COVE API User's Guide

The Committee on Earth Observation Satellites (CEOS) Visualization Environment (COVE) application programming interface (API) is a suite of endpoints for executing tasks and retrieving results for a collection of COVE tools.

All tasks created using the COVE API will be available in the COVE UI, and all tasks created in the COVE UI will be available in the COVE API.

A valid COVE username and password are required for all requests. A COVE login may be created in the COVE UI by clicking on the Log In/Register ling in the upper right corner.

COVE tool API sets are throttled to help reduce system overload. Throttle limits are subject to change if the need arises. The throttle limits will be detailed in each tool section below, and will be updated in this document as changes are made.

To submit a request to the service, include the appropriate JSON payload in the body of a POST request for the endpoint. Requests should include the trailing slash in the url. Examples using curl with each type of request are provided in each section below.

All responses will either be a JSON response or a binary file. All failed responses will be in JSON format, and will include a status (standard HTTP status code).

Execution start in all task status responses are in UTC time.

For CSV files, use unicode UTF-8.

Please refer to the COVE UI User's Guide for more information on the usage of each COVE tools.

The COVE tools with COVE API endpoints include:

- Acquisition Forecaster – A set of endpoints which provides users with the ability to submit a task in the Acquisition Forecaster tool, and retrieve results of the task (history, status, CSV, PNG).

- Coverage Analyzer – A set of endpoints which provides users with the ability to submit a task in the Coverage Analyzer tool, and retrieve results of the task (history, status, JSON, CSV, PNG, GeoTIFF, and NetCDF).
- Revisits Calculator – A set of endpoints which provides users with the ability to submit a task in the Revisits Calculator tool, and retrieve results of the task (history, status, JSON, CSV, PNG).
- Coincident Calculator – A set of endpoints which provides users with the ability to submit a task in the Coincident Calculator Tool (forecasted or archived), retrieve results of the task (forecasted: history, status, JSON, PNG, or archived: history, status, JSON, PNG), and includes endpoints which lists details of constellations available (forecasted or archived), and endpoints to create constellations (forecasted or archived).
- Data Browser – A set of endpoints which provides users with the ability to submit a task in the Data Browser tool, and retrieve results of the task (history, status, scene count, CSV, PNG).
- Country Coverage – A set of endpoints which provides users with the ability to submit a task in the Country Coverage tool, and retrieve results of the task (history, status, PDF, CSV, and PNG).
- Utilities – A set of endpoints for access to COVE utilities.

Other COVE API endpoints included in this document are:

- Missions
  - forecasted – An endpoint for Acquisition Forecaster, Coincident Calculator, and Revisits Calculator which lists details on forecasted missions available.
  - archived – An endpoint for Coverage Analyzer, Coincident Calculator, and Data Browser which lists details on archived missions available.
- Custom Missions – A pair of endpoints which provides users with the ability to list details on available custom missions, and create new custom missions and custom instruments.
- Regions – A set of endpoints which provides users with the ability to list, retrieve details, import (KML string, KML file, or shapefile), export (KML file, shapefile, or as a PNG).

Acquisition Forecaster

Acquisition Forecaster is tool that provides users with the ability to predict when a satellite has the ability to image a region of interest. Users may send requests for a task history, submit a new task, get a task status, retrieve a CSV with scene metadata, and retrieve a PNG map image of the task results.

Acquisition Forecaster throttle limits:

- POST: 5 requests per hour
- GET: 25 requests per hour

Retrieve task history

Lists all Acquisition Forecaster tasks in COVE for the user. The results include task ids which will allow users to retrieve results for existing tasks.

Request Method: GET

Request URL:
https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/

URL Parameters: None

Response Example:

```
[
  {
    "task_id": "<TASK ID>",
    "missions": [
      {
        "mission": "Sentinel-1A",
        "instrument": "C-SAR",
        "mode": "IWS"
      }, {
        "mission": "Sentinel-2A",
        "instrument": "MSI",
        "mode": ""
      }
    ],
    "custom_missions": [{
      "mission": "MissionA",
```

```
        "instrument": "BeamA"
      }],
      "start_date": "2019-01-01",
      "end_date": "2019-01-08",
      "region": "Ghana"
    }
]
```


Submit a task

Task Input Parameters for Acquisition Forecaster:

Parameter Name	*Data Type*	*Required*	*Description*
start_date	DateString	Yes	Range: mission launch date to three months from the latest TLE date. Valid dates may be found by submitting a COVE API request for the Missions forecasted list. Refer to the Special Data Types section for more information on DateString.
end_date	DateString	Yes	Range: mission launch date to three months from the latest TLE date. Valid dates may be found by submitting a COVE API request for the Missions forecasted list. Refer to the Special Data Types section for more information on DateString.
region_folder	String	Yes	Valid folder names may be found by requesting the Regions list.
region	String	Yes	Valid region names may be found by submitting a COVE API request for the Regions list.
custom_missions	CustomMissionsFilter []	No	Available custom missions may be found by submitting a COVE API request for the Custom Missions list. Refer to the Special Data Types

			section for more information on CustomMissionsFilter.
missions	MissionsFilter[]	No	Valid missions may be found by submitting a COVE API request for the Missions forecasted list. Refer to the Special Data Types section for more information on MissionsFilter.
calculate_solar_angles	Boolean	No	If true, solar elevation, solar azimuth, and solar zenith will be calculated for each forecasted scene. If false, some forecasted scenes may have solar angles calculated if the scenes were cached by COVE in another task.

Request Data Example:

```
{
  "start_date": "2020-01-01",
  "end_date": "2020-01-31",
  "region_folder": "Africa",
  "region": "Kenya",
  "custom_missions": [{
    "mission": "MissionA",
    "instrument": "BeamA"
  }],
  "missions": [{
    "mission": "Sentinel-1A",
    "instrument": "C-SAR",
    "mode": "IWS"
  }]
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/

URL Parameters: None

Response Examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Acquisition Forecaster task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Acquisition Forecaster results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has predicted scenes.

If a status code 200 is received, users may send a request for CSV or PNG results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/<TASK ID>/

URL Parameters: None

Response Example:

{
"execution_start": "2020-09-16 18:19:19",
"execution_time": "00:01:34",
"start_date": "2017-01-01",
"end_date": "2017-01-08",
"modes": "MSI - Sentinel-2A,IWS - C-SAR - Sentinel-1A,BeamA – MissionA",

```
   "region": "Ghana",
   "complete": true,
   "status": 200,
   "message": "Task successfully completed.",
   "success": true
}
```


Retrieve CSV file

The CSV file (binary) will contain the predicted scene metadata generated for the task. The CSV file contains the columns: mission, acquisition_time, tle_epoch, center_latitude, center_longitude, and orbit_direction. For extended, CSV file also contains the columns: sun_elevation, sun_zenith, sun_azimuth, and scene_coords.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/csv/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
extended	Boolean	No	Values: true or false. If true, full extended CSV is returned. If false, abbreviated CSV is returned. Default value is false.

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Retrieve PNG results

The PNG image file is a map image which outlines scenes on a map of the requested region of interest within the start date and end date for the task.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
orbit_direction	String	No	Values: ascending or descending. No value for orbit_direction will return results for both ascending and descending.
transparent	Boolean	No	Values: true or false. If transparent is true, the map background will be omitted and the background will instead be transparent. If transparent is false, image resolution is 200dpi.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.
line_width	Float	No	Values should be greater than 0. Allows users to define the line width of scene footprint outlines. This parameter does not apply to region outlines. Default value is 0.5.
show_region_outline	Boolean	No	Values: true or false. Allows users to show or hide the region outline.

map_coordinates	*Boolean*	*No*	*Values: true or false.* *Allows users to fetch the map coordinates used to generate a PNG image.* *If value is true, the map coordinates will be returned **instead of** a PNG image.* *If an orbit_direction parameter is used to generate an image, it should be included in requests for map coordinates.*
map_legend	Boolean	No	Values: true or false. Allows users to fetch the map legend used to generate a PNG image. If value is true, the map legend will be returned **instead of** a PNG image.

Map Coordinates Response Example:


```
{
  "status": 200,
  "map_coordinates": [
    [-8.661654877310252, -0.16135473389262667],
    [-8.661654877310252, 14.838645266107374],
    [6.3383451226897485, 14.838645266107374],
    [6.3383451226897485, -0.16135473389262667],
    [-8.661654877310252, -0.16135473389262667]
  ]
}
```


Map Legend Response Example:


```
{
  "status": 200,
  "map_legend": {
    "ALOS-2 – PALSAR-2 – Full Accessible": "#fc8d59"
  }
}
```

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Example API requests using curl

Request user history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/

Request for Acquisition Forecaster task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"start_date": "2017-01-01", "end_date": "2017-01-08", "region_folder": "Africa", "region": "Ghana", "custom_missions": [{"mission": "MissionA", "instrument": "InstA"}], "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"}, {"mission": "Sentinel-2A", "instrument": "MSI"}]}' https://ceos-cove.org/en/api/acquisition_forecaster/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/<TASK ID>/

Request CSV results:

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/csv/<TASK ID>/ -o filename.csv

Request CSV results (extended):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/csv/<TASK ID>/?extended=true -o filename.csv

Request PNG map image (orbit direction: all):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/ -o filename.png

Request PNG map image (orbit direction: ascending):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?orbit_direction=ascending -o filename.png

Request PNG map image (orbit direction: descending):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?orbit_direction=descending -o filename.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?transparent=true -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?resolution=200 -o filename.png

Request PNG map image (line_width):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?line_width=0.5 -o filename.png

Request PNG map image (show_region_outline):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?show_region_outline=false -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true -o filename.png

Request PNG map image (map_coordinates with orbit_direction):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&orbit_direction=ascending -o filename.png

Request PNG map image (map_legend):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?map_legend=true -o filename.png

Request PNG map image (map_legend with orbit_direction):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?map_legend=true&orbit_direction=ascending -o filename.png

Request PNG map image (map_coordinates with map_legend):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&map_legend=true -o filename.png

Request PNG map image (map_coordinates with map_legend and orbit_direction):

curl -u username:password https://ceos-cove.org/en/api/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&map_legend=true&orbit_direction=ascending -o filename.png

Coverage Analyzer

Coverage Analyzer is a tool that provides users with the ability to analyze the historical satellite coverage of a region of interest. Users may send requests for a task history, submit a new task, get a task status, retrieve a CSV with scene metadata, retrieve a PNG map image of the task results, retrieve a GeoTiff file, and retrieve a NetCDF file.

Coverage Analyzer throttle limits:

- POST: 5 requests per hour
- GET: 25 requests per hour

Retrieve user history

Lists all Coverage Analyzer tasks in COVE for the user. The results include task ids which will allow users to retrieve results for existing tasks.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/

URL Parameters: None

Response Example:

```
[
  {
    "task_id": "<TASK ID>",
    "missions": [
      {
        "mission": "Sentinel-2A",
        "instrument": "MSI",
        "mode": ""
      }
    ],
    "start_date": "2019-01-01",
    "end_date": "2019-01-08",
    "region": "Ghana"
    "filter_options": {}
  },
]
```

Submit a task

Task Input Parameters for Coverage Analyzer:

Parameter Name	*Data Type*	*Required*	*Description*
start_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on DateString.
end_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on DateString.
region_folder	String	Yes	Valid folder names may be found by requesting the regions list.
region	String	Yes	Valid region names may be found by submitting a COVE API request for the regions list.
missions	MissionsFilter[]	Yes	Valid missions may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on MissionsFilter.
discretization	DiscretizationFilter	Yes	Refer to the Special Data Types section for more information on DiscretizationFilter.
filters	MetadataFilter	No	Refer to the Special Data Types section for more information on MetadataFilter.

Request Data Example:


```
{
   "start_date": "2020-01-01",
   "end_date": "2020-01-31",
   "region_folder": "South America",
   "region": "Argentina",
   "missions": [{
      "mission": "Sentinel-1A",
      "instrument": "C-SAR",
      "mode": "IWS"
   }],
   "discretization": {
      "type": "",
      "size": 1.0,
      "unit": "deg",
      "include_overlap": false
   },
   "filters": {
      "cloud_cover": null,
      "day_night": "",
      "orbit_direction": "",
      "processing_level": ""
   }
}
```


Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/

URL Parameters: None

Response Examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Coverage Analyzer task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Coverage Analyzer results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has scene data.

If a status code 200 is received, users may send a request for CSV, PNG, NetCDF, or GeoTIFF results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/<TASK ID>/

URL Parameters: None

Response Example:

{
  "execution_start": "2020-09-18 11:56:42",
  "execution_time": "00:01:02",
  "start_date": "2019-01-01",
  "end_date": "2019-01-08",
  "modes": "IWS - C-SAR – Sentinel-1A",
  "region": "Africa: Ghana",
  "discretization": "0.5 deg",
  "filter_options": {},
  "complete": true,
  "status": 200,
  "message": "Task successfully completed.",
  "success": true
}

Retrieve JSON results

The JSON results will contain a list of coordinates for each discretized block in the region of interest. In each discretized block, it will show a title, and count of scenes in the block.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/json/<TASK ID>/

URL Parameters: None

Response Example:


```
{

   "0.0,5.0,0.0,6.0,1.0,6.0,1.0,5.0,0.0,5.0": {
      "title": "Region Discretization Longitude 0.0, Latitude 5.0",
      "acquisition_count": 2
   },
 (JSON RESULTS TRUNCATED)
}
```


Retrieve CSV results

The CSV file (binary) will contain the scene metadata for the task. The CSV file contains the columns: mission, name, acquisition_date, browse_url, order_url, start_time, stop_time, center_latitude, center_longitude, path, row, day_or_night, cloud_cover, sensor, sun_elevation, sun_azimuth, and scene_coords.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/csv/<TASK ID>/

URL Parameters: None

Failed Response Example:


```
{'status': 404, 'message': 'File not found.'}
```

Retrieve PNG results

The PNG image file shows the discretized region of interest on a map where the color of each block in the discretized region reflects the number of scenes intersecting the block for the start date and end date and for the missions requested in the task.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
transparent	Boolean	No	Values: true or false. If transparent is true, the map background will be omitted and the background will instead be transparent. If transparent is false, image resolution is 200dpi.
transparency	Float	No	Values should be between 0 and 1. Transparency defines the opacity of the coincidence results. Transparency does not apply to the region outline. Default transparency is 0.65.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.

show_region_outline	*Boolean*	*No*	*Values: true or false.* *Allows users to show or hide the region outline.*
map_coordinates	Boolean	No	Values: true or false. Allows users to fetch the map coordinates used to generate a PNG image. If value is true, the map coordinates will be returned **instead of** a PNG image.
map_legend	Boolean	No	Values: true or false. Allows users to fetch the map legend used to generate a PNG image. If value is true, the map legend will be returned **instead of** a PNG image. The number range on the left side of the map legend represents the number of scenes in the block.

Map Coordinates Response Example:


```
{
  "status": 200,
  "map_coordinates": [
    [-8.661654877310252, -0.16135473389262667],
    [-8.661654877310252, 14.838645266107374],
    [6.3383451226897485, 14.838645266107374],
    [6.3383451226897485, -0.16135473389262667],
    [-8.661654877310252, -0.16135473389262667]
  ]
}
```


Map Legend Response Example:


```
{
  "status": 200,
  "map_legend": {
```

```
      "0 - 0": "#d73027",
      "1 - 1": "#f46d43",
      "2 - 2": "#fdae61",
      "3 - 3": "#fee08b",
      "4 - 4": "#ffffbf",
      "5 - 5": "#d9ef8b",
      "6 - 6": "#a6d96a",
      "7 - 7": "#66bd63",
      "8 - 9": "#1a9850"
   }
}
```


Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Retrieve GeoTIFF results

The file exported will be in GeoTIFF format (file extension .tif).

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/geotiff/<TASK ID>/

URL Parameters: None

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Retrieve NetCDF results

The file exported will be in NetCDF format (file extension .nc).

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coverage_analyzer/netcdf/<TASK ID>/

URL Parameters: None

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Example API requests using curl

Request user history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coverage_analyzer/

Request for Coverage Analyzer task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"start_date": "2019-01-01", "end_date": "2019-01-08", "region_folder": "Africa", "region": "Ghana", "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"}], "discretization": {"type": "", "size": 1.0, "unit": "deg"}, "filters": {"cloud_cover": null, "day_night": "", "orbit_direction": "", "processing_level": ""}}' https://ceos-cove.org/en/api/coverage_analyzer/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coverage_analyzer/<TASK ID>/

Request JSON File:

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/json/<TASK ID>/ -o filename.csv

Request CSV File:

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/csv/<TASK ID>/ -o filename.csv

Request PNG map image:

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/<TASK ID>/ -o filename.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/<TASK ID>/?transparent=true -o filename.png

Request PNG map image (transparency):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/<TASK ID>/?transparency=0.65 -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/<TASK ID>/?resolution=200 -o filename.png

Request PNG map image (show_region_outline):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/<TASK ID>/?show_region_outline=false -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/<TASK ID>/?map_coordinates=true -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/
<TASK ID>/?map_legend=true -o filename.png

Request PNG map image (map_coordinates with map_legend):

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/png/
<TASK ID>/?map_coordinates=true&map_legend -o filename.png

Request GeoTIFF File:

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/geotiff/
<TASK ID>/ -o filename.tif

Request NetCDF File:

curl -u username:password https://ceos-cove.org/en/api/coverage_analyzer/netcdf/<TASK ID>/ -o filename.nc

Revisits Calculator

Revisits Calculator is a tool which allows users to analyze estimated satellite coverage and revisits for a region of interest. Users may send requests for a task history, submit a new task, get a task status, retrieve JSON results, retrieve a CSV with scene metadata, and retrieve a PNG map image of the task results.

Revisits Calculator throttle limits:

- POST: 5 requests per hour
- GET: 25 requests per hour

Retrieve user history

Lists all Revisits Calculator tasks in COVE for the user. The results include task ids which will allow users to retrieve results for existing tasks.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/revisits_calculator/

URL Parameters: None

Response Example:


```
[
  {
    "task_id": "<TASK ID>",
    "missions": [
      {
        "mission": "Sentinel-1A",
        "instrument": "C-SAR",
        "mode": "IWS"
      }, {
        "mission": "Sentinel-2A",
        "instrument": "MSI",
        "mode": ""
      }
    ],
    "custom_missions": [{
      "mission": "MissionA",
```

```
        "instrument": "BeamA"
      }],
      "start_date": "2019-01-01",
      "end_date": "2019-01-08",
      "region": "Ghana"
   }
]
```


Submit a task

Task Input Parameters for Revisits Calculator:

Parameter Name	*Data Type*	*Required*	*Description*
start_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on DateString.
end_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on DateString.
region_folder	String	Yes	Valid folder names may be found by requesting the regions list.
region	String	Yes	Valid region names may be found by submitting a COVE API request for the regions list.
custom_missions	CustomMissionsFilter []	No	Available custom missions may be found by submitting a COVE API request for the custom missions list. Refer to the Special Data Types section for more information on CustomMissionsFilter.

missions	MissionsFilter[]	No	Valid missions may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on MissionsFilter.
discretization	DiscretizationFilter	Yes	Refer to the Special Data Types section for more information on DiscretizationFilter.

Request Data Example:

```
{
   "start_date": "2020-01-01",
   "end_date": "2020-01-31",
   "region_folder": "Africa",
   "region": "Botswana",
   "custom_missions": [],
   "missions": [{
      "mission": "Sentinel-2A",
      "instrument": "MSI",
      "mode": ""
   }],
   "discretization": {
      "type": "S2Tiling",
      "size": null,
      "unit": ""
   }
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/revisits_calculator/

URL Parameters: None

Response Examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Revisits Calculator task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Revisits Calculator results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has scene data.

If a status code 200 is received, users may send a request for JSON, CSV, or PNG results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/revisits_calculator/<TASK ID>/

URL Parameters: None

Response Example:

{
  "execution_start": "2020-09-17 22:27:20",
  "execution_time": "00:00:07",
  "start_date": "2019-01-02",
  "end_date": "2019-01-03",
  "modes": "IWS - C-SAR – Sentinel-1A",
  "region": "Africa: Ghana",
  "discretization": "1.0 deg",
  "complete": true,
  "status": 200,
  "message": "Task successfully completed.",
  "success": true
}

Retrieve JSON results

The JSON results will contain a list of coordinates for each discretized block in the region of interest. In each discretized block, it will show a title, count of scenes in the block, mean time between revisits, median time between revisits, maximum time between revisits, and minimum time between revisits in the block for ascending orbit, descending orbit, or both.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/revisits_calculator/json/<TASK ID>/

URL Parameters: None

Response Example:


```
{
   "0.0,5.0,0.0,6.0,1.0,6.0,1.0,5.0,0.0,5.0": {
      "title": "Region Discretization Longitude 0.0, Latitude 5.0",
         "revisits": 2,
         "minimum": "12:23:00",
         "median": "12:23:00",
         "mean": "12:23:00",
         "maximum": "12:23:00",
         "desc_revisits": 1,
         "desc_minimum": "0:00:00",
         "desc_median": "0:00:00",
         "desc_mean": "0:00:00",
         "desc_maximum": "0:00:00",
         "count": 2,
         "asc_revisits": 1,
         "asc_minimum": "0:00:00",
         "asc_median": "0:00:00",
         "asc_mean": "0:00:00",
         "asc_maximum": "0:00:00"
   },
 (JSON RESULTS TRUNCATED)
}
```

Retrieve CSV results

The CSV file (binary) will contain the scene metadata for the task. The CSV file contains the columns: mission, acquisition_time, tle_epoch, center_latitude, center_longitude, and orbit_direction. For extended, CSV file also contains the columns: sun_elevation, sun_zenith, sun_azimuth, and scene_coords.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/revisits_calculator/csv/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
extended	Boolean	No	Values: true or false. If true, full extended CSV is returned. If false, abbreviated CSV is returned. Default value is false.

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}

{"status": 417, "message": "<Error Message>"}

Retrieve PNG results

The PNG image file shows the discretized region of interest on a map where the color of each block in the discretized region reflects the number of times missions/custom missions intersect the block within the start date and end date for the task.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
orbit_direction	String	No	Values: ascending or descending. No orbit_direction will return results for both ascending and descending.
transparent	Boolean	No	Values: true or false. If transparent is true, the map background will be omitted and the background will instead be transparent. If transparent is false, image resolution is 200dpi.
transparency	Float	No	Values should be between 0 and 1. Transparency defines the opacity of the coincidence results. Transparency does not apply to the region outline. Default transparency is 0.65.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.
show_region_outline	Boolean	No	Values: true or false. Allows users to show or hide the region outline.

map_coordinates	*Boolean*	*No*	*Values: true or false.* *Allows users to fetch the map coordinates used to generate a PNG image.* *If value is true, the map coordinates will be returned **instead of** a PNG image.*
map_legend	Boolean	No	Values: true or false. Allows users to fetch the map legend used to generate a PNG image. If value is true, the map legend will be returned **instead of** a PNG image. The number range on the left side of the map legend represents the number of revisits in the block.

Map Coordinates Response Example:


```
{
  "status": 200,
  "map_coordinates": [
    [-8.661654877310252, -0.16135473389262667],
    [-8.661654877310252, 14.838645266107374],
    [6.3383451226897485, 14.838645266107374],
    [6.3383451226897485, -0.16135473389262667],
    [-8.661654877310252, -0.16135473389262667]
  ]
}
```


Map Legend Response Example:


```
{
  "status": 200,
  "map_legend": {
    "0 - 3": "#d73027",
    "4 - 7": "#f46d43",
    "8 - 11": "#fdae61",
```

```
      "12 - 15": "#fee08b",
      "16 - 19": "#ffffbf",
      "20 - 23": "#d9ef8b",
      "24 - 27": "#a6d96a",
      "28 - 31": "#66bd63",
      "32 - 36": "#1a9850"
   }
}
```


Failed Response Examples:


```
{'status': 404, 'message': 'File not found.'}
```

Example API requests using curl

Request user history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/revisits_calculator/

Request for Revisits Calculator task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"start_date": "2019-01-01", "end_date": "2019-01-08", "region_folder": "Africa", "region": "Ghana", "custom_missions": [], "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"}], "discretization": {"type": "", "size": 1.0, "unit": "deg"}}' https://ceos-cove.org/en/api/revisits_calculator/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/revisits_calculator/<TASK ID>/

Request JSON File:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/revisits_calculator/json/<TASK ID>/

Request CSV File:

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/csv/<TASK ID>/ -o filename.csv

Request CSV File (extended):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/csv/<TASK ID>/?extended=true -o filename.csv

Request PNG map image:

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/ -o filename.png

Request PNG map image (orbit direction: ascending):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?orbit_direction=ascending -o filename.png

Request PNG map image (orbit direction: descending):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?orbit_direction=descending -o filename.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?transparent=true -o filename.png

Request PNG map image (transparency):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?transparency=0.65 -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?resolution=200 -o filename.png

Request PNG map image (show_region_outline):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?show_region_outline=false -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?map_coordinates=true -o filename.png

Request PNG map image (map_legend):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?map_legend=true -o filename.png

Request PNG map image (map_coordinates with map_legend):

curl -u username:password https://ceos-cove.org/en/api/revisits_calculator/png/<TASK ID>/?map_coordinates=true&map_legend=true -o filename.png

Coincident Calculator

Coincident Calculator is a tool which allows users to determine the coincidence of satellite instrument modes and/or custom constellations observing a location in the same day within a region of interest using historical (archived) or predicted (forecasted) scene data. Users may send requests for a task history, submit a new task, get a task status, retrieve JSON results, and retrieve a PNG map image of the task results.

Coincident Calculator throttle limits:

- POST: 5 requests per hour
- GET: 25 requests per hour

Forecasted Task

Retrieve forecasted constellations list

Lists all custom forecasted constellations in Coincident Calculator in COVE for the user.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/constellations/

URL Parameters: None

Response Example:


```
{
  "constellations": {
    "Landsat 7/8": {
      "missions": [
        "Landsat 7 – ETM",
        "Landsat 8 – TIRS"
      ],
      "custom_missions": []
    },
    "CBERS4_SatA": {
      "missions": [
        "CBERS-4 – MUXCam"
      ],
```

```
        "custom_missions": [
          "SatA – BeamA"
        ]
      }
    }
}
```

Create constellation

Create a constellation from existing forecasted missions and/or custom mission.

Task Input Parameters for Coincident Calculator (Forecasted):

Parameter Name	*Data Type*	*Required*	*Description*
constellation	String	Yes	Name of constellation
custom_missions	CustomMissionsFilter[]	No	Available custom missions may be found by submitting a COVE API request for the custom missions list. Refer to the Special Data Types section for more information on CustomMissionsFilter.
missions	MissionsFilter[]	No	Valid missions may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on MissionsFilter.

Request Data Example:

```
{
  "name": "SatGroup",
  "custom_missions": [
    {
      "mission”: "SatA",
      "instrument": "BeamA"
    }
  ],
  "missions": [
    {
      "mission": "Sentinel-1A",
```

```
        "instrument": "C-SAR",
        "mode": "IWS"
      },
    ],
}
```


Request Method: POST

Request URL:
https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/constellations/

URL Parameters: None

Response Examples:
Example successful response:

{"status": 200, "message": "Constellation created successfully"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve user history

Lists all forecasted Coincident Calculator tasks in COVE for the user. The results include task ids which will allow users to retrieve results for existing tasks.

Request Method: GET

Request URL:
https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/

URL Parameters: None

Response Example:

```
[
  {
    "task_id": "<TASK ID>",
    "missions": [
      {
        "mission": "Sentinel-1A",
```

```
            "instrument": "C-SAR",
            "mode": "IWS"
          }, {
            "mission": "Sentinel-2A",
            "instrument": "MSI",
            "mode": ""
          }
        ],
        "custom_missions": [],
        "constellations": [],
        "start_date": "2019-01-01",
        "end_date": "2019-01-08",
        "region": "Ghana",
        "coincidence_seconds": 86400
    },
]
```


Submit a task

Task Input Parameters for Coincident Calculator (Forecasted):

Parameter Name	*Data Type*	*Required*	*Description*
start_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on DateString.
end_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on DateString.
region_folder	String	Yes	Valid folder names may be found by requesting the regions list.
region	String	Yes	Valid region names may be found by submitting a COVE API request for the regions list.

constellations	ConstellationsFilter[]	No	Available constellations may be found by submitting a COVE API request for the forecasted constellations list. Refer to the Special Data Types section for more information on ConstellationsFilter.
custom_missions	CustomMissionsFilter[]	No	Available custom missions may be found by submitting a COVE API request for the custom missions list. Refer to the Special Data Types section for more information on CustomMissionsFilter.
missions	MissionsFilter[]	No	Valid missions may be found by submitting a COVE API request for the missions forecasted list. Refer to the Special Data Types section for more information on MissionsFilter.
discretization	DiscretizationFilter	Yes	Refer to the Special Data Types section for more information on DiscretizationFilter.
coincidence_days	integer	No	Range: 0 to 5, defaults to -1. Do not use coincidence_days if coincidence_seconds is specified. If neither coincidence_days or coincidence_seconds are specified, defaults to coincidence_days=0.

coincidence_seconds	*integer*	*No*	*Range: 0 to 432000, defaults to -1.* *Do not use coincidence_seconds if coincidence_days is specified.* *If neither coincidence_days or coincidence_seconds are specified, defaults to coincidence_days=0.*

Request Data Example:


```
{
   "start_date": "2020-01-01",
   "end_date": "2020-01-31",
   "region_folder": "North America",
   "region": "Canada",
   "constellations": [],
   "custom_missions": [],
   "missions": [
      {
         "mission": "Sentinel-1A",
         "instrument": "C-SAR",
         "mode": "IWS"
      }, {
         "mission": "Sentinel-2A",
         "instrument": "MSI",
         "mode": ""
      }
   ],
   "discretization": {
      "size": 1.0,
      "unit": "deg"
   },
   "coincidence_seconds": 86400
}
```


Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/

URL Parameters: None

Response Examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Coincident Calculator task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Coincident Calculator results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has scene data.

If a status code 200 is received, users may send a request for JSON or PNG results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/<TASK ID>/

URL Parameters: None

Response Example:

{
"execution_start": "2020-09-14 12:38:34",
"execution_time": "00:00:04",
"start_date": "2019-01-01",
"end_date": "2019-01-08",
"modes": "IWS - C-SAR - Sentinel-1A, MSI – Sentinel-2A",

```
  "constellations": "",
  "region": "Ghana",
  "discretization": "1.0 deg",
  "coincidence_seconds": 86400,
  "complete": true,
  "status": 200,
  "message": "Task successfully completed.",
  "success": true
}
```


Retrieve JSON results

The JSON results will contain a list of coordinates for each discretized block in the region of interest. In each discretized block, it will show a title, coincidence dates, scene (acquisition) metadata, coincidence count, coincidence (dates and count) where scenes are ascending, coincidence where scenes are descending.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/json/<TASK ID>/

URL Parameters: None

Response Example:


```
{
  "0.0,8.0,0.0,9.0,1.0,9.0,1.0,8.0,0.0,8.0": {

    "title": "Region Discretization Longitude 0.0, Latitude 8.0",
    "coincidence": "2019-01-06",
    "acquisitions": [
      {
        "name": "Landsat 8 - TIRS",
        "acquisition_time": "2019-01-06 10:20:30",
        "tle_epoch": "2019-01-06 02:58:25",
        "final_prediction": false,
        "db_insert_date": "2020-09-18",
        "center_latitude": 10.27,
        "center_longitude": -0.57,
        "orbit_direction": "Descending",
        "scene_coords": "0.6660363424876055,11.962612495110209,-1.014522933011194,12.203808739278776,-
1.7926181561449557,8.578126402975682,-
0.13054000602536892,8.339640664025538,0.6660363424876055,11.962612495110209"
      },
```

```
        {
          "name": "CBERS-4 - MUXCam",
          "acquisition_time": "2019-01-06 22:05:30",
          "tle_epoch": "2019-01-06 22:03:25",
          "final_prediction": false,
          "db_insert_date": "2020-09-18",
          "center_latitude": 7.42,
          "center_longitude": -0.39,
          "orbit_direction": "Ascending",
          "scene_coords": "-0.5336858426123086,5.553900730294913,0.5330482808132545,5.710459991383701,-
0.24584157033903395,9.280660729314569,-1.320750071368642,9.12287381737216,-
0.5336858426123086,5.553900730294913"
        }
      ],
      "coincidence_asc": "",
      "coincidence_desc": "",
      "coincidence_count": 1,
      "coincidence_asc_count": 0,
      "coincidence_desc_count": 0
    },
    (JSON RESULTS TRUNCATED)
}
```


Retrieve PNG results

The PNG image file shows the discretized region of interest on a map where the color of each block in the discretized region reflects the number of pairs of missions/custom missions/constellations intersecting the block within the start date and end date for the task.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
orbit_direction	String	No	Values: ascending or descending. No orbit_direction will return results for both ascending and descending.

transparent	*Boolean*	*No*	*Values: true or false.* *If transparent is true, the map background will be omitted and the background will instead be transparent.* *If transparent is false, image resolution is 200dpi.*
transparency	Float	No	Values should be between 0 and 1. Transparency defines the opacity of the coincidence results. Transparency does not apply to the region outline. Default transparency is 0.65.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.
show_region_outline	Boolean	No	Values: true or false. Allows users to show or hide the region outline.
map_coordinates	Boolean	No	Values: true or false. Allows users to fetch the map coordinates used to generate a PNG image. If value is true, the map coordinates will be returned **instead of** a PNG image.

map_legend	*Boolean*	*No*	*Values: true or false.* *Allows users to fetch the map legend used to generate a PNG image.* *If value is true, the map legend will be returned **instead of** a PNG image.* *The number range on the left side of the map legend represents the number of coincidences in the block.*

Map Coordinates Response Example:


```
{
   "status": 200,
   "map_coordinates": [
      [-8.661654877310252, -0.16135473389262667],
      [-8.661654877310252, 14.838645266107374],
      [6.3383451226897485, 14.838645266107374],
      [6.3383451226897485, -0.16135473389262667],
      [-8.661654877310252, -0.16135473389262667]
   ]
}
```


Map Legend Response Example:


```
{
   "status": 200,
   "map_legend": {
      "0 - 0": "#d73027",
      "1 - 1": "#f46d43",
      "2 - 2": "#fdae61",
      "3 - 3": "#fee08b",
      "4 - 4": "#ffffbf",
      "5 - 5": "#d9ef8b",
      "6 - 6": "#a6d96a",
      "7 - 7": "#66bd63",
      "8 - 9": "#1a9850"
   }
}
```

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Example API requests using curl

Request user history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/

Request for Forecasted Coincident Calculator task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"start_date": "2019-01-01", "end_date": "2019-01-08", "region_folder": "Africa", "region": "Ghana", "constellations": [], "custom_missions": [], "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"}, {"mission": "Sentinel-2A", "instrument": "MSI"}], "discretization": {"size": 1.0, "unit": "deg"}, "coincidence_seconds": 86400}' https://ceos-cove.org/en/api/coincident_calculator/forecasted/

Request forecasted custom constellations list:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/constellations/

Create forecasted custom constellation:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"name": "SatGroup - F", "custom_missions": [], "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"},{"mission": "Sentinel-2A", "instrument": "MSI"}]' https://ceos-cove.org/en/api/coincident_calculator/forecasted/constellations/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/<TASK ID>/

Request JSON File:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/json/<TASK ID>/

Request PNG map image:

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/ -o filename.png

Request PNG map image (orbit direction: ascending):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?orbit_direction=ascending -o filename.png

Request PNG map image (orbit direction: descending):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?orbit_direction=descending -o filename.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?transparent=true -o filename.png

Request PNG map image (transparency):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?transparency=0.65 -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?resolution=200 -o filename.png

Request PNG map image (show_region_outline):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?show_region_outline=false -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?map_coordinates=true -o filename.png

Request PNG map image (map_legend):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?map_legend=true -o filename.png

Request PNG map image (map_coordinates with map_legend):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/forecasted/png/<TASK ID>/?map_coordinates=true&map_legend=true -o filename.png

Archived Task

Retrieve archived constellations list

Lists all custom archived constellations in Coincident Calculator in COVE for the user.

Request Method: GET

Request URL:
https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/constellations/

URL Parameters: None

Response Example:


```
{
  "constellations": {
    "L7/8": [
      "Landsat 7 – ETM",
      "Landsat 8 – OLI/TIRS"
    ],
    "S1": [
      "Sentinel-1A - C-SAR – EW",
      "Sentinel-1A - C-SAR – IWS",
      "Sentinel-1A - C-SAR – SM",
      "Sentinel-1A - C-SAR – WV",
      "Sentinel-1B - C-SAR – EW",
      "Sentinel-1B - C-SAR – IWS",
      "Sentinel-1B - C-SAR – SM",
      "Sentinel-1B - C-SAR – WV"
    ]
  }
}
```


Create constellation

Create a constellation from existing archived missions.

Task Input Parameters for Coincident Calculator (Archived):

Parameter Name	*Data Type*	*Required*	*Description*
constellation	String	Yes	Name of constellation
missions	MissionsFilter[]	No	Valid missions may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on MissionsFilter.

Request Data Example:

```
{
   "name": "SatGroup",
   "missions": [
      {
         "mission": "Sentinel-1A",
         "instrument": "C-SAR",
         "mode": "IWS"
      },
      {
         "mission": "Sentinel-2A",
         "instrument": "MSI",
         "mode": ""
      },
   ],
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/constellations/

URL Parameters: None

Response Examples:

Example successful response:

```
{"status": 200, "message": "Constellation created successfully"}
```

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve user history

Lists all archived Coincident Calculator tasks in COVE for the user. The results include task ids which will allow users to retrieve results for existing tasks.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/

URL Parameters: None

Response Example:


```
[
  {
    "task_id": "<TASK ID>",
    "missions": [
      {
        "mission": "Sentinel-1A",
        "instrument": "C-SAR",
        "mode": "IWS"
      }, {
        "mission": "Landsat 8",
        "instrument": "OLI/TIRS",
        "mode": ""
      }
    ],
    "constellations": [],
    "start_date": "2019-01-01",
    "end_date": "2019-01-08",
    "region": "Ghana",
    "coincidence_seconds": 86400
  }
]
```

Submit a task

Task Input Parameters for Coincident Calculator (Archived):

Parameter Name	*Data Type*	*Required*	*Description*
start_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on DateString.
end_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on DateString.
region_folder	String	Yes	Valid folder names may be found by requesting the regions list.
region	String	Yes	Valid region names may be found by submitting a COVE API request for the regions list.
constellations	ConstellationsFilter[]	No	Valid constellations may be found by submitting a COVE API request for the archived constellations list. Refer to the Special Data Types section for more information on ConstellationsFilter.
missions	MissionsFilter[]	Yes	Valid missions may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on MissionsFilter.
discretization	DiscretizationFilter	Yes	Refer to the Special Data Types section for more information on DiscretizationFilter.

coincidence_days	integer	No	Range: 0 to 5, defaults to -1. Do not use coincidence_days if coincidence_seconds is specified. If neither coincidence_days or coincidence_seconds are specified, defaults to coincidence_days=0.
coincidence_seconds	integer	No	Range: 0 to 432000, defaults to -1. Do not use coincidence_seconds if coincidence_days is specified. If neither coincidence_days or coincidence_seconds are specified, defaults to coincidence_days=0.

Request Data Example:


```
{
   "start_date": "2020-01-01",
   "end_date": "2020-01-31",
   "region_folder": "Oceania",
   "region": "Australia",
   "constellations": [],
   "missions": [],
   "discretization": {
      "size": 1.0,
      "unit": "deg"
   },
   "coincidence_seconds": 172800
}
```


Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/

URL Parameters: None

Response examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Coincident Calculator task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Coincident Calculator results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has scene data.

If a status code 200 is received, users may send a request for JSON or PNG results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/<TASK ID>/

URL Parameters: None

Response Example:

{
"execution_start": "2020-09-14 12:31:41",
"execution_time": "00:01:02",
"start_date": "2019-01-01",
"end_date": "2019-01-08",

```
  "modes": "IWS - C-SAR - Sentinel-1A, MSI - Sentinel-2A, OLI/TIRS - Landsat 8",
  "constellations": "",
  "region": "Africa: Ghana",
  "discretization": "5.0 deg",
  "coincidence_seconds": 0,
  "complete": true,
  "status": 200,
  "message": "Task successfully completed.",
  "success": true
}
```


Retrieve JSON results

The JSON results will contain a list of coordinates for each discretized block in the region of interest. In each discretized block, it will show a title, coincidence dates, scene (acquisition) metadata, coincidence count, coincidence (dates and count) where scenes are ascending, coincidence where scenes are descending.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/json/<TASK ID>/

URL Parameters: None

Response Example:


```
[
  "-4.0,11.0,-4.0,12.0,-3.0,12.0,-3.0,11.0,-4.0,11.0": {
      "title": "Region Discretization Longitude -4.0, Latitude 11.0",
    "coincidence": "2019-01-03",
    "acquisitions": [
      {
        "mission": "Sentinel-2A – MSI",
        "name": "6718341",
        "acquisition_date": "2019-01-03",
        "browse_url": <BROWSE JPG URL>,
        "order_url": <ORDER URL>,
        "sun_azimuth": 150.134493948532,
        "granule_name": "L1C_T30PVT_A018452_20190103T104928",
        "sun_elevation": 39.3260813690852,
        "scene_stop_time": "2019-01-03T11:00:14.693Z",
        "cloud_cover_full": 0.0,
```

```
            "scene_start_time": "2019-01-03T10:49:28.901Z",
            "scene_center_latitude": 11.2632574,
            "scene_center_longitude": -3.4135721,
            "orbit_direction": "Descending",
            "scene_coords": "-3.9181409,11.7585667,-2.9104213,11.76003,-2.910728,10.7670169,-3.914998,10.7656802,-
3.9181409,11.7585667"
         },
         {
            "mission": "Sentinel-1A - C-SAR – IWS",
            "name": "S1A_IW_SLC__1SDV_20190103T182746_20190103T182813_025317_02CD19_622F",
            "acquisition_date": "2019-01-03",
            "browse_url": <BROWSE JPG URL>,
            "order_url": <ORDER URL>,
            "path": 45,
            "frame": 32,
            "orbit": 25317,
            "scene_end_time": "2019-01-03T18:28:13.000000",
            "center_latitude": 11.562,
            "center_longitude": -3.8554,
            "processing_level": "SLC",
            "scene_start_time": "2019-01-03T18:27:46.000000",
            "sending_polarization": "VV",
            "receiving_polarization": "VH",
            "orbit_direction": "Ascending",
            "scene_coords": "-2.560575,10.969422,-4.81989,10.522881,-5.154573,12.152341,-
2.8816349999999997,12.594698,-2.560575,10.969422"
         }
      ],
      "coincidence_asc": "",
      "coincidence_desc": "",
      "coincidence_count": 1,
      "coincidence_asc_count": 0,
      "coincidence_desc_count": 0
   }
   (JSON RESULTS TRUNCATED)
]
```


Retrieve PNG results

The PNG image file shows the discretized region of interest on a map where the color of each block in the discretized region reflects the number of pairs of missions/constellations intersecting the block within the start date and end date for the task.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
orbit_direction	String	No	Values: ascending or descending. No value for orbit_direction will return results for both ascending and descending.
transparent	Boolean	No	Values: true or false. If transparent is true, the map background will be omitted and the background will instead be transparent. If transparent is false, image resolution is 200dpi.
transparency	Float	No	Values should be between 0 and 1. Transparency defines the opacity of the coincidence results. Transparency does not apply to the region outline. Default transparency is 0.65.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.
show_region_outline	Boolean	No	Values: true or false. Allows users to show or hide the region outline.

map_coordinates	Boolean	No	Values: true or false. Allows users to fetch the map coordinates used to generate a PNG image. If value is true, the map coordinates will be returned **instead of** a PNG image.
map_legend	Boolean	No	Values: true or false. Allows users to fetch the map legend used to generate a PNG image. If value is true, the map legend will be returned **instead of** a PNG image. The number range on the left side of the map legend represents the number of coincidences in the block.

Map Coordinates Response Example:


```
{
   "status": 200,
   "map_coordinates": [
      [-8.661654877310252, -0.16135473389262667],
      [-8.661654877310252, 14.838645266107374],
      [6.3383451226897485, 14.838645266107374],
      [6.3383451226897485, -0.16135473389262667],
      [-8.661654877310252, -0.16135473389262667]
   ]
}
```


Map Legend Response Example:


```
{
   "status": 200,
   "map_legend": {
      "0 - 0": "#d73027",
      "1 - 1": "#f46d43",
      "2 - 2": "#fdae61",
      "3 - 3": "#fee08b",
```

```
      "4 - 4": "#ffffbf",
      "5 - 5": "#d9ef8b",
      "6 - 6": "#a6d96a",
      "7 - 7": "#66bd63",
      "8 - 9": "#1a9850"
    }
}
```


Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Example API requests using curl

Request user history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/

Request for Archived Coincident Calculator task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"start_date": "2019-01-01", "end_date": "2019-01-08", "region_folder": "Africa", "region": "Ghana", "constellations": [], "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"},{"mission": "Sentinel-2A", "instrument": "MSI"}, {"mission": "Landsat 8", "instrument": "OLI/TIRS"}], "discretization": {"size": 5.0, "unit": "deg"}, "coincidence_seconds": 86400}' https://ceos-cove.org/en/api/coincident_calculator/archived/

Request archived custom constellations list:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/constellations/

Create archived custom constellation:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"name": "SatGroup - A", "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"},{"mission": "Sentinel-2A", "instrument": "MSI"}]' https://ceos-cove.org/en/api/coincident_calculator/archived/constellations/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/<TASK ID>/

Request JSON File:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/json/<TASK ID>/

Request PNG map image:

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/ -o filename.png

Request PNG map image (orbit direction: ascending):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?orbit_direction=ascending -o filename.png

Request PNG map image (orbit direction: descending):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?orbit_direction=descending -o filename.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?transparent=true -o filename.png

Request PNG map image (transparency):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?transparency=0.65 -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?resolution=200 -o filename.png

Request PNG map image (show_region_outline):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?show_region_outline=false -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?map_coordinates=true -o filename.png

Request PNG map image (map_legend):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?map_legend=true -o filename.png

Request PNG map image (map_coordinates with map_legend):

curl -u username:password https://ceos-cove.org/en/api/coincident_calculator/archived/png/<TASK ID>/?map_coordinates=true&map_legend=true -o filename.png

Data Browser

Data Browser is a tool that allows users to view the satellite image archives from multiple CEOS missions. Users may send requests for a task history, submit a new task, get a task status, retrieve a scene count for the task, retrieve CSV results of scene metadata, and retrieve a PNG map image of the task results.

Data Browser throttle limits:

- POST: 5 requests per hour
- GET: 25 requests per hour

Retrieve user history

Lists all Data Browser tasks in COVE for the user. The results include task ids which will allow users to retrieve results for existing tasks.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/data_browser/

URL Parameters: None

Response Example:


```
[
  {
    "task_id": "<TASK ID>",
    "missions": [
      {
        "mission": "Sentinel-1A",
        "instrument": "C-SAR",
        "mode": "IWS"
      }, {
        "mission": "Sentinel-2A",
        "instrument": "MSI",
        "mode": ""
      }
    ],
    "start_date": "2019-01-01",
```

```
    "end_date": "2019-01-08",
    "region": "Ghana",
    "filter_options": {}
  }
]
```


Submit a task

Task Input Parameters for Data Browser:

Parameter Name	*Data Type*	*Required*	*Description*
start_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on DateString.
end_date	DateString	Yes	Range: mission launch date to the latest acquisition date. Valid dates may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on DateString.
region_folder	String	Yes	Valid folder names may be found by requesting the regions list.
region	String	Yes	Valid region names may be found by submitting a COVE API request for the regions list.
missions	MissionsFilter[]	Yes	Valid missions may be found by submitting a COVE API request for the missions archived list. Refer to the Special Data Types section for more information on MissionsFilter.

filters	MetadataFilter	No	Refer to the Special Data Types section for more information on MetadataFilter.

Request Data Example:

```
{
   "start_date": "2020-01-01",
   "end_date": "2020-01-31",
   "region_folder": "Europe",
   "region": "Spain",
   "missions": [],
   "filters": {
      "cloud_cover": null,
      "day_night": "",
      "orbit_direction": "",
      "processing_level": ""
   }
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/data_browser/

URL Parameters: None

Response Examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Data Browser task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Data Browser results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has scene data.

If a status code 200 is received, users may send a request for JSON or PNG results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/data_browser/<TASK ID>/

URL Parameters: None

Response Example:


```
{
   "execution_start": "2020-09-14 12:31:41",
   "execution_time": "02:38:58",
   "start_date": "2019-01-01",
   "end_date": "2019-01-08",
   "modes": "OLI/TIRS - Landsat 8,IWS - C-SAR - Sentinel-1A,MSI – Sentinel-2A",
   "region": "Ghana",
   "filter_options": {},
   "complete": true,
   "status": 200,
   "message": "Task successfully completed.",
   "success": true
}
```


Retrieve scene count

Returns the number of scenes in the task results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/data_browser/count/<TASK ID>/

URL Parameters: None

Response Example:


```
{
   "status": 200,
   "count": 130
}
```


Retrieve CSV results

The CSV file (binary) will contain the scene metadata for the task. The CSV file contains the columns: mission, name, acquisition_date, browse_url, order_url, start_time, stop_time, center_latitude, and center_longitude. For extended CSV file also contains columns: path, row, day_or_night, cloud_cover, sensor, sun_elevation, sun_azimuth, and scene_coords.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/data_browser/csv/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
extended	Boolean	No	Values: true or false. If true, full extended CSV is returned. If false, abbreviated CSV is returned. Default value is false.

Failed Response Example:


```
{'status': 404, 'message': 'File not found.'}
```

Retrieve PNG results

The PNG image file is a map image which outlines scenes on a map of the requested region of interest within the start date and end date for the task.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
transparent	Boolean	No	Values: true or false. If transparent is true, the map background will be omitted and the background will instead be transparent. If transparent is false, image resolution is 200dpi.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.
line_width	Float	No	Values should be greater than 0. Allows users to define the line width of scene footprint outlines. This parameter does not apply to region outlines. Default value is 0.5.
show_region_outline	Boolean	No	Values: true or false. Allows users to show or hide the region outline.

map_coordinates	Boolean	No	Values: true or false. Allows users to fetch the map coordinates used to generate a PNG image. If value is true, the map coordinates will be returned **instead of** a PNG image.

Map Coordinates Response Example:


```
{
  "status": 200,
  "map_coordinates": [
    [-8.661654877310252, -0.16135473389262667],
    [-8.661654877310252, 14.838645266107374],
    [6.3383451226897485, 14.838645266107374],
    [6.3383451226897485, -0.16135473389262667],
    [-8.661654877310252, -0.16135473389262667]
  ]
}
```


Failed Response Example:


```
{'status': 404, 'message': 'File not found.'}
```

Example API requests using curl

Request user history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/data_browser/

Request for Data Browser task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"start_date": "2019-01-01", "end_date": "2019-01-08", "region_folder": "Africa", "region": "Ghana", "missions": [{"mission": "Sentinel-1A", "instrument": "C-SAR", "mode": "IWS"}], "filters": {"cloud_cover": null, "day_night": "", "orbit_direction": "asc", "processing_level": ""}}' https://ceos-cove.org/en/api/data_browser/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/data_browser/<TASK ID>/

Request scene count:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/data_browser/count/

Request CSV File:

curl -u username:password https://ceos-cove.org/en/api/data_browser/csv/<TASK ID>/ -o filename.csv

Request CSV File (extended):

curl -u username:password https://ceos-cove.org/en/api/data_browser/csv/<TASK ID>/?extended=true -o filename.csv

Request PNG map image:

curl -u username:password https://ceos-cove.org/en/api/data_browser/png/<TASK ID>/ -o filename.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/data_browser/png/<TASK ID>/?transparent=true -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/data_browser/png/<TASK ID>/?resolution=200 -o filename.png

Request PNG map image (line_width):

curl -u username:password https://ceos-cove.org/en/api/data_browser/png/<TASK ID>/?line_width=0.5 -o filename.png

Request PNG map image (show_region_outline):

curl -u username:password https://ceos-cove.org/en/api/data_browser/png/<TASK ID>/?show_region_outline=false -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/data_browser/png/<TASK ID>/?map_coordinates=true -o filename.png

Country Coverage

Country Coverage is a tool that allows users to generate and view GFOI Country Coverage reports for over 70 countries and 3 constellations. Users may send requests for a constellations list, a countries list, a daily history, submit a new task, get a task status, retrieve JSON results, retrieve PDF results, retrieve CSV results of scene metadata, retrieve a PNG bar graph, and retrieve ZIP archive file of the reports from the task results. Users must submit a new task to retrieve monthly cached report as well as to initiate report tasks.

Country Coverage throttle limits:

- POST: 1 Country Coverage task running in COVE at a time
- GET: 25 requests per hour

Retrieve constellations list

Lists all constellations and the missions associated with each constellation. These constellations are only applicable to the Country Coverage tool and API.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/constellations/

URL Parameters: None

Response Example:


```
{
  "constellations": {
    "Landsat": [
      "Landsat 5 - TM",
      "Landsat 7 - ETM",
      "Landsat 8 - OLI/TIRS"
    ],
    "Sentinel-1": [
      "Sentinel-1A - C-SAR - EW",
      "Sentinel-1A - C-SAR - IWS",
      "Sentinel-1A - C-SAR - SM",
      "Sentinel-1A - C-SAR - WV",
      "Sentinel-1B - C-SAR - EW",
      "Sentinel-1B - C-SAR - IWS",
      "Sentinel-1B - C-SAR - SM",
```

```
        "Sentinel-1B - C-SAR - WV"
      ],
      "Sentinel-2": [
        "Sentinel-2A - MSI",
        "Sentinel-2B - MSI"
      ]
    }
}
```


Retrieve countries list

Lists over 70 countries available for generating Country Coverage reports in COVE.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/countries/

URL Parameters: None

Response Example:


```
{
   "countries": [
      "Algeria",
      "Argentina",
      "Australia",
      "Bangladesh",
      "Belize",
      (COUNTRIES LIST TRUNCATED)
   ]
}
```


Retrieve daily history

Lists all existing and generating Country Coverage reports in COVE for the current day.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/

URL Parameters: None

Response Example:


```
{
  "existing": {
    "Algeria": [
      "Landsat",
      "Sentinel-1",
      "Sentinel-2"
    ],
    "Argentina": [
      "Landsat",
      "Sentinel-1"
    ],
    "Australia": [
      "Landsat"
    ]
  },
  "generating": {
    "Argentina": [
      "Sentinel-2",
    ],
    "Australia": [
      "Sentinel-1",
      "Sentinel-2",
    ]
  }
}
```


Retrieve monthly cached history

Lists all cached Country Coverage reports available in COVE. Reports are generated on the first day of each month and include the period of the start of the mission through the current month minus two months. For example, on January 1st reports will be generated for the period through November 30th.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/?daily_task=false

URL Parameters: None

Response Example:


```
{
   "existing": {
      "Algeria": [
         "Landsat",
         "Sentinel-1",
         "Sentinel-2"
      ],
      "Argentina": [
         "Landsat",
         "Sentinel-1",
         "Sentinel-2"
      ],
      "Australia": [
         "Landsat",
         "Sentinel-1",
         "Sentinel-2"
      ],
      (HISTORY TRUNCATED)
   },
}
```


Submit a task

Country Coverage tasks have a size limit. The limit is the number of constellations times the number of countries requested in the task.

Task Input Parameters for Country Coverage:

Parameter Name	*Data Type*	*Required*	*Description*
constellations	ConstellationsFilter[]	Yes	Refer to section Retrieve constellations list for a list of valid constellations. Refer to the Special Data Types section for more information on ConstellationsFilter.

countries	*CountriesFilter[]*	*Yes*	*Refer to section Retrieve countries list for a list of valid countries. Refer to the Special Data Types section for more information on CountriesFilter.*
daily_task	Boolean	No	Default value is true. If value is true, reports will be generated based on current data. If value is false, resulting task id may be used to retrieve monthly cached reports.

Request Data Example:

```
{
   "constellations": [
      "Landsat",
      "Sentinel-1",
      "Sentinel-2"
   ],
   "countries": [
      "Algeria",
      "Argentina",
      "Australia",
      "Bangladesh",
      "Belize"
   ],
   "daily_task": true
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/

URL Parameters: None

Response Examples:

Example successful response from request where the results are not ready to retrieve:

{"status": 202, "message": "Country Coverage reports task as been submitted. Please wait for the results.", "id": "<TASK ID>"}

Example successful response from a request where the results are ready to retrieve:

{"status": 200, "message": "Country Coverage reports results are ready", "id": "<TASK ID>"}

Failed Response Examples:

{"status": 429,
 "message": "Another country coverage task is currently running. Please try again later."}
{"status": 400, "message": "<Error Message>"}
{"status": 417, "message": "<Error Message>"}

Retrieve task status

Once a task has been submitted, users should periodically check the task status and progress percentage.

Status codes:

- 200: task has completed
- 202: task is still running
- 417: task has terminated in an error

If the status code is 200 and success is true, it indicates the task has scene data.

If a status code 200 is received, users may send a request for JSON or PNG results.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/<TASK ID>/

URL Parameters: None

Response Example:


```
{
  "execution_start": "2020-09-18 14:11:21",
  "execution_time": "03:05:07",
  "constellations": "Landsat",
  "countries": "Benin",
  "complete": true,
  "status": 200,
  "message": "Your task has completed successfully.",
  "progress": 85,
  "completed": {
    "Benin": [
      "Landsat"
    ]
  }
}
```


Retrieve JSON results

The JSON results will contain scene counts for every year since mission launch for all missions in all constellations and all countries in a task request. If a URL parameter is included in the request URL, the results will be filtered by the parameter(s) provided.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/json/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
constellation	String	No	Refer to section constellations.
country	String	No	Refer to section countries.

Response Example:


```
{
  "Sentinel-1": {
    "Benin": [
      {
        "year": 2014,
        "Sentinel-1A": 0,
```

```
          "Sentinel-1B": 0
        },
        {
          "year": 2015,
          "Sentinel-1A": 442,
          "Sentinel-1B": 0
        },
        {
          "year": 2016,
          "Sentinel-1A": 575,
          "Sentinel-1B": 0
        },
      (RESULTS TRUNCATED)
      ]
    }
}
```


Retrieve PDF results

The PDF file will contain a chart with the totals of scenes for the country and mission in the constellation requested for each year since launch. It will also contain a bar graph of the totals for each year. Reports for Sentinel-1 include an additional bar graph where values are separated by processing level. If the task associated with the task id only requests one constellation and one country, no URL parameters are needed.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/pdf/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
constellation	String	No	The constellation parameter is only required if multiple constellations are associated with the task. Refer to section constellations.
country	String	No	The country parameter is only required if multiple countries are associated with the task. Refer to section countries.

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Retrieve CSV results

The CSV file (binary) will contain the scene metadata. The CSV file contains the columns:

- Landsat:
  Date Acquired, Year, Mission, Path, Row, Scene Cloud Cover, Processing Level, Tier, Product ID, Scene ID
- Sentinel-1:
  Date Acquired, Year, Mission, Path, Frame, Processing Level, Orbit Direction, Granule Name
- Sentinel-2:
  Date Acquired, Year, Mission, Scene Center Latitude, Scene Center Longitude, Scene Cloud Cover, Scene ID

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/csv/<TASK ID>/

URL Parameters:

Parameter Name	***Data Type***	***Required***	***Description***
constellation	String	No	The constellation parameter is only required if multiple constellations are associated with the task. Refer to section constellations.
country	String	No	The country parameter is only required if multiple countries are associated with the task. Refer to section countries.

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Retrieve PNG results

The PNG image file is a bar graph which shows the number of scenes for each year for each mission for the country and constellation parameter specified in the request. If the task associated with the task id only requests one constellation and one country, no URL parameters are needed.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/png/<TASK ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
constellation	String	No	The constellation parameter is only required if multiple constellations are associated with the task. Refer to section constellations.
country	String	No	The country parameter is only required if multiple countries are associated with the task. Refer to section countries.

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Retrieve ZIP results

The ZIP archive file will contain all PDF and CSV files for all constellations and countries in the task request.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/country_coverage/reports/zip/<TASK ID>/

URL Parameters: None

Failed Response Example:

{'status': 404, 'message': 'File not found.'}

Example API requests using curl

Request Constellations List:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/constellations/

Request Countries List:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/countries/

Request Country Coverage daily history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/

Request Country Coverage monthly cached history:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/?daily_task=false

Request for Country Coverage daily reports task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"constellations": [<CONSTELLATION>], "countries": [<COUNTRY>], daily_task=true}' https://ceos-cove.org/en/api/country_coverage/reports/

Request for Country Coverage monthly cached reports task:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"constellations": [<CONSTELLATION>], "countries": [<COUNTRY>], daily_task=false}' https://ceos-cove.org/en/api/country_coverage/reports/

Request task status:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/<TASK ID>/

Request JSON results for all countries and constellations in task:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/json/<TASK ID>/

Request JSON results for all constellations for a country in task:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/json/<TASK ID>/?country=<COUNTRY>

Request JSON results for all countries for a constellation in task:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/json/<TASK ID>/?constellation=<CONSTELLATION>

Request JSON results for a country and a constellation in task:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/country_coverage/reports/json/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION>

Request PDF report:

curl -u username:password https://ceos-cove.org/en/api/dcountry_coverage/reports/csv/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION> -o filename.pdf

Request CSV File:

curl -u username:password https://ceos-cove.org/en/api/country_coverage/reports/csv/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION> -o filename.csv

Request PNG Bar Chart:

curl -u username:password https://ceos-cove.org/en/api/country_coverage/reports/png/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION> -o filename.png

Request ZIP File:

curl -u username:password https://ceos-cove.org/en/api/country_coverage/reports/zip/<TASK ID>/ -o filename.zip

Utilities

Utilities is a collection of calculators to provide users with a means of estimating various parameters of interest about CEOS satellite missions. There are two collections of calculators in utilities repeating orbit and swath calculators. Repeating orbit calculators available are ground track interval, period/velocity, and sun synchronous orbit. Swath calculators available are incidence to pointing, fov from swath width, swath width from fov, swath from incidence, and swath/off-nadir.

Utilities throttle limits:

- GET: 25 requests per hour

Repeating Orbit

Ground Track Interval

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
days_to_repeat	Float	Yes	Greater than 0
latitude	Float	Yes	Range: 0 to 90
revs_to_repeat	Float	No	Greater than 0; Calculated if not provided.

Request Data Example:

```
{
   "altitude": 800,
   "days_to_repeat": 16,
   "latitude": 0,
   "revs_to_repeat": 228
}
```

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/repeating_orbit/ground_track_interval/

URL Parameters: None

Response Example:


```
{
   "altitude": 800.0,
   "days_to_repeat": 16.0,
   "latitude": 0.0,
   "revs_to_repeat": 228.0,
   "fundamental_interval_deg_long": 25.2632,
   "fundamental_interval_km": 2812.3,
   "subinterval_deg_long": 1.5789,
   "subinterval_km": 175.8
}
```


Period/Velocity

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500

Request Data Example:


```
{
   "altitude": 800
}
```


Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/repeating_orbit/period_velocity/

URL Parameters: None

Response Example:


```
{
   "altitude": 800.0,
   "period": 100.87,
   "velocity": 7.45
}
```

Sun Synchronous Orbit

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
revs_to_repeat	Float	Yes	Greater than 0; Calculated if not provided.
days_to_repeat	Float	No	Greater than 0

Request Data Example:

```
{
   "altitude": 800,
   "revs_to_repeat": 16,
   "days_to_repeat": 1
}
```

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/repeating_orbit/sun_synchronous_orbit/

URL Parameters: None

Response Example:

```
{
   "altitude": 800.0,
   "revs_to_repeat": 16.0,
   "days_to_repeat": 1.0,
   "estimated_altitude": 268.1315,
   "estimated_inclination": 96.5607
}
```

Swath Calculator

Incidence To Pointing

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
incidence_angle	Float	Yes	Range: 0 to 90

Request Data Example:

```
{
   "altitude": 800,
   "incidence_angle": 15
}
```

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/incidence_to_pointing/

URL Parameters: None

Response Example:

```
{
   "altitude": 800.0,
   "incidence_angle": 15.0,
   "off_nadir_angle": 13.3
}
```

FOV from Swath Width

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
swath_width	Float	Yes	Greater than 0

Request Data Example:


```
{
  "altitude": 800,
  "swath_width": 15
}
```


Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/fov_from_swath_width/

URL Parameters: None

Response Example:


```
{
  "altitude": 800.0,
  "swath_width": 210.9,
  "fov": 15.0,
  "half_fov": 7.5
}
```


Swath Width from FOV

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
fov	Float	Yes	Range: 0 to 140

Request Data Example:


```
{
  "altitude": 800,
  "fov": 15
}
```


Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/swath_width_from_fov/

URL Parameters: None

Response Example:


```
{
   "altitude": 400.0,
   "swath_width": 105.4,
   "fov": 15.0,
   "half_fov": 7.5
}
```


Failed Response Example:


```
{"status": 400, "message": "math domain error"}
```


Swath From Incidence

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
min_incidence_angle	Float	Yes	Range: 0 to 90
max_incidence_angle	Float	Yes	Range: 0 to 90

Request Data Example:


```
{
   "altitude": 800,
   "min_incidence_angle": 0,
   "max_incidence_angle": 16
}
```


Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/swath_from_incidence/

URL Parameters: None

Response Example:


```
{
   "altitude": 800.0,
   "min_incidence_angle": 0.0,
   "max_incidence_angle": 16.0,
   "off_nadir_angle": 7.09,
   "fov": 14.177,
   "half_fov": 7.088,
   "swath_width": 202.94
}
```


Swath/Off-Nadir

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
altitude	Float	Yes	Range: 200 to 1500
off_nadir_angle	Float	Yes	Range: 0 to 90
fov	Float	Yes	Range: 0 to 90

Request Data Example:


```
{
   "altitude": 800,
   "off_nadir_angle": 25,
   "fov": 5
}
```


Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/swath_off_nadir/

URL Parameters: None

Response Example:


```
{
   "altitude": 800.0,
   "off_nadir_angle": 25.0,
   "fov": 5.0,
   "swath_width": 88.93
}
```

Example API requests using curl

Calculator: Repeating Orbit: Ground Track Interval:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/repeating_orbit/ground_track_interval/?altitude=<ALTITUDE>&days_to_repeat=<DAYS TO REPEAT>&latitude=<LATITUDE>&revs_to_repeat=<REVOLUTIONS TO REPEAT>

Calculator: Repeating Orbit: Period/Velocity:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/repeating_orbit/period_velocity/?altitude=<ALTITUDE>

Calculator: Repeating Orbit: Sun Synchronous Orbit:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/repeating_orbit/sun_synchronous_orbit/?altitude=<ALTITUDE>&revs_to_repeat=<REVOLUTIONS TO REPEAT>&days_to_repeat=<DAYS TO REPEAT>

Calculator: Swath Calculator: Incidence To Pointing:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/swath_calculator/incidence_to_pointing/?altitude=<ALTITUDE>&incidence_angle=<INCIDENCE ANGLE>

Calculator: Swath Calculator: FOV From Swath Width:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/swath_calculator/fov_from_swath_width/?altitude=<ALTITUDE>&swath_width=<SWATH WIDTH>

Calculator: Swath Calculator: Swath Width From FOV:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/swath_calculator/swath_width_from_fov/?altitude=<ALTITUDE>&fov=<FOV>

Calculator: Swath Calculator: Swath From Incidence:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/swath_calculator/swath_from_incidence/?altitude=<ALTITUDE>&min_incidence_angle=<MINIMUM INCIDENCE ANGLE>&max_incidence_angle=<MAXIMUM INCIDENCE ANGLE>

Calculator: Swath Calculator: Swath/Off-Nadir:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/utilities/swath_calculator/swath_off_nadir/?altitude=<ALTITUDE>&off_nadir_angle=<OFF-NADIR ANGLE>&fov=<FOV>

Missions

Missions is a list of forecasted or archived missions. Forecasted missions are used in Acquisition Forecaster, Revisits Calculator, and Coincident Calculator. Archived missions are used in Data Browser, Coverage Analyzer, and Coincident Calculator. The missions results will help users determine correct mission, instrument, and mode names as well as determine valid start and end dates when creating tasks.

Missions throttle limits:

- GET: 25 requests per hour

Retrieve forecasted list

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/missions/forecasted/

URL Parameters: None

Response Example:


```
[
  {
    "mission": "ALOS",
    "norad_id": "28931",
    "mim_id": 242,
    "launch_date": "2006-01-24",
    "decommissioned_date": "2011-04-22",
    "earliest_tle_date": "2006-01-25",
    "latest_tle_date": "2011-07-20",
    "status": "deactivated",
    "instrument_modes": [
      {
        "instrument": "PRISM",
        "mode": "Nadir"
      }, {
        "instrument": "AVNIR-2",
        "mode": "Standard"
      }, {
        "instrument": "AVNIR-2",
        "mode": "Full Accessible"
      }, {
        "instrument": "PALSAR",
        "mode": ""
      }
    ]
```

```
  },
  (MISSIONS LIST TRUNCATED)
]
```


Retrieve archived list

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/missions/archived/

URL Parameters: None

Response Example:


```
[
  {
    "mission": "Landsat 5",
    "norad_id": "14780",
    "mim_id": 226,
    "launch_date": "1984-03-01",
    "decommissioned_date": "2013-06-05",
    "latest_acquisition_date": "2012-05-05",
    "status": "deactivated",
    "instrument_modes": [
      {
        "instrument": "TM",
        "mode": ""
      }
    ]
  },
  (MISSIONS LIST TRUNCATED)
]
```

Example API requests using curl

Forecasted missions list:

curl -H 'Accept: application/json; indent=4' -u username:password https://ceos-cove.org/en/api/missions/forecasted/

Archived missions list:

curl -H 'Accept: application/json; indent=4' -u username:password https://ceos-cove.org/en/api/missions/archived/

Custom Missions

The Custom Missions feature allows users to create notional or proposed missions, and request a list of custom missions a user has already created. Custom Missions may be used in Acquisition Forecaster, Revisits Calculator, and Coincident Calculator to submit tasks.

Custom Missions throttle limits:

- GET: 25 requests per hour

Retrieve custom missions list

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/custom_missions/

URL Parameters: None

Response Example:


```
{
  "custom_missions": [{
    "custom_mission_name": "Mission_A",
    "orbit_type": "Sun Synchronous",
    "revolutions_per_day_revs": 14.56,
    "altitude_km": 705.0,
    "revolutions_to_repeat_revs": 233.0,
    "local_time": "11:10",
    "direction": "ascending",
    "instruments": [{
      "custom_instrument_name": "Beam_A",
      "field_of_view_deg": 5.0,
      "pointing_angle_deg": 5.0
    }]
  }]
}
```


Create a custom mission

The endpoint will allow users to create one custom mission with multiple custom instruments. Custom missions may be created from existing missions or with new mission details. Custom instruments may be created from an existing mission's instrument-mode or using new instrument details. Custom instruments may be added to an existing custom instrument.

Refer to the COVE UI User's Guide for additional details on creating custom missions.

Input parameters to create a Custom Mission:

Parameter Name	*Data Type*	*Required*	*Description*
custom_mission	ExistingMissionFilter, CircularOrbitFilter, SunSynchronousOrbitFilter, or AdvancedOrbitFilter	Yes	Refer to the Special Data Types section for more information on ExistingMissionFilter, CircularOrbitFilter, SunSynchronousOrbitFilter, or AdvancedOrbitFilter.
custom_instruments	CustomInstrumentsFilter[]	Yes	Refer to the Special Data Types section for more information on CustomInstrumentsFilter.

Example request to add a new instrument to an existing custom mission CustomInstrumentFilter:

```
{
  "custom_mission": {
    "name": "Mission1"
  },
  "custom_instruments": [
    {
      "name": "beam",
      "existing": true,
      "mission": {
        "mission": "Sentinel-2A",
        "instrument": "MSI",
        "mode": ""
      }
    }
  ]
}
```

Example request to create a custom mission from an existing mission using ExistingMissionFilter and CustomInstrumentFilter:

```
{
  "custom_mission": {
    "name": "Euclid",
    "existing": true,
    "mission": "Sentinel-1A"
```

```
  },
  "custom_instruments": [
    {
      "name": "beam",
      "existing": true,
      "mission": {
        "mission": "Sentinel-2A",
        "instrument": "MSI",
        "mode": ""
      }
    }
  ]
}
```

Example request to create a custom mission with a circular orbit using CircularOrbitFilter:

```
{
  "custom_mission": {
    "name": "Pythagoras",
    "existing": false,
    "orbit_type": "circular",
    "inclination": 65,
    "altitude": 600,
    "longitude": 350
  },
  "custom_instruments": [
    {
      "name": "beam",
      "existing": false,
      "field_of_view": 15.0,
      "pointing_angle": 0.0
    }
  ]
}
```

Example request to create a custom mission with a sun synchronous orbit using SunSynchronousOrbitFilter:

```
{
  "custom_mission": {
    "name": "Archimedes",
    "existing": false,
    "orbit_type": "sun_synchronous",
    "altitude": 705.0,
    "revolutions_to_repeat": 233.0,
    "local_time": "11:10",
    "direction": "ascending"
```

```
  },
  "custom_instruments": [
    {
      "name": "beam",
      "existing": false,
      "field_of_view": 1.2,
      "pointing_angle": 5.0
    }
  ]
}
```

Example request to create a custom mission with an advanced orbit using AdvancedOrbitFilter:

```
{
  "custom_mission": {
    "name": "Newton",
    "existing": false,
    "orbit_type": "advanced",
    "semimajor_axis": 6800.0,
    "eccentricity": 0,
    "inclination": 35,
    "argument_of_perigee": 90,
    "raan": 130,
    "true_anomaly": 250
  },
  "custom_instruments": [
    {
      "name": "beam",
      "existing": false,
      "field_of_view": 9.0,
      "pointing_angle": 0
    }
  ]
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/custom_missions/

URL Parameters: None

Response Examples:

Example successful response:

{"status": 200, "message": "Custom mission created successfully"}

Failed Response Examples:

{"status": 417, "message": "An error occurred while creating custom mission"}

Example API requests using curl

Custom missions list:

curl -H 'Accept: application/json; indent=4' -u username:password https://ceos-cove.org/en/api/custom_missions/

Add instrument to existing custom mission:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"custom_mission": {"name": "Mission1"}, "custom_instruments": [{"name": "beam", "existing": true, "mission": {"mission": "Sentinel-2A", "instrument": "MSI", "mode": ""}}]}' https://ceos-cove.org/en/api/custom_missions/

Create custom mission from existing mission:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"custom_mission": {"name": "Euclid", "existing": true, "mission": "Sentinel-1A"}, "custom_instruments": [{"name": "beam", "existing": true, "mission": {"mission": "Sentinel-2A", "instrument": "MSI", "mode": ""}}]}' https://ceos-cove.org/en/api/custom_missions/

Create custom mission (circular orbit):

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"custom_mission": {"name": "Pythagoras", "existing": false, "orbit_type": "circular", "inclination": 0, "altitude": 600, "longitude": 180}, "custom_instruments": [{"name": "beam", "existing": false, "field_of_view": 5.0, "pointing_angle": 5.0}]}' https://ceos-cove.org/en/api/custom_missions/

Create custom mission (sun synchronous orbit):

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"custom_mission": {"name": "Archimedes", "existing": false, "orbit_type": "sun_synchronous", "altitude": 705.0, "revolutions_to_repeat": 233.0, "local_time": "11:10", "direction": "ascending"}, "custom_instruments": [{"name": "beam", "existing": false, "field_of_view": 1.2, "pointing_angle": 5.0}]}' https://ceos-cove.org/en/api/custom_missions/

Create custom mission (advanced orbit):

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"custom_mission": {"name": "Newton", "existing": false, "orbit_type": "advanced", "semimajor_axis": 6800.0, "eccentricity": 0, "inclination": 35, "argument_of_perigee": 90, "raan": 130, "true_anomaly": 250}, "custom_instruments": [{"name": "beam", "existing": false, "field_of_view": 9.0, "pointing_angle": 0}]}' https://ceos-cove.org/en/api/custom_missions/

Regions

Regions allows users to create custom regions of interest. Regions are used in Acquisition Forecaster, Coverage Analyzer, Revisits Calculator, Coincident Calculator, and Data Browser. Users may send requests for a regions list, details of a region, import a region by KML string, KML binary file, or Shapefile, export a region by KML file or Shapefile, and retrieve a PNG map image of the region.

Regions throttle limits:

- POST: 5 requests per hour
- GET: 25 requests per hour

Retrieve regions list

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/regions/

URL Parameters: None

Response Example:


```
[
  {
    "folder": "Africa",
    "region": "Algeria"
  }, {
    "folder": "Africa",
    "region": "Angola"
  }, {
    "folder": "Africa",
    "region": "Benin"
  }, {
    "folder": "Africa",
    "region": "Botswana"
  },
  (REGIONS LIST TRUNCATED)
]
```

Retrieve region details

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
region_folder	String	No	Default folder is User Folder.
region	String	Yes	Region Name

Request Data Example:

```
{
  "region_folder": "Africa",
  "region": "Ghana"
}
```

Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/regions/

URL Parameters: None

Response Example:

```
{
  "status": 200,
  "region_folder": "Africa",
  "region": "Ghana",
  "id": 171
}
```

Import region KML string

The KML (Keyhole Markup Language) is an XML formatted file, and is was developed for use with GoogleEarth. It contains polygon coordinates of the region of interest. KML files must contain only one region. If the KML file contains multiple regions, it must be imported from the COVE UI.

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
region	String	Yes	Region name
data	String	Yes	KML file passed as a string.

Request Data Example:


```
{
   "region": "Barekese Dam",
   "data": "<?xml version="1.0" encoding="UTF-8"?><kml
xmlns="http://www.opengis.net/kml/2.2"><Placemark><Polygon><outerBoundaryIs><LinearRing><coordinates>-
1.722,6.844,0 -1.721,6.844,0 -1.722,6.843,0 -1.721,6.839,0 -1.723,6.837,0 -1.721,6.836,0 -1.723,6.832,0 -1.721,6.832,0 -
1.72,6.831,0 -1.718,6.83,0 -1.716,6.827,0 -1.716,6.83,0 -1.715,6.832,0 -1.712,6.83,0 -1.707,6.825,0 -1.707,6.827,0 -
1.71,6.831,0 -1.713,6.834,0 -1.713,6.837,0 -1.71,6.838,0 -1.707,6.837,0 -1.707,6.837,0 -1.708,6.839,0 -1.707,6.84,0 -
1.704,6.839,0 -1.703,6.841,0 -1.703,6.842,0 -1.706,6.845,0 -1.705,6.846,0 -1.706,6.849,0 -1.7,6.85,0 -1.697,6.852,0 -
1.695,6.85,0 -1.695,6.85,0 -1.695,6.852,0 -1.694,6.855,0 -1.693,6.855,0 -1.69,6.855,0 -1.688,6.856,0 -1.686,6.854,0 -
1.684,6.854,0 -1.684,6.856,0 -1.687,6.858,0 -1.686,6.861,0 -1.687,6.863,0 -1.692,6.86,0 -1.697,6.858,0 -1.701,6.861,0 -
1.707,6.86,0 -1.701,6.861,0 -1.697,6.858,0 -1.701,6.855,0 -1.705,6.855,0 -1.707,6.854,0 -1.71,6.855,0 -1.712,6.854,0 -
1.712,6.852,0 -1.713,6.85,0 -1.712,6.847,0 -1.715,6.843,0 -1.716,6.844,0 -1.716,6.842,0 -1.716,6.842,0 -1.718,6.841,0 -
1.721,6.841,0 -1.722,6.844,0</coordinates></LinearRing></outerBoundaryIs></Polygon></Placemark></kml>"
}
```


Request Method: POST

Request URL:

https://ceos-cove.org/en/api/v1_2/regions/

URL Parameters: None

Failed Response Example:


```
{'status': 415, 'message': 'Unable to parse KML string.'}
```


Import region KML file

KML files must contain only one region. If the KML file contains multiple regions, it must be imported from the COVE UI.

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
file	KML (binary)	Yes	Region name will be the name of the file received. If the file name is unable to be determined, the default name is User Region.

Request Method: POST

Request URL:
https://ceos-cove.org/en/api/v1_2/regions/upload/

URL Parameters: None

Failed Response Example:
{'status': 415, 'message': '<Error Message>'}

Import region shapefile

Shapefiles must contain only one region. If the shapefile contains multiple regions, it must be imported from the COVE UI.

Input parameters:

Parameter Name	*Data Type*	*Required*	*Description*
file	Shapefile	Yes	Region name will be the name of the file received. If the file name is unable to be determined, the default name is User Region.

Request Method: POST

Request URL:
https://ceos-cove.org/en/api/v1_2/regions/upload/

URL Parameters: None

Failed Response Example:

{'status': 415, 'message': '<Error Message>'}

Export region KML file

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/regions/kml/

URL Parameters: None

Export region shapefile

The shapefile file exported (ZIP) is used in geographic information systems (GIS) and contains polygon coordinates of the region of interest.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/regions/shapefile/

URL Parameters: None

Retrieve region PNG

The PNG image file shows a map of the region of interest, and allows users to view existing and imported regions.

Request Method: GET

Request URL:

https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/

URL Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
transparent	Boolean	No	Values: true or false. If transparent is true, the map background will be omitted and the background will instead be transparent. If transparent is false, image resolution is 200dpi.
resolution	Integer	No	Values should be in dots per inch (dpi). If transparent is false, resolution must be less than or equal to the default resolution. Default resolution is 200dpi.
line_width	Float	No	Values should be greater than 0. Allows users to define the line width for the region outline. Default value is 2.0.
line_color	String	No	Values should be a standard six character hex color string. The leading # character is optional. Allows users to define the line color for the region outline. Default value is #FFFFFF (white).
map_coordinates	Boolean	No	Values: true or false. Allows users to fetch the map coordinates used to generate a PNG image. If value is true, the map coordinates will be returned **instead of** a PNG image.

Map Coordinates Response Example:


```
{
   "status": 200,
   "map_coordinates": [
      [-8.661654877310252, -0.16135473389262667],
      [-8.661654877310252, 14.838645266107374],
      [6.3383451226897485, 14.838645266107374],
      [6.3383451226897485, -0.16135473389262667],
      [-8.661654877310252, -0.16135473389262667]
   ]
}
```


Failed Response Example:


```
{'status': 404, 'message': 'File not found.'}
```

Example API requests using curl

Request region list:

curl -H "Accept: application/json; indent=4" -u username:password https://ceos-cove.org/en/api/regions/

Request region information:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"region_folder": "Africa", "region": "Ghana"}' https://ceos-cove.org/en/api/regions/

Import region KML string:

curl -H "Content-Type: application/json" -X POST -u username:password -d '{"region": "RegionA", "data": "<KML STRING>"}' https://ceos-cove.org/en/api/regions/

Import region KML file:

curl -H "Content-Type: multipart/form-data" -X POST -u username:password -F file=@region_name.kml https://ceos-cove.org/en/api/regions/upload/

Import region shapefile:

curl -H "Content-Type: multipart/form-data" -X POST -u username:password -F file=@region_name.zip https://ceos-cove.org/en/api/regions/upload/

Export region PNG map image:

curl -u username:password https://ceos-cove.org/en/api/regions/png/<REGION ID>/ -o region.png

Request PNG map image (transparent):

curl -u username:password https://ceos-cove.org/en/api/region/png/<REGION ID>/?transparent=true -o filename.png

Request PNG map image (resolution):

curl -u username:password https://ceos-cove.org/en/api/regions/png/<REGION ID>/?resolution=200 -o filename.png

Request PNG map image (line_width):

curl -u username:password https://ceos-cove.org/en/api/regions/png/<REGION ID>/?line_width=0.5 -o filename.png

Request PNG map image (line_color):

curl -u username:password https://ceos-cove.org/en/api/regions/png/<REGION ID>/?line_color=%23FFFFFF -o filename.png

Request PNG map image (map_coordinates):

curl -u username:password https://ceos-cove.org/en/api/regions/png/<REGION ID>/?map_coordinates=true -o filename.png

Export region KML file:

curl -u username:password https://ceos-cove.org/en/api/regions/kml/<REGION ID>/ -o region.kml

Export region shapefile:

curl -u username:password https://ceos-cove.org/en/api/regions/shapefile/<REGION ID>/ -o region.zip

Version Information

In future versions of the COVE API, the default base URL will always point to the most recent version, and older versions may be depreciated. If COVE API endpoints are integrated into custom applications, please use the versioned URL. Users may refer to this document for version information or by sending a request to the request URL below.

COVE API details:

- Current version: v1_2
- Supported versions: v1_0, v1_1, v1_2
- Depricated versions: None
- Revision history:
  v1_1:
    - Added calculate_solar_angles option to acquisition forecaster task.
    - Added endpoints to create constellations (archived and forecasted).
    - Added options to PNG requests:
      - line_width: in Acquisition Forecaster, Data Browser, and Regions
      - line_color: in Regions
      - transparent: in Acquisition Forecaster, Coverage Analyzer, Coincident Calculator, Revisits Calculator, Data Browser, and Regions
      - transparency: in Coverage Analyzer, Coincident Calculator, Revisits Calculator
      - resolution: in Acquisition Forecaster, Coverage Analyzer, Coincident Calculator, Revisits Calculator, Data Browser, and Regions
      - show_region_outline: in Acquisition Forecaster, Coverage Analyzer, Coincident Calculator, Revisits Calculator, and Data Browser
      - map_coordinates: in Acquisition Forecaster, Coverage Analyzer, Coincident Calculator, Revisits Calculator, Data Browser, and Regions
    - Added extended option to CSV requests in Acquisition Forecaster, Revisits Calculator, and Data Browser

  v1_2:
    - Updated utilities to use GET requests instead of POST.
- Default base url: https://ceos-cove.org/en/api/

- Versioned base url: https://ceos-cove.org/en/api/v1_2/

Retrieve version details

Request Method: GET

Request URL:
https://ceos-cove.org/en/api/

URL Parameters: None

Response Example:

```
{
   "current_version": "<CURRENT VERSION>",
   "default_version": "<CURRENT VERSION>",
   "supported_versions": [
      "<CURRENT VERSION>",
      "<OLDER VERSION>"
   ],
   "deprecated_versions": [
      {
         "<DEPRECATED VERSION>": "<DEPRECATION DATE>"
      }
   ],
   "revision_history": {
      "<VERSION>": [
         <DETAILS STRING>
      ]
   }
}
```

Example API requests using curl

Version information:

```
curl -H "Accept: application/json; indent=4" -u username:password
https://ceos-cove.org/en/api/
```

Special Data Types

AdvancedOrbitFilter

A dictionary containing values needed to create a custom mission using parameters required for an advanced orbit type. Used in Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	string	Yes	Name of custom mission
existing	boolean	Yes	Value: false Create custom mission using a advanced orbit.
orbit_type	string	Yes	Value: advanced
semimajor_axis	float	Yes	Range: 6778.127 to 7878.137
eccentricity	float	Yes	Range: 0 to 1
inclination	float	Yes	Range: 0 to 180
argument_of_perigee	float	Yes	Range: 0 to 360
raan	float	Yes	Range: 0 to 360
true_anomaly	float	Yes	Range: 0 to 360

Filter example for request:

```
{
   "name": "Newton",
   "existing": False,
   "orbit_type": "advanced",
   "semimajor_axis": 6800.0,
   "eccentricity": 0,
   "inclination": 35,
   "argument_of_perigee": 90,
   "raan": 130,
   "true_anomaly": 250
}
```

CircularOrbitFilter

A dictionary containing values needed to create a custom mission using parameters required for a circular orbit type. Used in Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	string	Yes	Name of custom mission
existing	boolean	Yes	Value: false Create custom mission using a circular orbit.
orbit_type	string	Yes	Value: circular
inclination	integer or float	Yes	Range: 0 to 180
altitude	integer or float	Yes	Range: 400 to 1500
longitude	integer or float	Yes	Range: 0 to 360

Filter example for request:

```
{
   "name": "Pythagorus",
   "existing": False,
   "orbit_type": "circular",
   "inclination": 0,
   "altitude": 600,
   "longitude": 180
}
```

ConstellationsFilter

A list of constellation name strings. Used in Coincident Calculator and Country Coverage.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	string	No: Coincident Calculator Yes: Country Coverage	Coincident Calculator: Filter optional. Refer to section forecasted constellations or archived to submit a request for a valid list of countries. Country Coverage: At least one constellation required. Refer to section Retrieve constellations list to submit a request for a valid list of countries.

Filter example for request:

```
["Landsat", "Sentinel-1", "Sentinel-2"]
```

CustomInstrumentFilter

A dictionary of containing new custom instrument parameters. Used in Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Require*	*Description*
name	string	Yes	Name of custom instrument
existing	boolean	Yes	Value: false
field_of_view	Integer or float	Yes	Range: 0 to 60
pointing_angle	Integer or float	Yes	Range: -60 to 60

Filter example for request:

```
{
   "name": "beam",
   "existing": False,
   "field_of_view": 5.0,
   "pointing_angle":  -5.0
}
```

CustomInstrumentsFilter

A list of ExistingInstrumentFilter and/or CustomInstrumentFilter. Used in Custom Missions.

CustomMissionFilter

A dictionary of containing custom mission name, and custom instrument name. Used in Acquisition Forecaster, Revisits Calculator, Coincident Calculator, and Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
mission	string	Yes	Valid existing custom missions (mission and instrument) may be found by submitting a COVE API request for the Custom Missions list.
instrument	string	Yes	

Filter example for request:

```
{
  "mission": "sputnik",
  "instrument": "beam"
}
```

CustomMissionsFilter

A list of CustomMissionFilter containing custom mission names, and custom instrument names. Used in Acquisition Forecaster, Revisits Calculator, and Coincident Calculator.

CountriesFilter

A list of country names. Used in Country Coverage.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	string	Yes	Refer to section Retrieve countries list to submit a request for a valid list of countries.

Filter example for request:

["Algeria", "Argentina", "Australia", "Bangladesh", "Belize"]

DateString

Date string format YYYY-MM-DD. Example: 2020-01-31

DiscretizationFilter

A dictionary values used to divide a region of interest into blocks. of Used in Coverage Analyzer, Revisits Calculator, and Coincident Calculator.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
type	string	No	Landsat WRS: wrsdata S2 Tiling Scheme: s2tiling Coverage Analyzer: Value: s2tiling or wrsdata. Revisits Calculator: Value: s2tiling or wrsdata. Coincident Calculator: Invalid parameter.
unit	string	No	Unit parameter should be an empty string or omitted if type parameter is specified. Unit parameter required if size parameter is specified. Value: deg, km.
size	float	No	Size parameter should be null or omitted if type parameter is specified. Size parameter required if unit parameter is specified. Coverage Analyzer: Value (deg): between 5.0 to 0.1 Value (km): between 555 to 12 Revisits Calculator: Value (deg): between 5.0 to 0.1 Value (km): between 555 to 12 Coincident Calculator: Value (deg): between 1.0 to 0.1 Value (km): between 111 to 12

include_overlap	boolean	No	Coverage Analyzer: Value should only be true if type is s2tiling and missions is Sentinel-2A or Sentinel-2B. Value: true, false. Revisits Calculator: Invalid parameter. Coincident Calculator: Invalid parameter.

Filter example for request for Coverage Analyzer:


```
{
  "type": "s2tiling",
  "size": null,
  "unit": "",
  "include_overlap": true
}
```


Filter example for request for Revisits Calculator:


```
{
  "type": "",
  "size": 5.0,
  "unit": "deg"
}
```


Filter example for request for Coincident Calculator:


```
{
  "size": 0.25,
  "unit": "deg"
}
```

ExistingInstrumentFilter

A dictionary containing values needed to create a custom mission from an existing mission. Used in Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	String	Yes	Name of custom mission
existing	Boolean	Yes	Value: true Create custom instrument using existing mission/instrument/mode.
mission	MissionsFilter	Yes	Refer to the Special Data Types section for more information on MissionsFilter

Filter example for request:

```
{
  "name": "beam",
  "existing": True,
  "mission": {
    "mission": "Sentinel-1A",
    "instrument": "C-SAR",
    "mode": "IWS"
  }
}
```

ExistingMissionFilter

A dictionary containing values needed to create a custom mission from an existing mission. Used in Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	string	Yes	Name of custom mission
existing	boolean	Yes	Value should be true. Create custom mission using existing mission.
mission	string	Yes	Valid mission name may be found by submitting a COVE API request for the missions forecasted list.

Filter example for request:

```
{
   "name": "Euchlid",
   "existing": True,
   "mission": “ALOS-2”
}
```

MetadataFilter

Used in Coverage Analyzer, and Data Browser.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
cloud_cover	float	No	Cloud cover filter only applies to Landsat 5, Landsat 7, Landsat 8, Sentinel-2A, and Sentinel-2B. Values: between 0 and 100
day_night	string	No	Day/Night filter only applies to Landsat 5, Landsat 7, and Landsat 8. Values: day, night
processing_level	string	No	Processing level filter only applies to Sentinel-1A, and Sentinel-1B. Values: GRD, SLC
orbit_direction	string	No	Orbit direction filter only applies to Sentinel-1A, Sentinel-1B, Sentinel-2A, and Sentinel-2B. Ascending: asc Descending: desc Values: asc, desc

Filter example for request:

```
{
   "cloud_cover": null,
   "day_night": "",
   "orbit_direction": "ascending",
   "processing_level": ""
}
```

MissionsFilter

Used in Acquisition Forecaster, Coverage Analyzer, Revisits Calculator, Coincident Calculator, and Data Browser.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
mission	string	Yes	Acquisition Forecaster: Valid mission, instrument, and mode may be found by submitting a COVE API request for the missions forecasted list. Coverage Analyzer: Valid mission, instrument, and mode may be found by submitting a COVE API request for the missions archived list. Revisits Calculator: Valid mission, instrument, and mode may be found by submitting a COVE API request for the missions forecasted list. Coincident Calculator (Forecasted): Valid mission, instrument, and mode may be found by submitting a COVE API request for the missions forecasted list. Coincident Calculator (Archived): Valid mission, instrument, and mode may be found by submitting a COVE API request for the missions archived list. Data Browser: Valid mission, instrument, and mode may be found by submitting a COVE API request for the missions archived list.
instrument	string	Yes	
mode	string	Yes	

Filter example for request:

```
{
  "mission": "Sentinel-2A",
  "instrument": "MSI",
  "mode": ""
}
```

SunSynchronousOrbitFilter

A dictionary containing values needed to create a custom mission using parameters required for a sun synchronous orbit type. Used in Custom Missions.

Input Parameters:

Parameter Name	*Data Type*	*Required*	*Description*
name	string	Yes	Name of custom mission
existing	boolean	Yes	Value: false Create custom mission using a sun synchronous orbit.
orbit_type	string	Yes	Value: sun_synchronous
revolutions_per_day	integer or float	No	Range: 12.4 to 15.6 Must be included if altitude is omitted.
altitude	integer or float	No	Range: 400 to 1500 Must be included if revolutions_per_day is omitted.
revolutions_to_repeat	Integer or float	Yes	Range: 1 to 1500
local_time	string	Yes	Format: HH:MM
orbit_direction	string	Yes	Values: ascending or descending

Filter example for request using revolutions_per_day:

```
{
   "name": "Archimedes",
   "existing": False,
   "orbit_type": "sun_synchronous",
   "revolutions_per_day": 14.56,
   "revolutions_to_repeat": 233.0,
   "local_time": "11:10",
   "direction": "ascending"
}
```

Filter example for request using altitude:


```
{
   "name": "Archimedes",
   "existing": False,
   "orbit_type": "sun_synchronous",
   "altitude": 705.0,
   "revolutions_to_repeat": 233.0,
   "local_time": "11:10",
   "direction": "ascending"
}
```

Python Examples

Define Credentials

credentials.py:

```
'''Example: Define Credentials class for sending credentials header to COVE.'''

import base64

class Credentials:
   '''Credentials: public class
         All COVE API tools require authorization.  Users must have an existing
         username and password in COVE. Create an account at https://ceos-cove.org.
   '''
   header = None

   def __init__(self, username, password):
      '''Set header for all GET/POST requests using COVE API.'''
      credentials = "{}:{}".format(username, password)
      token = base64.b64encode(credentials.encode())
      self.header = {
         'Authorization': 'Basic ' + token.decode('utf-8')
      }
```

Send API GET Request

get_request.py:

```
'''Example: Send GET request to COVE for User History'''

import requests
from credentials import Credentials

# Define API endpoint (request URL)
endpoint = 'https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/'

# Set credentials
credentials = Credentials(username='<cove username', password='cove password')

# Sent GET request
response = requests.get(url=endpoint, headers=credentials.header)

# Print results
print(response.json())
```

Send API POST Request

post_request.py:

```
'''Example: Submit a task to acquisition forecaster. '''

import requests
from credentials import Credentials

# Define API endpoint (request URL)
endpoint = 'https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/'

# Define JSON data for request
data = {
   "start_date": "2020-01-01",
   "end_date": "2020-01-31",
   "region_folder": "Africa",
   "region": "Kenya",
   "missions": [{
      "mission": "Sentinel-1A",
      "instrument": "C-SAR",
      "mode": "IWS"
   }]
}

# Define COVE credentials
credentials = Credentials(username='<cove username>', password='<cove password>')

# Send POST request
response = requests.post(url=endpoint, headers=credentials.header, json=data)

# Print results
print(response.json())
```

COVE API Endpoints Summary

Request Method	Request Type	Request URL
	Acquisition Forecaster	
GET	User History	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/
POST	Task	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/
GET	Status	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/csv/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/csv/<TASK ID>/?extended=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?orbit_direction=descending
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?line_width=0.5
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?show_region_outline=false
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&orbit_direction=descending
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_legend=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_legend=true&orbit_direction=ascending

GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_legend=true&orbit_direction=descending
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&map_legend=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&map_legend=true&orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/acquisition_forecaster/png/<TASK ID>/?map_coordinates=true&map_legend=true&orbit_direction=descending
Coverage Analyzer		
GET	User History	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/
POST	Task	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/
GET	Status	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/<TASK ID>/
GET	JSON	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/json/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/csv/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?transparency=0.65
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?show_region_outline=false
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?map_coordinates=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?map_legend=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/png/<TASK ID>/?map_coordinates=true&map_legend=true
GET	NetCDF	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/netcdf/<TASK ID>/
GET	GeoTiff	https://ceos-cove.org/en/api/v1_2/coverage_analyzer/geotiff/<TASK ID>/

Revisits Calculator		
GET	User History	https://ceos-cove.org/en/api/v1_2/revisits_calculator/
POST	Task	https://ceos-cove.org/en/api/v1_2/revisits_calculator/
GET	Status	https://ceos-cove.org/en/api/v1_2/revisits_calculator/<TASK ID>/
GET	JSON	https://ceos-cove.org/en/api/v1_2/revisits_calculator/json/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/revisits_calculator/csv/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/revisits_calculator/csv/<TASK ID>/?extended=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?orbit_direction=descending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?transparency=0.65
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?show_region_outline=false
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_coordinates=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_coordinates=true&orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_coordinates=true&orbit_direction=descending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_legend=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_legend=true&orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_legend=true&orbit_direction=descending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_coordinates=true&map_legend=true

GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_coordinates=true&map_legend=true&orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/revisits_calculator/png/<TASK ID>/?map_coordinates=true&map_legend=true&orbit_direction=descending
Coincident Calculator		
GET	User History	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/
POST	Task	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/
GET	Constellations List	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/constellations/
POST	Constellations Create	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/constellations/
GET	Status	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/<TASK ID>/
GET	JSON	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/json/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?transparency=0.65
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?map_coordinates=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?map_legend=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?map_coordinates=true&map_legend=true
GET	User History	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/
POST	Task	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/
GET	Constellations List	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/constellations/

POST	Constellations Create	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/constellations/
GET	Status	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/<TASK ID>/
GET	JSON	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/json/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/forecasted/png/<TASK ID>/?show_region_outline=false
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/?show_region_outline=false
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/?map_coordinates=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/?map_legend=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/coincident_calculator/archived/png/<TASK ID>/?map_coordinates=true&map_legend=true
Data Browser		
GET	User History	https://ceos-cove.org/en/api/v1_2/data_browser/
POST	Task	https://ceos-cove.org/en/api/v1_2/data_browser/
GET	Status	https://ceos-cove.org/en/api/v1_2/data_browser/<TASK ID>/
GET	Scene Count	https://ceos-cove.org/en/api/v1_2/data_browser/count/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/data_browser/csv/<TASK ID>/
GET	CSV	https://ceos-cove.org/en/api/v1_2/data_browser/csv/<TASK ID>/?extended=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?orbit_direction=ascending
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?orbit_direction=descending

GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?line_width=0.5
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?show_region_outline=false
GET	PNG	https://ceos-cove.org/en/api/v1_2/data_browser/png/<TASK ID>/?map_coordinates=true
Country Coverage		
GET	Countries List	https://ceos-cove.org/en/api/v1_2/country_coverage/countries/
GET	Constellations List	https://ceos-cove.org/en/api/v1_2/country_coverage/constellations/
GET	Daily History	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/
GET	Monthly Cached History	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/?daily_task=false
POST	Task	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/
GET	Status	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/<TASK ID>/
GET	JSON	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/json/<TASK ID>/
GET	JSON	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/json/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION>
GET	JSON	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/json/<TASK ID>/?country=<COUNTRY>
GET	JSON	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/json/<TASK ID>/?constellation=<CONSTELLATION>
GET	PDF	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/pdf/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION>
GET	CSV	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/csv/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION>

GET	ZIP	https://ceos-cove.org/en/api/v1_2/country_coverage/reports/zip/<TASK ID>/?country=<COUNTRY>&constellation=<CONSTELLATION>
	Utilities	
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/repeating_orbit/ground_track_interval/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/repeating_orbit/period_velocity/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/repeating_orbit/sun_synchronous_orbit/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/incidence_to_pointing/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/fov_from_swath_width/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/swath_width_from_fov/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/swath_from_incidence/
GET	Calculator	https://ceos-cove.org/en/api/v1_2/utilities/swath_calculator/swath_off_nadir/
	Missions	
GET	List	https://ceos-cove.org/en/api/v1_2/missions/forecasted/
GET	List	https://ceos-cove.org/en/api/v1_2/missions/archived/
	Custom Missions	
GET	List	https://ceos-cove.org/en/api/v1_2/custom_missions/
POST	Create	https://ceos-cove.org/en/api/v1_2/custom_missions/
	Regions	
GET	List	https://ceos-cove.org/en/api/v1_2/regions/
POST	Region Details	https://ceos-cove.org/en/api/v1_2/regions/
POST	Import KML String	https://ceos-cove.org/en/api/v1_2/regions/
POST	Import KML File	https://ceos-cove.org/en/api/v1_2/regions/upload/
POST	Import Shapefile	https://ceos-cove.org/en/api/v1_2/regions/upload/

GET	Export KML File	https://ceos-cove.org/en/api/v1_2/regions/kml/<REGION ID>/
GET	Export Shapefile	https://ceos-cove.org/en/api/v1_2/regions/shapefile/<REGION ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/
GET	PNG	https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/?transparent=true
GET	PNG	https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/?resolution=200
GET	PNG	https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/?line_width=0.5
GET	PNG	https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/?line_color=%23FFFFFF
GET	PNG	https://ceos-cove.org/en/api/v1_2/regions/png/<REGION ID>/?map_coordinates=true

Contact Us

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Send a message via the Contact Us page with details of any issues and the COVE team will attempt to rectify the situation in a timely manner.

Refer to the COVE UI User's Guide for more information on the usage of each COVE tools.