

SPACE DEBRIS SYMPOSIUM (A6)  
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OPERATIONAL SPACE SURVEILLANCE ACTIVITIES AT CNES

**Abstract**

The main objective of the CNES operational activities in the field of space surveillance is to limit the risks: in-orbit collision risks with catalogued objects, on-ground risks in case of debris fallout following the atmospheric reentry of a space vehicle.

The activities are carried on in close cooperation with the Defence partners having, on one hand, the overall responsibility of space surveillance at national level and, on the other hand, operating facilities to detect and track space objects. CNES brings its expertise in the fields of trajectories determination, of risks estimation and of satellites operations.

Concerning the collision risk management, an operational service, called Caesar (Conjunction Analysis and Evaluation, Assessment and Recommendations) has been set up: in a first phase the service has been developed to satisfy the needs of the satellites controlled by CNES. The service is now open to external customers and a first contract has been established for the monitoring of Astro Terra. The input data come from the US and French surveillance systems, including Conjunction Summary Messages issued by JSpOC. After analysis by the orbitography experts, radar tracking measurements may be requested to available facilities in order to improve the accuracy of the trajectories. Finally, when the risk is confirmed, an avoidance manoeuvre is proposed to the control centre.

In the field of atmospheric reentries an operational service is being implemented to monitor potentially dangerous objects. In a first step an automatic screening based on available orbit parameters is performed, allowing identifying objects expected to reenter in the next weeks: French registered objects that could fall on foreign countries or large objects registered by other countries that could fall on the national territory. In a second step these particular objects are more accurately monitored: tracking measurements are performed during the last days and the uncertainties relative to the impact zone are progressively reduced.

This paper describes the French organization concerning these activities, together with the two operational services put in place to manage the in-orbit collision risks and the atmospheric reentries monitoring.