



## Better Planning, Better Results

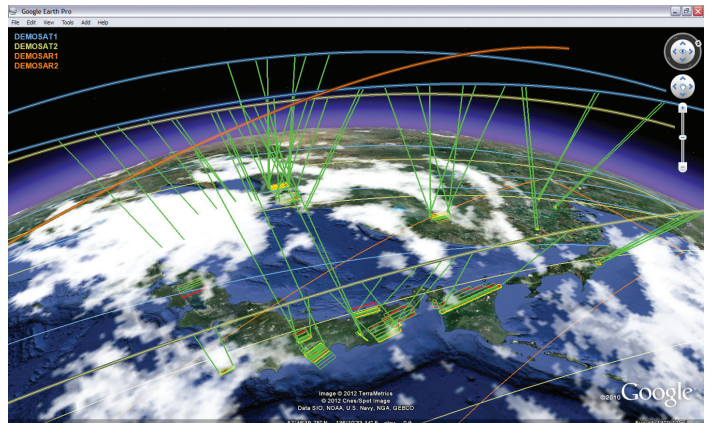
Maximize the quantity and value of imagery collected by your imaging satellites by integrating Orbit Logic's **Collection Planning & Analysis Workstation™ (CPAW)** into your satellite ground control system. **CPAW** couples high fidelity spacecraft modeling with multiple advanced scheduling algorithms and a user-friendly interface to generate optimized collection plans for one or more synthetic-aperture RADAR (SAR) or electro-optical (EO) satellites.

### Sample CPAW Planning GUI

| Index | Task Order | Step             | Priority | Area | Score | Status    | CCF | Max CO | Ship Angle | Imaging Start Time       | Y    | OR  | Medi | GSD  | Steeep | Duration |
|-------|------------|------------------|----------|------|-------|-----------|-----|--------|------------|--------------------------|------|-----|------|------|--------|----------|
| 1     | EO_Azimuth | EO_Azimuth_PAN_0 | 70       | 575  | 237   | Included  | 0   | 31     | 182.0      | 2011-05-21T01:35:09.000Z | 0.45 | 473 | -    | 7    | 7      |          |
| 2     | EO_Azimuth | EO_Azimuth_PAN_0 | 70       | 284  | 220   | Included  | 0   | 44     | 0.0        | 2011-05-21T01:35:09.000Z | 0.45 | 473 | -    | 7    | 7      |          |
| 3     | EO_Pan     | EO_Pan_PAN_0     | 50       | 1738 | 363   | Included  | 8   | 20     | 0.0        | 2011-05-21T01:35:28.000Z | 0.30 | 443 | -    | 21.6 | 21.6   |          |
| 4     | EO_Pan     | EO_Pan_PAN_0     | 50       | 2950 | 270   | Included  | 23  | 44     | 0.0        | 2011-05-21T01:35:28.000Z | 0.30 | 454 | -    | 25.8 | 25.8   |          |
| 5     | EO_Azimuth | EO_Azimuth_PAN_0 | 40       | 100  | 144   | Included  | 0   | 17     | 0.0        | 2011-05-21T01:34:39.000Z | 0.30 | 478 | -    | 1.9  | 1.9    |          |
| 6     | EO_Azimuth | EO_Azimuth_PAN_0 | 71       | 2070 | 350   | Included  | 7   | 20     | 0.0        | 2011-05-21T01:32:22.000Z | 0.45 | 421 | -    | 27.4 | 27.4   |          |
| 7     | EO_Azimuth | EO_Azimuth_PAN_0 | 71       | 2019 | 480   | Included  | 11  | 20     | 0.0        | 2011-05-21T01:32:22.000Z | 0.45 | 466 | -    | 30.2 | 30.2   |          |
| 8     | EO_Azimuth | EO_Azimuth_PAN_0 | 100      | 143  | 325   | Included  | 0   | 100    | 0.0        | 2011-05-21T01:32:12.000Z | 0.30 | 51  | -    | 2.2  | 2.2    |          |
| 9     | EO_Shrimp  | EO_Shrimp_PAN_0  | 50       | 888  | 289   | Included  | 0   | 20     | 0.0        | 2011-05-21T01:34:49.000Z | 0.30 | 427 | -    | 12   | 12     |          |
| 10    | EO_Shrimp  | EO_Shrimp_PAN_0  | 50       | 2117 | 185   | Included  | 8   | 20     | 0.0        | 2011-05-21T01:34:49.000Z | 0.30 | 427 | -    | 14   | 14     |          |
| 11    | EO_Shrimp  | EO_Shrimp_PAN_0  | 100      | 351  | 327   | Included  | 4   | 100    | 33.3       | 2011-05-21T01:31:41.000Z | 0.30 | 532 | 0    | 4.2  | 4.2    |          |
| 12    | EO_Shrimp  | EO_Shrimp_PAN_0  | 100      | 351  | 327   | Included  | 4   | 100    | 33.3       | 2011-05-21T01:31:41.000Z | 0.30 | 532 | 1    | 4    | 4      |          |
| 13    | EO_Terrain | EO_Terrain_PAN_0 | 50       | 703  | 212   | Included  | 11  | 20     | 0.0        | 2011-05-21T01:35:09.000Z | 0.30 | 477 | -    | 8.8  | 8.8    |          |
| 14    | EO_Azimuth | EO_Azimuth_PAN_1 | 70       | 668  | 224   | Available | 0   | 31     | 182.0      | 2011-05-21T01:34:26.000Z | 0.45 | -   | -    | -    | -      |          |
| 15    | EO_Pan     | EO_Pan_PAN_0     | 50       | 824  | 214   | Available | 0   | 40     | 33.3       | 2011-05-21T01:34:08.000Z | 0.30 | -   | -    | -    | -      |          |
| 16    | EO_Chase   | EO_Chase_PAN_0   | 50       | 268  | 184   | Available | 0   | 41     | 31.6       | 2011-05-21T01:34:28.000Z | 0.30 | -   | -    | -    | -      |          |
| 17    | EO_Datku   | EO_Datku_PAN_0   | 50       | 720  | 208   | Available | 0   | 40     | 17.9       | 2011-05-21T01:33:55.000Z | 0.30 | -   | -    | -    | -      |          |

With STK and Google Earth visualization, **CPAW** GUIs and map displays provide situational awareness of the planning process. **CPAW** can be used for coverage analysis with high fidelity models and targeting algorithms; ground station and communication link trade studies; sensor, spacecraft, and orbit design trade studies; and system throughput analysis.

### CPAW Collaborative Multi-Satellite Plan Visualization



**CPAW** collection planning is enabled by a set of models that simulate and predict the physical environment, spacecraft subsystems and target constraints. The **CPAW** modeling approach and architecture have been validated operationally for multiple spacecraft from multiple manufacturers. This is not just field-of-regard access determination – **CPAW** provides operational-fidelity scheduling and generates plans that are ready for command generation. This kind of fidelity is needed not only to operate imaging satellites, but is also useful to imagery customers trying to ensure they get the most value for their imagery budget.

## Automated and Manual Planning

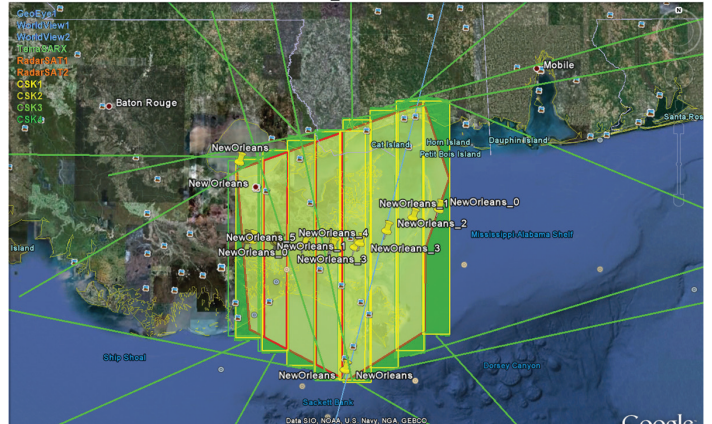
Multiple CPAW algorithms compete to generate optimized conflict-free collection plans meeting all spacecraft and target constraints. The user may always generate or edit plans manually, with CPAW providing immediate model validation and feedback. Enabling the CPAW lights-out mode generates plans automatically just in time for each scheduled uplink.

### CPAW Gantt View

## Constellation Planning

A single **CPAW** workstation can complete collection planning for multiple satellites individually or perform collaborative constellation planning for a mixed fleet of satellites with different capabilities, all working to image targets from a single unified collection deck. Tasking specifications are respected even when multiple satellites are used to complete a single area request. By using the capabilities of the constellation, areas can be completed more quickly, more efficiently, and for less cost.

### CPAW Area Fulfillment Tracking – Detailed View





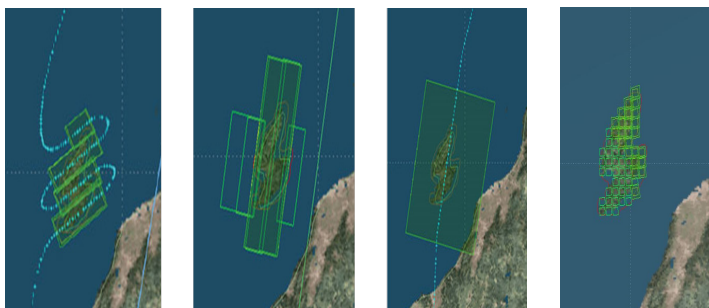
## Order Management and Fulfillment Tracking

CPAW provides order deck management features to accept tasking from external systems and/or define tasking on-the-fly. Order fulfillment tracking ensures that large areas are efficiently collected. **Order Logic** provides web-based order management.

## Rapid Satellite Integration

New satellites can be added to CPAW quickly, sometimes in a matter of hours without the need for new software development. XML files define most satellite parameters while plug-in interfaces for spacecraft agility and imaging models ensure that conforming models can be added and replaced easily. Agile line imagers, pushbroom satellites, SAR beam imagers, and frame cameras are all supported out-of-the-box with CPAW.

## CPAW Planning for Agile, Beam, Pushbroom, and Frame Imagers



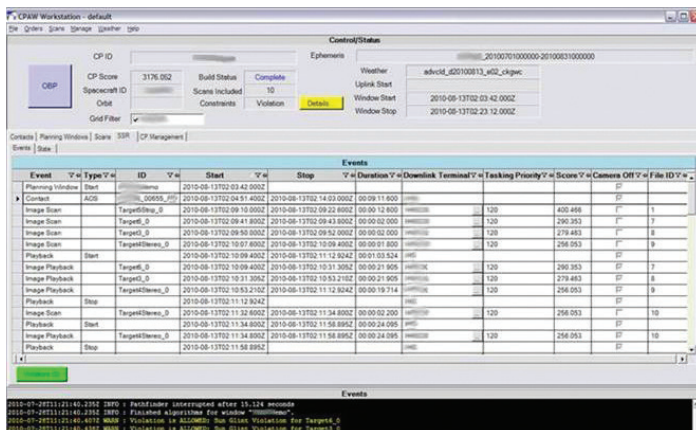
## Orbit Logic CPAW solutions provide the following benefits:

- **Operationally proven heritage** – Years of operational experience for multiple high resolution imaging satellites.
- **Maximized imagery value** – Optimized planning is one of the linchpins in a successful and efficient imaging system.
- **Flexible planning** – Configurable Figure-of-Merit (FOM) and multiple planning process flows supported.
- **Low cost and low risk** – CPAW is a COTS product that can greatly reduce or eliminate new software development.
- **Ready for operations quickly** – CPAW for a new satellite can be configured and running in a matter of hours or days.
- **Constellation planning** – Perform collection planning for your full constellation of mixed satellite types to achieve more efficient operations.

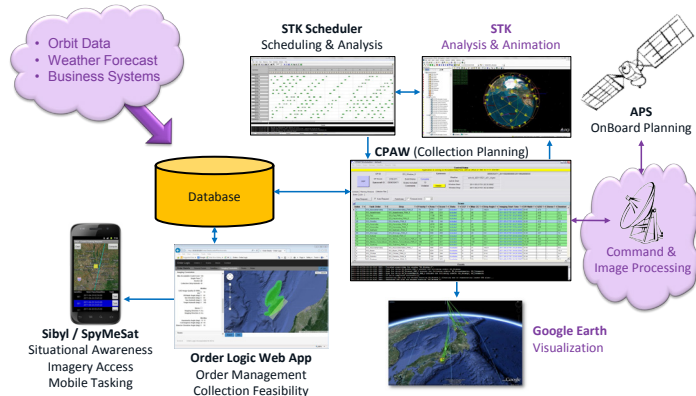
## Contact Scheduling and Recorder Management

CPAW can automatically schedule contacts based on the latest spacecraft and ground station information, or import contact schedules from external sources including STK Scheduler. Based on the contact schedule and collection plan CPAW can perform downlink planning and manage the onboard recorder using high-fidelity recorder models. Configurable settings tailor the downlink approach for different missions.

### CPAW Recorder Manager GUI



### Orbit Logic Collection Planning System Architecture:



## Enterprise Solutions

Extend CPAW capabilities to your customers and throughout your organization with Orbit Logic's web-based **Order Logic** application for imagery request management and collection feasibility, and **SpyMeSat** and **Sibyl** mobile apps for remote tasking from the field. In addition, custom deployments can include distributed tasking architectures and clustered computing solutions for enterprise-level performance.

