



Debris Operational Support Through Web Applications

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Experience the commitment®

Web front-ends

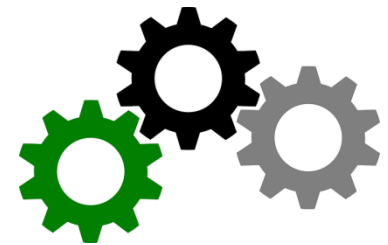
1. Event Visualisation with (PREEMPT)
2. Event tracking (PREEMPT Manager)
3. Re-entry tracking

Next generation tools for more efficient, scalable and reliable operational support

User friendly and modern look and feel

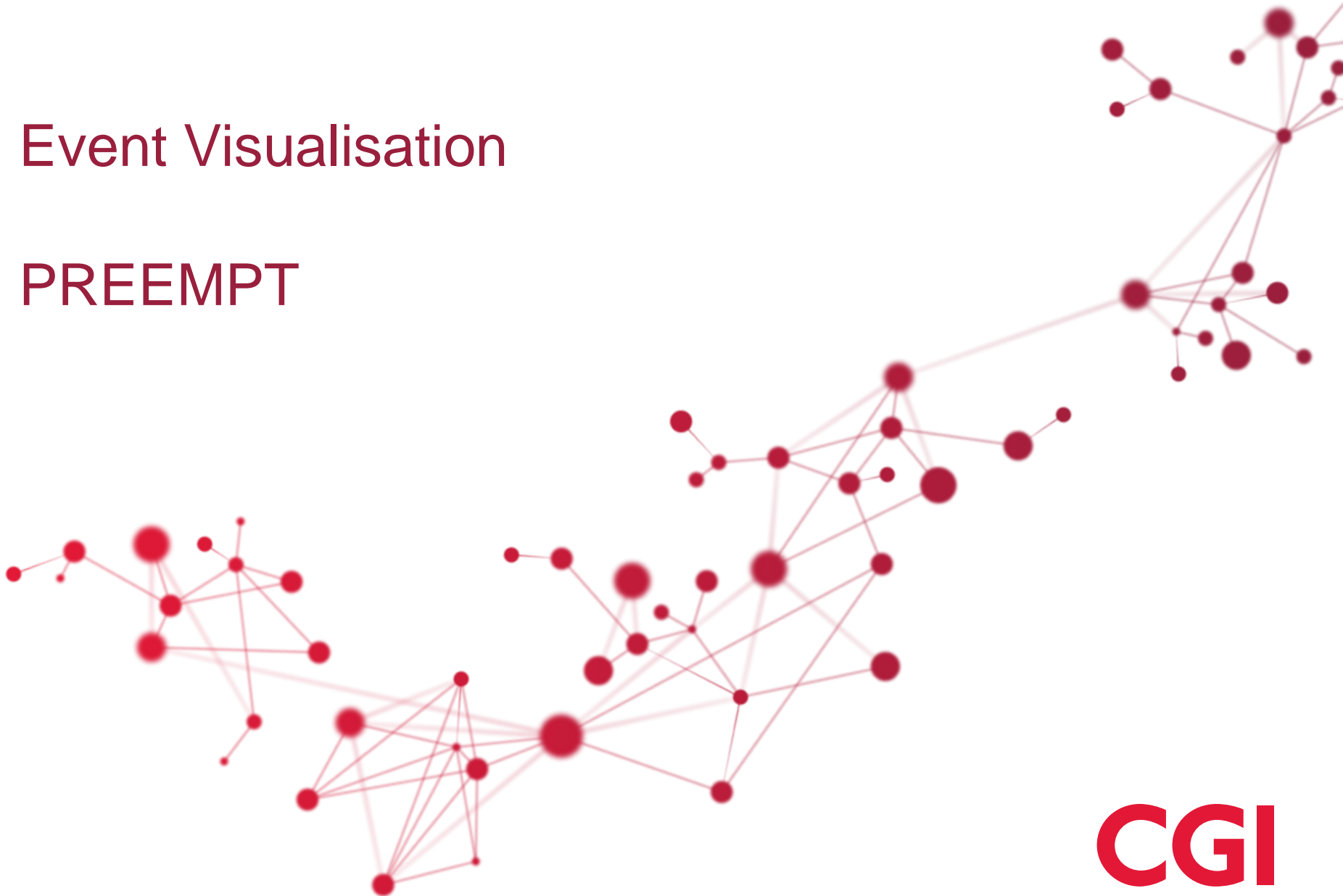
Seamless support of operational workflows

Ease of maintenance



Event Visualisation

PREEMPT

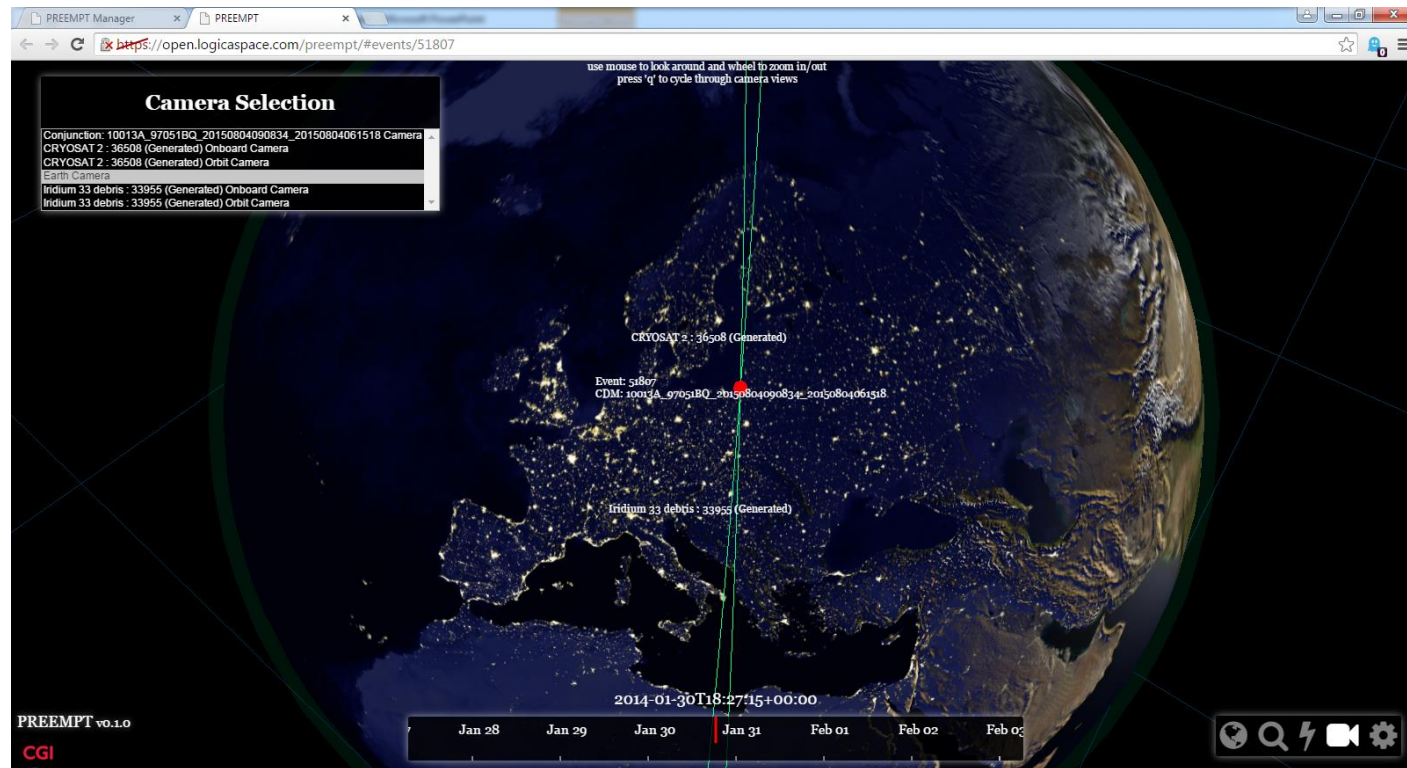


Event visualisation

High fidelity visualisation of situation

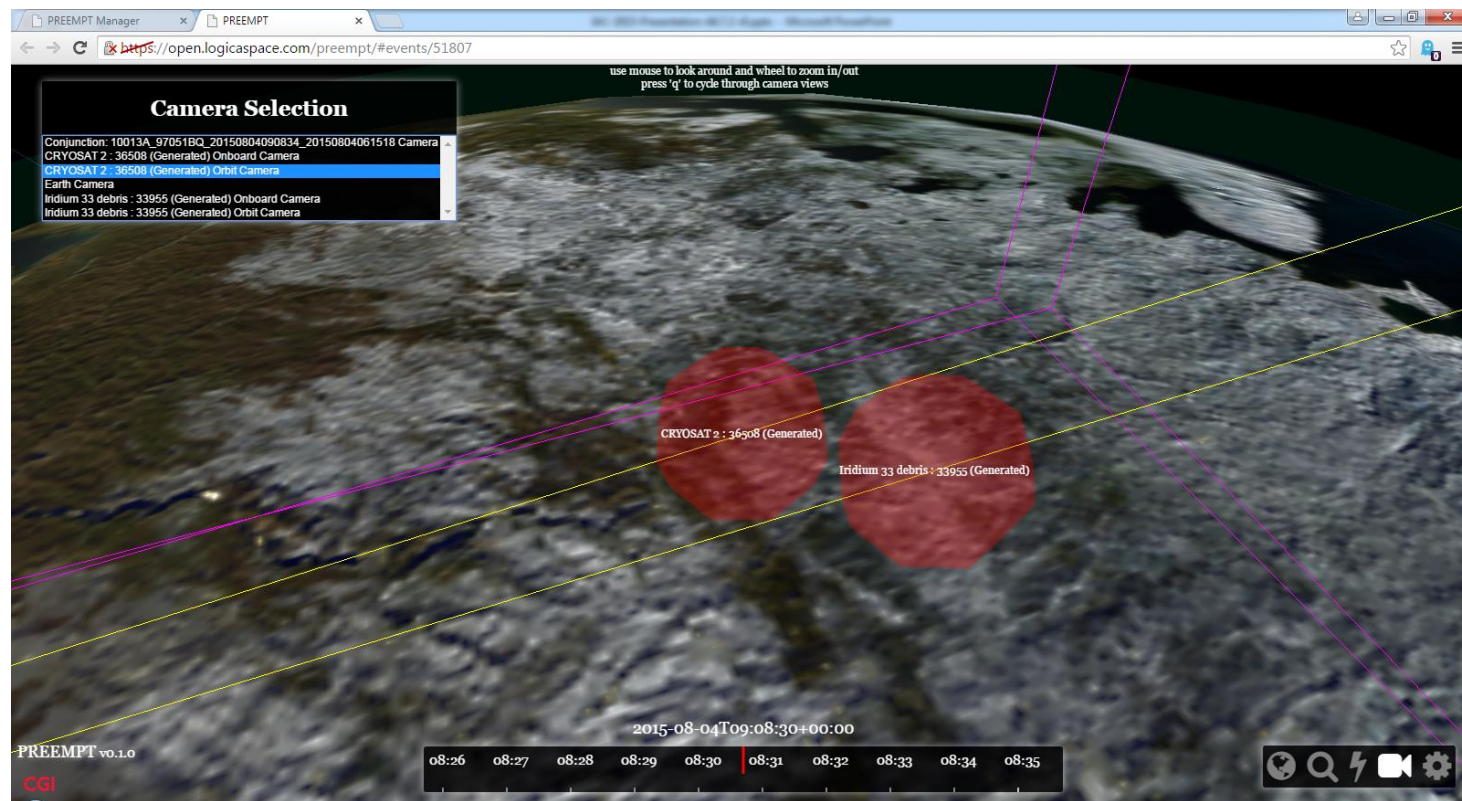
Multiple camera views

Time scrubbing



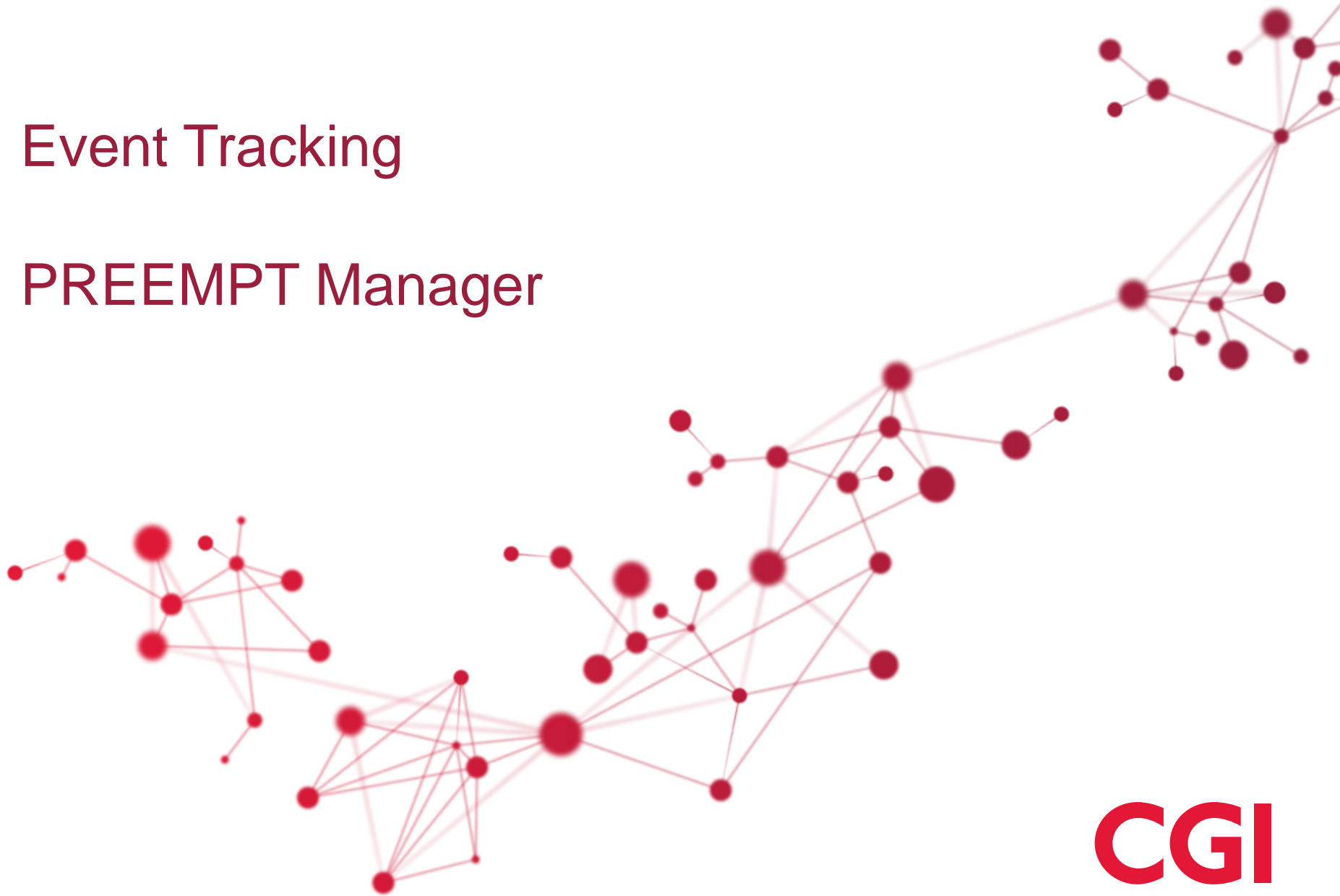
Event visualisation

Visualisation of conjunction geometry
Relative movement of covariance ellipsoids



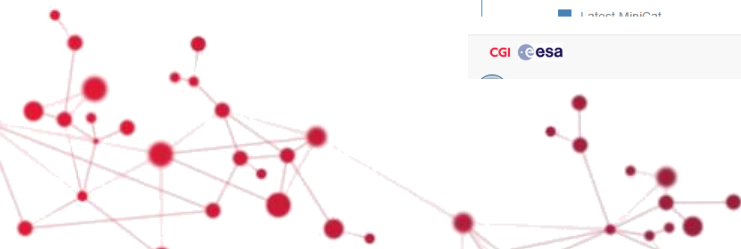
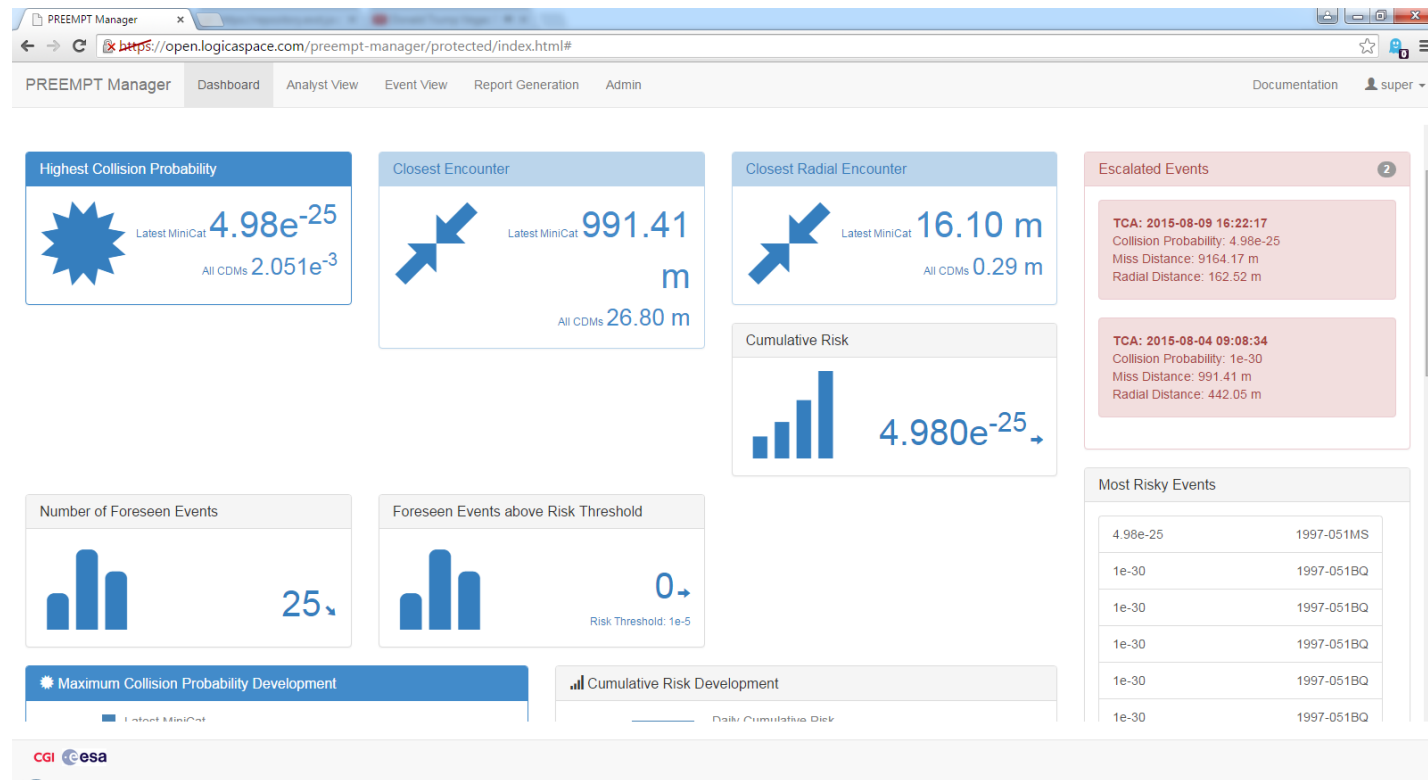
Event Tracking

PREEMPT Manager



Dashboard

High level overview of the mission
Cumulative and prediction data



Analyst view

Detailed view of events and CDMs

Sorted, filtered, grouped

The screenshot displays the PREEMPT Manager Analyst View interface. The browser address bar shows the URL: <https://open.logicaspace.com/preempt-manager/protected/index.html#analyst>. The navigation menu includes: PREEMPT Manager, Dashboard, Analyst View (selected), Event View, Report Generation, and Admin. A user profile 'super' is visible in the top right. Below the navigation, there are controls for 'Group Events?' (Yes/No) and a filtering bar with the text: 'Filtering (MISS_DISTANCE < *100* AND R_DISTANCE < *50* AND KLINKRAD > *1e-5*)'. The main content is a table with the following columns: Event, Mission, Target, Chaser, TCA, Creation Date, Distance [m], R Distance [m], R_Pos [m], T_Pos [m], N_Pos [m], and P_coll. The table contains 13 rows of data, with the 8th row highlighted in blue. A tooltip is visible over the 'Creation Date' cell of the 8th row, showing the date '2015-07-25 06:21:12'. The footer of the interface includes the logos for CGI and ESA.

Event	Mission	Target	Chaser	TCA	Creation Date	Distance [m]	R Distance [m]	R_Pos [m]	T_Pos [m]	N_Pos [m]	P_coll
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.18...	2015-07-26 19:52:55	71.80	49.71	-49.71	4.47	51.62	1.3310e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.20...	2015-07-26 10:45:28	42.73	19.47	-19.47	3.19	37.90	1.4870e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.204	2015-07-26 09:42:08	38.00	17.60	-17.60	2.90	33.80	2.0510e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.21...	2015-07-26 08:00:26	26.80	18.08	-18.08	1.70	19.71	1.4710e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.21...	2015-07-26 01:24:50	26.80	18.08	-18.08	1.70	19.71	1.4710e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.21...	2015-07-25 10:36:14	41.61	40.55	-40.55	-0.81	-9.32	8.8170e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.221	2015-07-25 09:11:25	36.00	34.50	-34.50	-5.00	-10.10	1.2410e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.26...	2015-07-25 06:21:12	36.95	34.64	-34.64	-1.11	-12.80	3.6640e
51249	2010-013A	2010-013A	1997-051MR	2015-07-27 00:55:04.25...	2015-07-24 22:11	38.26	34.89	-34.89	-1.40	-15.63	3.5440e
51871	2014-016A	2014-016A	9999-81875III	2015-08-06 09:36:43.14...	2015-07-31 13:36:33	78.53	45.51	45.51	46.63	-43.85	5.5440e
51871	2014-016A	2014-016A	9999-81875III	2015-08-06 09:36:43.13...	2015-07-31 13:17:56	53.88	46.87	46.87	-19.21	18.36	5.0060e



Filter

Advanced and easy filtering over all available fields
Ability to apply and save default filters

The screenshot displays the PREEMPT Manager web interface with the following sections:

- event**: Fields for Event, Mission, Target, and Chaser, each with a search box and a clear (X) button.
- datetime**: Includes TCA (Until), Creation Date (16 October 2015), T OBS Epoch (Since), and C OBS Epoch (Since) filters.
- meta**: Fields for Checked by, Owner, CDM Status, and EV Status, each with a search box and a clear (X) button.
- cdm**: A grid of filters including Distance (< 100), R Distance (< 50), P_{coll} (> 1e-5), P_{max} (>), T σ_R (>), T σ_T (>), T σ_N (>), C σ_R (>), C σ_T (>), C σ_N (>), T OBS Interval (>), and C OBS Interval (>).

At the bottom, there is a "Show Advanced Filter Options..." link, a "default" dropdown, a "Reset" button, and an "Apply Filter" button.

Event view

User friendly display of target and chaser data

The screenshot displays the PREEMPT Manager web application. The browser address bar shows the URL: <https://open.logicaspace.com/preempt-manager/protected/index.html#events/51807>. The navigation menu includes Dashboard, Analyst View, Event View (selected), Report Generation, and Admin. A user profile for 'super' is visible in the top right.

The main content area is titled 'Event: 51807' and includes buttons for 'Open Viz', 'Email', and 'Comment'. Below this, there are tabs for 'Summary', 'Table', 'Objects Info', and 'Log'. The 'Summary' tab is active, showing a comparison between 'Target' and 'Chaser' data.

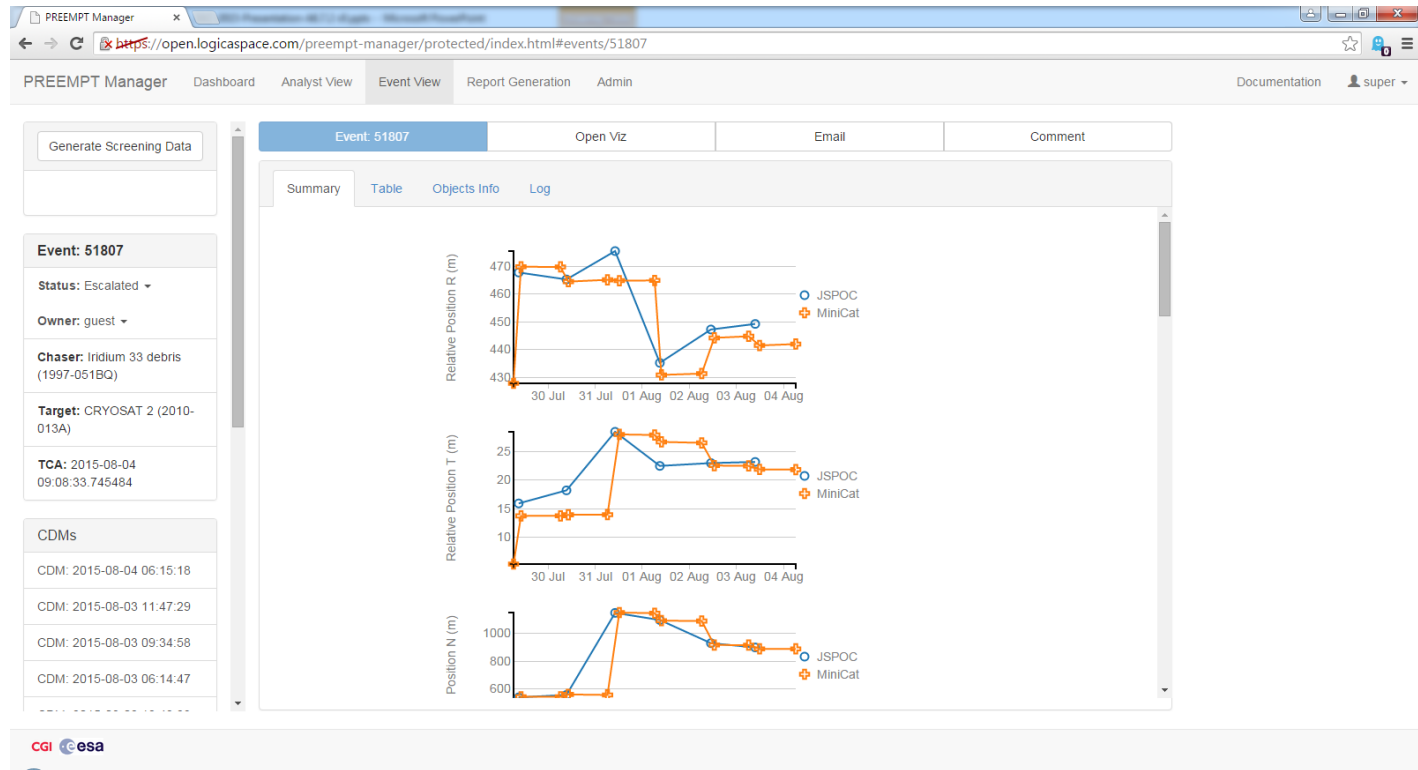
Target	Chaser
TARGET: CRYOSAT 2	CHASER: Iridium 33 debris
TARGET_ID: 2010-013A	CHASER_ID: 1997-051BQ
NORAD_ID: 36508	NORAD_ID: 33955
TYPE: Payload	TYPE: Payload Debris
GEOMETRY: Hex Cyl	GEOMETRY:
LENGTH: 2.3	LENGTH:
DEPTH: 4.6	DEPTH:
HEIGHT: 2.3	HEIGHT:
MASS: 720	MASS:
AVG_AREA: 5.6855	AVG_AREA:
RCS_AREA: 2.9528	RCS_AREA: .09
ORG_OWNER: European Space Agency	ORG_OWNER: Iridium Satellite LLC
LAUNCHING_STATE: EUROPEAN SPACE AGENCY (ESA)	LAUNCHING_STATE: UNITED STATES OF AMERICA (USA)
LAUNCH_DATE: 2010-04-08	LAUNCH_DATE: 1997-09-14

On the left side, there is a sidebar with a 'Generate Screening Data' button and a list of CDMs (Change Detection Messages) for the event, including their timestamps.

The footer of the interface features the logos for CGI and ESA.

Event view – trend plots

Trend plots of multiple CDM data



Event view – Log

Textual and graphical log

Log entry details easily obtained by drilling down

The screenshot displays the PREEMPT Manager web application. The browser address bar shows the URL: <https://open.logicaspace.com/preempt-manager/protected/index.html#events/51807>. The navigation menu includes: PREEMPT Manager, Dashboard, Analyst View, Event View (selected), Report Generation, and Admin. The sidebar on the left provides details for Event 51807:

- Event: 51807**
- Status: Escalated
- Owner: guest
- Chaser: Iridium 33 debris (1997-051BQ)
- Target: CRYOSAT 2 (2010-013A)
- TCA: 2015-08-04 09:08:33.745484
- CDMs:
 - CDM: 2015-08-04 06:15:18
 - CDM: 2015-08-03 11:47:29
 - CDM: 2015-08-03 09:34:58
 - CDM: 2015-08-03 06:14:47

The main content area shows the Event View for Event 51807. It includes tabs for Summary, Table, Objects Info, and Log. The Log tab is active, displaying a graphical log and a list of log entries. The graphical log shows a timeline from July 29 to August 4, 2015, with vertical lines representing CDM Creation events. The log entries are as follows:

Timestamp	Event Description
[2015-07-29T04:21:39.000Z]	CDM Creation : New CDM 51807: 10013A_97051BQ_20150804090836_20150729062139
[2015-07-29T06:58:37.000Z]	CDM Creation : New CDM 51807: 36508_conj_33955_2015216090835_210091541490NR
[2015-07-29T08:09:13.000Z]	CDM Creation : New CDM 51807: 10013A_97051BQ_20150804090835_20150729100913
[2015-07-30T04:16:21.000Z]	CDM Creation : New CDM 51807: 10013A_97051BQ_20150804090835_20150730061621
[2015-07-30T07:21:00.000Z]	CDM Creation : New CDM 51807: 36508_conj_33955_2015216090835_211094056484NR
[2015-07-30T08:17:20.000Z]	CDM Creation : New CDM 51807: 10013A_97051BQ_20150804090835_20150730101720
[2015-07-31T04:15:24.000Z]	CDM Creation : New CDM 51807: 10013A_97051BQ_20150804090835_20150731061524



Event view – email

Ability to create email templates

Ability to include any combination of textual data and plots

The screenshot displays the PREEMPT Manager web application. The main interface shows an event view for Event 51807, with details such as Status (Escalated), Owner (guest), Chaser (Iridium 33 debris), and Target (CRYOSAT 2). A table of CDMs (Change Data Messages) is visible below. An 'Email' modal window is open, allowing the user to create an email template. The modal includes a dropdown for the template name ('test-event - event email test template'), a 'Users' field set to 'guest@cgl.com', and a text area for the email body. The text area contains a rich text editor with a 'Preview' button and several lines of text, including placeholders for event data like `{{event.EVENT_ID}}` and `{{plots.MISS_DISTANCE}}`. An 'Attachments' section is also present, showing 'Available Fields'. The background interface includes navigation tabs like 'Dashboard', 'Analyst View', 'Event View', and 'Report Generation', along with a user profile 'super'.



Report generation

Ability to create customised reports of historical and future data

The screenshot displays the PREEMPT Manager web application interface. The browser address bar shows the URL: <https://open.logicaspace.com/preempt-manager/protected/index.html#report>. The navigation menu includes: PREEMPT Manager, Dashboard, Analyst View, Event View, Report Generation (active), and Admin. A user profile 'super' is visible in the top right.

Missions:

- Sentinel-1A - 2014-016A
- Sentinel-2A - 2015-028A
- Swarm-A - 2013-067B
- Swarm-B - 2013-067A
- Swarm-C - 2013-067C

Report Start Time:

Report End Time:

Generate

test-report - Report test template

Preview

```

{{#each events}}
{{EVENT_ID}} | {{ICA}} | {{TARGET_ID}}***{{TARGET}} | {{CHASER_ID}}***{{CHASER}}
### min Miss distance: {{#min CDMS property="MISS_DISTANCE"}}{{formatNumber MISS_DISTANCE format="%_2e"}}{{/formatNumber}}{{/min}}
[m]
## {{#first CDMS sortBy="CREATION_DATE"}}{{CREATION_DATE}}{}/first}}
## {{#last CDMS sortBy="CREATION_DATE"}}{{CREATION_DATE}}{}/last}}
Loggings:
{{#each logs}}
{{Time}} | {{Body}}
--
{{/each}}
=====
{{/each}}

```

Download

CGI ESA



Re-entry Tracking



Re-entry details (preview)

Detailed tabular view of all available data
Dynamic filtering over all important fields

The screenshot displays the 'Re-entry Tool' interface. At the top, there are navigation tabs: 'Re-entry Tool', 'Home', 'Re-entries', 'Live', and 'Admin'. On the right side of the header, there is a 'Documentation' link and a user profile icon labeled 'super'. Below the header, a sidebar on the left contains various filters: 'COSPAR Id', 'SATNO', 'Name', 'Reentry Date' (with 'From' and 'To' date pickers), 'Mass_{kg}' (with a slider set to 58 : 2800), 'Class' (with checkboxes for 'Payload' and 'Rocket Body'), 'Inclination_{degree}' (with a slider set to 54 : 98), 'Perigee_{km}' (with a slider set to 102 : 278), and 'Apogee_{km}' (with a slider set to 166 : 8961). At the bottom of the sidebar is an 'Ask Admin' button. The main area shows a table with the following columns: 'COSPAR Id', 'SATNO', 'Name', 'Reentry Date', 'Uncertainty', 'Mass_{kg}', 'Class', 'Inclination_{degree}', 'Perigee_{km}', 'Apogee_{km}', 'Tool', 'Country', and 'Details'. The table contains four rows of data, each with a star icon, a lock icon, and a share icon in the 'Details' column.

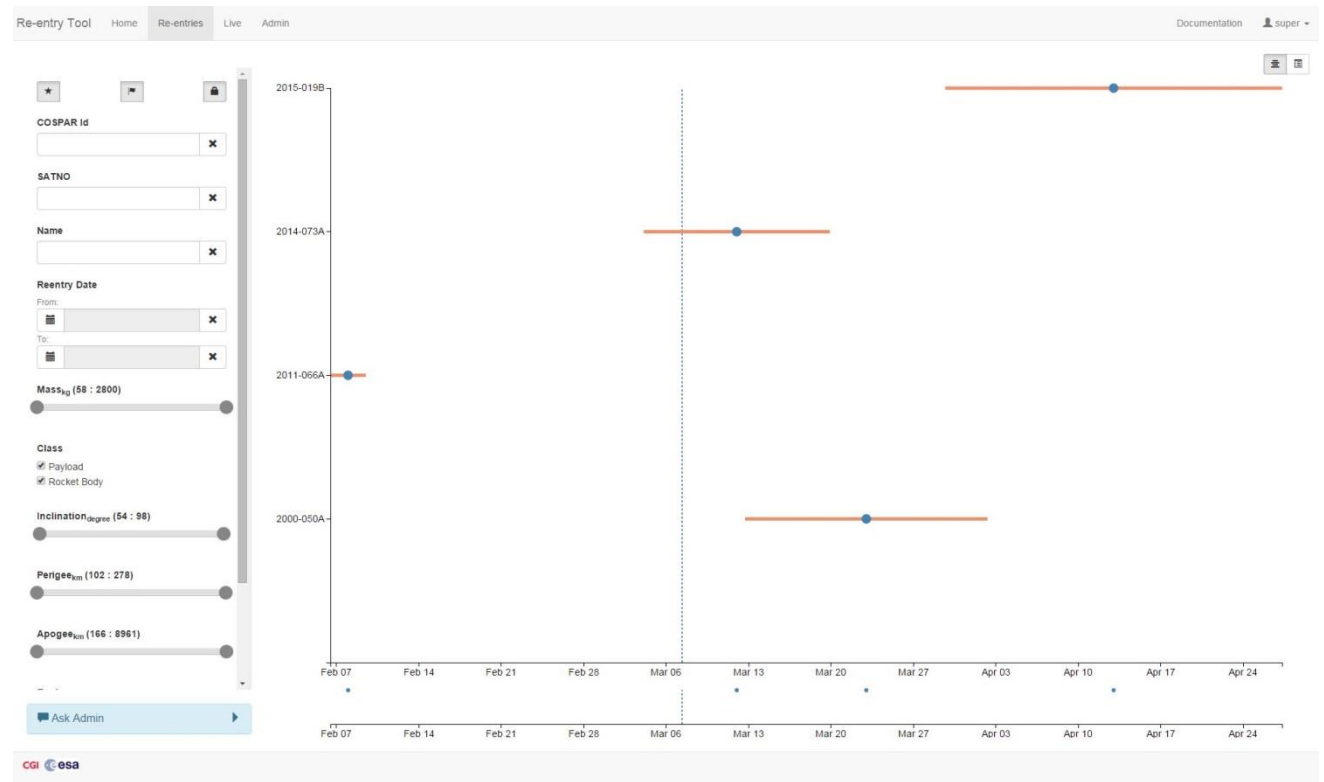
COSPAR Id	SATNO	Name	Reentry Date	Uncertainty	Mass _{kg}	Class	Inclination _{degree}	Perigee _{km}	Apogee _{km}	Tool	Country	Details
★ 🔒 2000-050A	26481	Zi Yuan 2	23 Mar 2016	10.300	1450 000	Payload	97.169	247 237	253 029	RAPID	China	🔗
★ 🔒 2011-066A	37874	Tianxun-1	08 Feb 2016	1.500	58 000	Payload	97.293	152 651	166 357	RAPID	China	🔗
★ 🔒 2014-073A	40311	Kualzhou-2	12 Mar 2016	7.900	150 000	Payload	96.488	277 019	304 386	RAPID	China	🔗
★ 🔒 2015-019B	40550	CZ-3C third stage (H-18)	13 Apr 2016	14.300	2800 000	Rocket Body	54.617	102 299	8960 661	RAPID	China	🔗



Re-entry dates visualisation (preview)

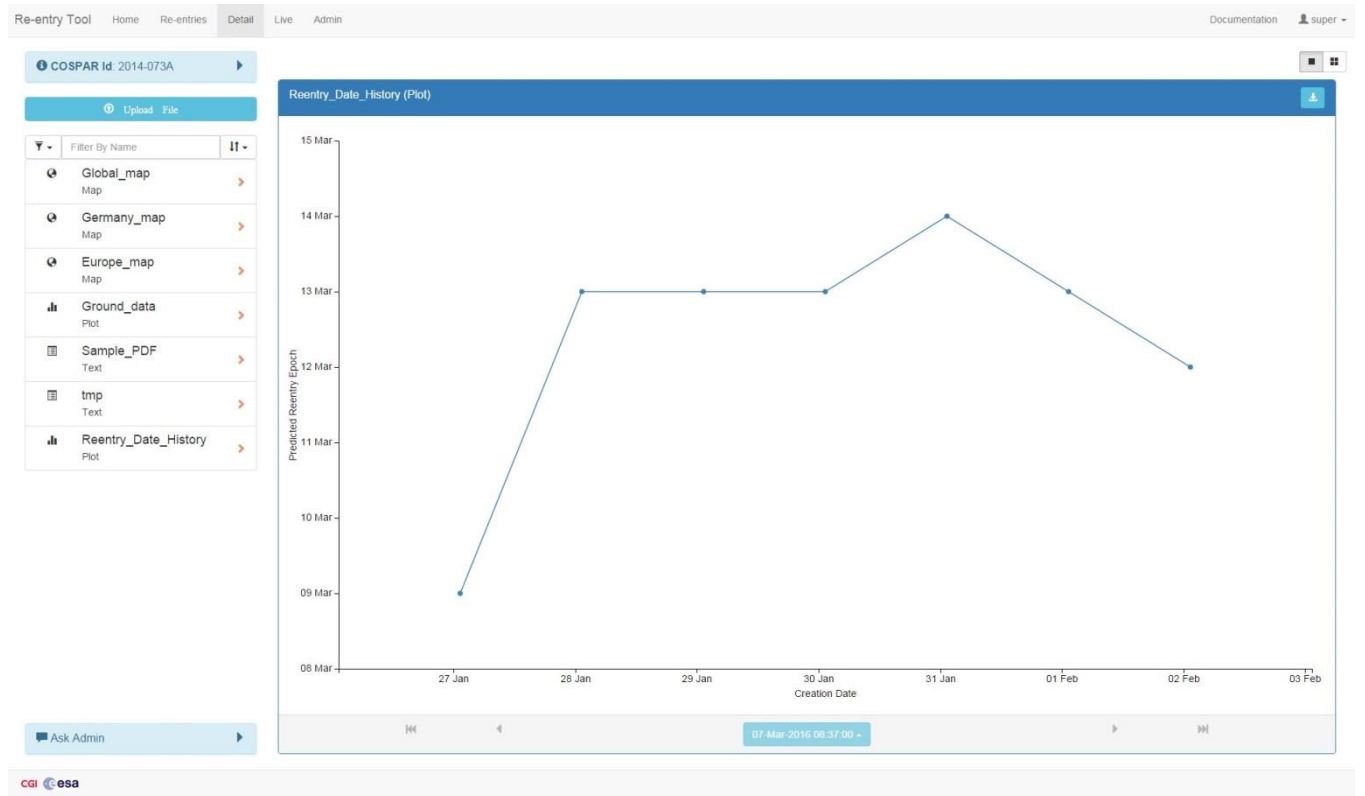
Visualise the re-entry dates of filtered objects

View the uncertainties on the re-entry dates and times



Re-entry date trend (preview)

View trend plots of important data



Summary



Summary

The front-ends support ESA's services to current and future missions

They are part of the future of operational support

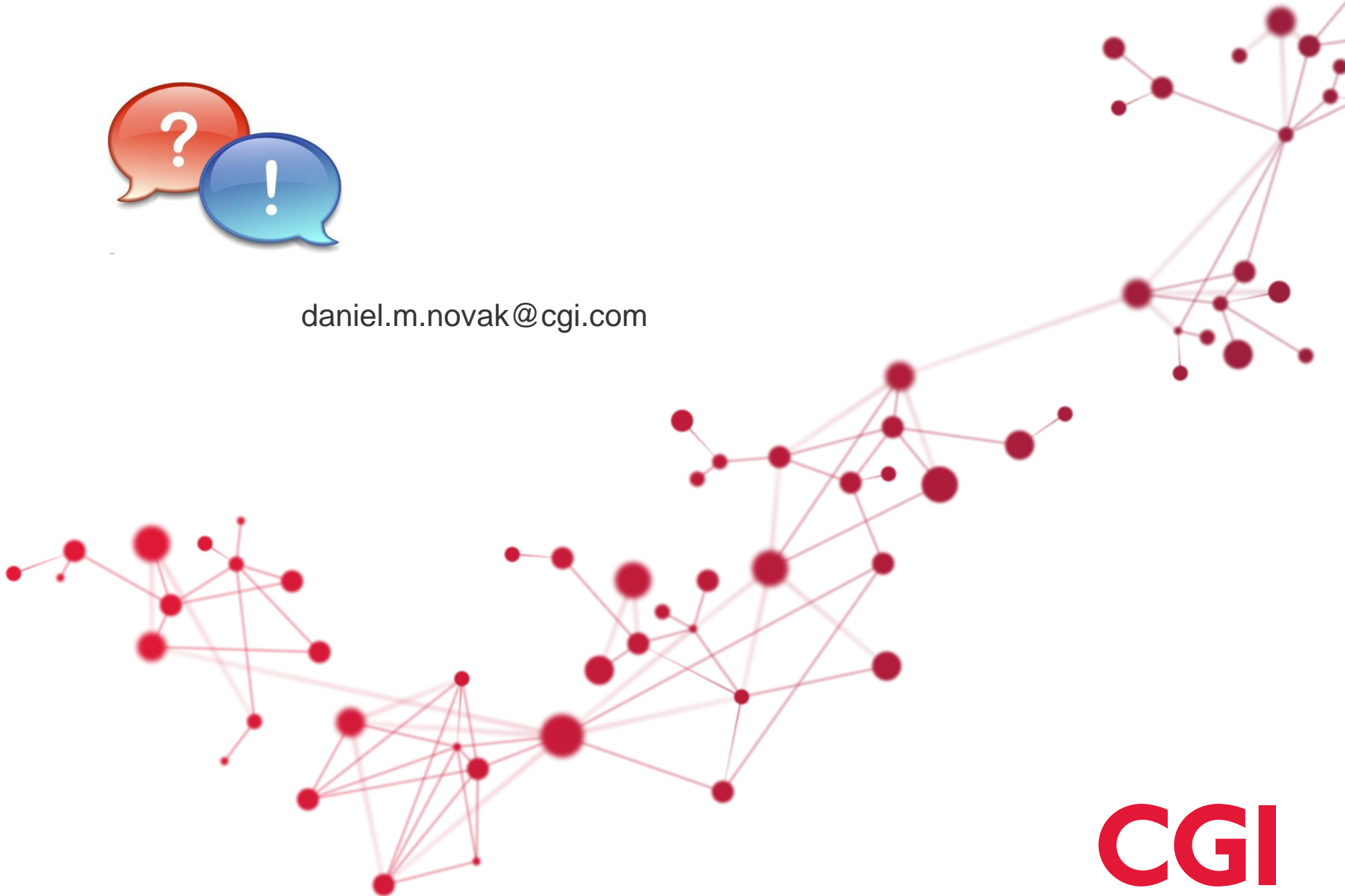
They can be deployed in any organisation if requested

CGI can tailor PREEMPT and PREEMPT Manager for specific needs and provide license for them





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