sun.ae.gatech.edu/combustion-webinar/
for details or directly contact wenting.sun@aerospace.gatech.edu.



STRATOFLY MR3 concept vehicle
(https://www.h2020-stratofly.eu)

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Biography: Prof. Christer Fureby is the head of the Heat Transfer division at the Department Energy Sciences since Jan 2020. Prior to that, Fureby was the Research Director of the Computational Fluid Dynamics and Combustion (CFD&C) group at the Defence & Security, Systems and Technology division of the Swedish Defense Research Agency, FOI, in Stockholm, Sweden. Between 2003 and 2012, he also held a position as adjunct professor in hydrodynamics at Chalmers University of Technology in Gothenburg, Sweden. Fureby received his M.Sc. in civil engineering in 1989 and his Ph.D. in engineering physics, both at Lund University in 1995. After that he worked as post-doctoral fellow at the department of Mechanical Engineering at Imperial College in London, UK. Fureby is an associate fellow of the American Institute of Aeronautics and Astronautics. Fureby have published more than 250 conference papers, journal articles and book chapters. Fureby is also the 2020 Research Excellence Award winner of The Combustion Institute. Contact him at christer.fureby@energy.lth.se.

Abstract: The need to discover new commercial flight routes combined with the desire to shorten long-haul flights from intercontinental to antipodal trajectories has recently boosted the interest in civil hypersonic flight vehicle designs. The EC funded STRATOFLY project aims at designing a 300-passenger aircraft reaching speeds of Mach 8 and flying in the stratosphere. Among all critical technologies required by such design, this work is mainly focused on the investigation of the combined propulsion system, employed to operate between Mach 0 and Mach 8. A combined cycle propulsion plant consisting of multiple turbojet engines combined with a dual mode ramjet engine appears most promising. In this lecture, I will briefly describe the project before focusing on the propulsion plant and dual mode ramjet engine to be used during cruise. High-fidelity experiments and numerical simulation are here used together to provide the necessary understanding of the engine flow physics, which in turn forms the basis for the design of a conceptual propulsion plant. The computational approach combines URANS and LES for flow-physics elucidation and RANS for design Specific emphasis of these studies is devoted to the supersonic to hypersonic acceleration from Mach 3 to Mach 4.5, and during cruise at around Mach 7.4. Emission modeling and experimental investigations are performed in order to minimize the overall environmental impact.