Operations File Schema

This document describes the schema for specifying the commands.json’ file to the satellite. First a ‘operations.json’ file is produced from the input command file. The operations file filters feasible commands which can be executed.

In EO-Sim, when animating the satellite operations, the ‘operations.json’ file is turned into CZML format which can be read and animated in Cesium JS.



(Some of the schema is identical to the the CZML schema defined in <https://github.com/AnalyticalGraphicsInc/czml-writer/wiki>

An example command.json file is present in the examples/mission2/ folder.

# Overview

* **Structure:** Each mission has the operations defined as a list of JSON objects (packets).
* Each packet corresponds to a spacecraft operation.
* Allowed operations:
  + **TakeImage** - Take an image of a set of ground-points (GP). The corresponding GP lights up and remains lit until the end of mission.
  + **TransmitData** - Transmit data from spacecraft to another spacecraft or ground-station. A ‘line’ is animated corresponding to the time interval indicated.
* Example of TakeImage json-object

{

"@id": “ANI-10000231”,

"@type": "TakeImage",

"spacecraftId": "557",

"startTime": "2018-07-17T15:06:21Z",

"endTime": "2018-07-17T15:08:19Z",

"observedPosition":

{"@type": "cartographicDegrees",

"cartographicDegrees": [[30.2, 30.01, 0],

[30.3, 30.01, 0]]

},

"color": {"rgba": [255,0,0,255]}

}

* Example of TransmitData json-object

{

"@id": “ANI-10000271”,

"@type": "TransmitData",

"txEntityId": "557",

"rxEntityId": "41",

"startTime": “2018-07-17T15:08:36Z”,

"endTime": "2018-07-17T15:08:40Z"

}

# Packet Schema

This section describes the schema of a single packet. Below are the basic fields required for each packet. Depending on the operation-type additional required fields manifest which are described in the sub-sections.

| **Parameter** | **Type** | **Description** |
| --- | --- | --- |
| @id | string | An alphanumeric unique identifier. It shall consist of 3 uppercase characters ‘ANI’ and 8 digit number, separated by a dash ‘-‘(example: ANI-10000008). |
| @type | [**operationType**](#_bq99xswg8899) | Operation type |

## **operationType**

| **Type** | **Context** | **Description** |
| --- | --- | --- |
| string | enumeration | Limited to [‘TakeImage’](#_usldx2tvpmd4) and [‘TransmitData’](#_gxa70suxfkq5). |

### TakeImage

| **Parameter** | **Type** | **Description** |
| --- | --- | --- |
| spacecraftId | string | Unique spacecraft identifier which is making the observation. |
| startTime | [**time**](#_dbnsxgmzisd5) | Start time of observation. |
| endTime | [**time**](#_dbnsxgmzisd5) | Stop time of observation. |
| observedPosition | **list,** [**position**](#_cpjp27wquwv8) | List of observed positions |
| color | [**color**](#_aal4quwbjtyc) | Color of the observed ground-position. |

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### TransmitData

| **Parameter** | **Type** | **Description** |
| --- | --- | --- |
| txEntityId | string | Unique identifier of the transmitter. |
| txEntityType | entityType | Transmitter entity type (Spacecraft or GroundStation)\* |
| rxEntityId | string | Unique identity of the receiver. |
| rxEntityType | entityType | Receiver entity type (Spacecraft or GroundStation)\* |
| startTime | [**time**](#_dbnsxgmzisd5) | Start time of data transmission. |
| endTime | [**time**](#_dbnsxgmzisd5) | Stop time of data transmission. |

\* The transmit data is allowed to be specified only between spacecraft to spacecraft or spacecraft to/from ground-station. (Not from ground-station to ground-station.)

## Other JSON fields

### time

| **Type** | **Units** | **Description** |
| --- | --- | --- |
| string | UTC | Time value shall be in YYYY-MM-DDThh:mm:ssZ format. Reference ISO-8601 standard.  Example: "2021-10-15T10:00:00Z" |

### position

position can be expressed with cartographic-degrees by specifying the “@type”:”cartographicDegrees”

#### cartographicDegrees

| **Type** | **Context** | **Units** | **Description** |
| --- | --- | --- | --- |
| List, float | [Longitude, Latitude, Height] | degrees, meters | Specify the longitude, latitude (in degrees) and height (in meters).  Example: [70.45, -30.32, 0] |

### color

A color specified as an array of color components [Red, Green, Blue, Alpha] where each component is in the range 0-255.

| **Type** | **Context** | **Description** |
| --- | --- | --- |
| List, integer  (0-255) | [Red, Green, Blue, Apha] | Specify the RGBA values between 0-255.  Example: [0,255,0,255] |