

SPACE PROPULSION SYMPOSIUM (C4)  
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TEST OF FLOW DEFLECTOR PROOF-OF-CONCEPT MODELS IN LOX/METHANE  
COMBUSTION GASES.

**Abstract**

Airbus Safran Launchers has been investigating the use of flow deflection using mobile deflectors inside the exhaust plume of a liquid rocket engine. This technology offers layout flexibility when compared to fully gimbaled engines and potential gain in cost at vehicle level. It can in particular benefit small low cost expendable launchers or vehicles with rocket engines confined inside a narrow fuselage-like structure such as spaceplanes or reusable fly-back booster. It can also be a competitor to classical actuators for upper stage thrust vectoring. However, the capability of the deflector material to sustain rocket engine exhaust gas temperature and the efficiency of such a thrust vectoring system remain limitations to be investigated. By using in-house operational thermo-structural material, usually applied to aircraft engines hot gas section or LOX/LH2 liquid rocket engine nozzle extensions, ASL manufactured simple deflector proof-of-concept models. These demonstrators were tested during a thrust chamber test campaign, planned in the frame of Airbus Safran Launchers LOX/Methane RT program. The test consisted in positioning the flap demonstrator inside the thrust chamber exhaust plume. The objectives of this test were to characterise the thermo-structural material in LOX/Methane combustion gases as well as to measure aerodynamic loads on the flap itself. This paper will focus on the preliminary results obtained through those demonstrator tests