

IAF SPACE OPERATIONS SYMPOSIUM (B6)  
Innovative Space Operations Concepts and Advanced Systems (2)

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DECISION-AID ALGORITHMS FOR FLIGHT SAFETY BASED ON LAUNCHER TELEMETRY

**Abstract**

The CNES Flight Safety Team at Europe's Spaceport in Kourou is tasked to interrupt the mission of a launcher vehicle in flight should it deviate from its nominal trajectory, before becoming effectively dangerous to populations and protected areas. The decision to neutralize a launcher might be taken by the Team within seconds based on information presented in form of trajectory and launcher health status coming from localization systems and launcher telemetry. At the moment, trajectory and launcher health status data are treated independently, the purpose of the latter being to prevent the team for a potential degradation of the trajectory. Innovative space operations concepts are being set in place to ameliorate the reactivity and pertinence of the Team's decision. This paper investigates the potential of merging telemetry and localization systems data by implementing algorithms to aid the Team in the decision process. These algorithms make use of propulsion, navigation, functional systems status, structural integrity and stage separation data among others to extrapolate the trajectory and determine if a neutralization decision shall be taken and the suitable moment to do so. First, a simple extrapolation model is proposed taking into account telemetry data. Then the model is tested and tuned by comparing it to other models and real flight data. Finally this innovative concept is presented to the Flight Safety Team for feedback and to assess its convenience.