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ROSIE MISSIONS STATUS AND CAMPAIGNS OVERVIEW

Abstract

The ESA-funded activity S2-SD-03 ROSIE is dedicated to the planning, preparation, and execution of a targeted airborne observation mission focused on the atmospheric re-entry of satellites from the ESA

Cluster fleet. The activity was initiated in 2024 with the highly successful Salsa observation campaign, during which optical measurements of an artificial satellite re-entry were acquired under near–local-noon conditions. This campaign convincingly demonstrated the feasibility of conducting daylight airborne observations of satellite re-entries, thereby validating a challenging but scientifically valuable observation strategy.

The Salsa mission represented a collaborative international effort involving Astros Solutions s.r.o. (Slovakia), the High Enthalpy Flow Diagnostics Group at the University of Stuttgart (Germany), Hyperschall Technologie Göttingen GmbH (Germany), and Comenius University in Bratislava (Slovakia), with additional participation from the University of Southern Queensland (Australia). The campaign delivered high-quality observational data and provided critical insights into instrumentation performance, mission planning constraints, and atmospheric background conditions relevant to daytime re-entry observations.

Building on the success and lessons learned from the Salsa campaign, the team was presented in 2026 with an even more challenging opportunity: to execute an airborne observation mission targeting the re-entries of two Cluster satellites, Samba and Tango, whose predicted re-entry epochs are separated by only one day. This unique configuration imposes significant operational, logistical, and analytical challenges, while simultaneously offering an unprecedented opportunity. This contribution summarizes the key assumptions and methodological refinements derived from the Salsa mission and their application to the planning of the Samba and Tango re-entry observations. Furthermore, it outlines the scientific objectives of the 2026 campaign and presents preliminary observational footage acquired during the mission.