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Author: Mr. Daniel Novak  
CGI, Germany, daniel.m.novak@cgi.com

Mr. Davide Biamonti  
Logica Deutschland GmbH&Co. KG, Germany, davide.biamonti@logica.com  
Mr. Jeremy Gross  
Logica Deutschland GmbH&Co. KG, Germany, jeremy.gross@logica.com

TWO MODERN WEB TOOLS HELPING ESA'S DEBRIS OPERATIONAL SUPPORT

**Abstract**

Two tools have been developed by CGI to help ESA's Space Debris Office with its operational support of conjunction avoidance for ESA missions: PREEMPT and PREEMPT Manager. The tools' unique characteristics are their functionalities, usability, visual appeal, and ease to deploy and maintain. The reason for their success lies in the continuous feedback from the end users during the development.

The first product, PREEMPT, is a web-based high-fidelity 3D visualisation tool. Its objective is to provide the satellite operators with a visualisation of conjunction geometries, to make it easier for them to understand the situation immediately. It is used for the decision making process about whether to implement an avoidance manoeuvre or not. PREEMPT runs in a web browser with no plug-ins and supports various camera views: on-board the target or the chaser, centred on the event, or following the target or the chaser. Multiple Conjunction Data Messages (CDMs) related to the same event can be compared simultaneously and one can see the effect of an avoidance manoeuvre on the conjunction geometry. The user interface is highly responsive and has a modern look and feel.

The second product, PREEMPT Manager, is also a web-based tool. Its purpose is to make the tracking, analysis and management of conjunction events easier. These conjunction events consist of a set of CDMs and are in one of the following statuses: unassigned, assigned, escalated, manoeuver, closed, or archived. Each CDM can be given an assignee and can be marked as checked by that person. This person then can escalate a threatening event and send an email to the team from within the tool with one button click. A dashboard view serves as a landing page summarizing the state of events for each mission and allows generating reports. In the back-end, the software interfaces with a database containing all CDMs and other information. Accounts can be easily set up for operators wishing to follow events more closely.

The development with regular deliveries and continuous interaction with end users made it possible to maximize the usability and efficiency of the tools. Being web-based tools, no installation is required for end users. The two tools will be demoed to the audience.