

IAF SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)
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INVESTIGATION ON SAFE AND ECO-FRIENDLY RE-ENTRY AREAS FOR POTENTIAL
SUBORBITAL PARABOLIC FLIGHTS OVER EUROPEAN SEAS**Abstract**

In the course of the upcoming business of suborbital space tourism, various plans for the installation of special spaceports are proposed by many different nations and institutions around the world. However, there are many requirements which have to be considered during the selection process of a spaceport's location in order to provide safe and eco-friendly spaceflight operation. Especially in Europe, where space tourism is facing a high demand, the realization of an appropriate spaceport and re-entry area is a challenging task.

While American commercial spaceflight providers like Virgin Galactic or Blue Origin have the possibility to provide flights from spaceports in sparsely populated areas like the Mojave Desert or Southern New Mexico, European competitors face a continuously high population density. Except for some parts of Northern Scandinavia, it thus seems impossible to provide European spaceflights close to customers due to the potential on-ground risk, strict noise avoidance requirements and high air traffic densities.

Still, there is the possibility to perform suborbital re-entry flights over European seas. Some maritime regions like the Forties and Great Fisher Bank between Denmark and Scotland experience a low commercial air traffic and are in sufficient distance from coast borders to prevent high noise impact by rocket engines or sonic booms. Especially the low air traffic densities in these areas allow the potential installation of a new airspace class enabling a safe reintegration of spaceplanes into regular air traffic without any hazards or disturbances for common airline operation.

In order to identify these certain areas and associated potential spaceport locations, GAIA Aerospace and the Institute of Space Systems (IRAS) at TU Braunschweig investigate current air traffic densities over Europe and minimum distances between aeronautical noise sources and populated areas required by the European nations. The paper will give an overview over the methodological approach for the air traffic density and noise range analysis and presents the final propositions for safe and eco-friendly re-entry areas and associated spaceport locations.