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SAMI: HIGH RESOLUTION 3D VISUALISATION OF ESA EARTH OBSERVATION SATELLITE MISSIONS

Abstract

This paper presents SAMI (SAtellite MIssion Editor Player), a software application for visualization of high-resolution 3D satellite mission scenarios distributed by the ESA-ESTEC EOP System Support Division to users part of the ESA Earth Observation Earth Explorer and Copernicus satellites community.

SAMI is a freely available application that displays stunning high-resolution 3D and 2D scenarios of ESA Earth Observation satellites. SAMI is a response to the need to visualize ESA EO satellite mission scenarios in high resolution including realistic satellite elements, for example, orbit tracks, ground-tracks and footprints of the instruments on-board. The software also highlights entering and exiting the area of visibility between the satellite and the ground stations. It is possible as well to trigger animations with the deployment sequence of solar arrays and antennas and schedule thruster firing events.

The time window in the application can be configured as real-time or as simulated time (scene set in the past or in the future). In addition an endless loop simulation mode is available, with the objective to replay a given sequence.

With the editing capabilities of SAMI, the user can drive the various camera views (camera attached to the Earth or to the satellite), change the global Earth map images used as layer texture and enable or disable objects in the scene, running standalone animations to display scenes involving the ESA EO satellites e.g. for public relation purposes.

The SAMI embedded capability to export image snapshots or HD video can be exploited to share media content and enhance the demonstration of mission concepts.

Another more specific use case for this application would be the playback of a scenario within a given time window to observe a particular satellite geometry, e.g. to inspect solar illumination on satellite parts, which is possible due to the realistic Sun illumination and shadow casting.

The missions currently supported are Sentinel 1A/1B, Sentinel 2A/2B, Sentinel 3A/3B, Sentinel5P, SWARM, Cryosat, SMOS and Aeolus. The capability to seamlessly display several satellites simultaneously is one of the stronger features of SAMI.

The coherence and accuracy of the orbital and geometrical calculations within the SAMI application is ensured by the use of embedded Earth Observation CFI Software libraries (EOCFI SW). The libraries are used to obtain the satellite position, orbit ground-track, attitude and swath footprint.

The application runs on desktop platforms (Mac OS X, Windows) and mobile platforms (iOS based, e.g. iPad).