

Annex D: ENCODING EXAMPLES (NON-NORMATIVE)

Extracts of the following examples were used in the body of the document. The current Annex includes the complete examples in their original metadata format and in the proposed encodings.

The following tools were very useful to improve readability and check the examples.

- XMLSpy (<http://www.altova.com>)
- <http://json-ld.org/playground/>.
- <http://rdf-translator.appspot.com/>
- <http://geojsonlint.com/>
- <http://jsonpath.com/>

D.1 Metadata Examples

D.1.1 Example 1: Seasat (Radar)

D.1.1.1 OGC 10-157r4

```
<?xml version="1.0" encoding="UTF-8"?>
<sar:EarthObservation xmlns:sar="http://www.opengis.net/sar/2.0"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:eop="http://www.opengis.net/eop/2.0"
xmlns:om="http://www.opengis.net/om/2.0" xmlns:ows="http://www.opengis.net/ows/2.0"
xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" gml:id="ID_64dd0a6f-72bd-40c9-
a8cd-10fe33c6516b" xsi:schemaLocation="http://www.opengis.net/sar/2.0
https://svn.openegeospatial.org/ogc-
projects/cite/scripts/wcseo/1.0/tags/r1/resources/omeo/sar.xsd">
  <om:phenomenonTime>
    <gml:TimePeriod gml:id="tp_64dd0a6f-72bd-40c9-a8cd-10fe33c6516b">
      <gml:beginPosition>1978-09-27T01:04:30Z</gml:beginPosition>
      <gml:endPosition>1978-09-27T01:04:45Z</gml:endPosition>
    </gml:TimePeriod>
  </om:phenomenonTime>
  <om:resultTime>
    <gml:TimeInstant gml:id="archivingdate_64dd0a6f-72bd-40c9-a8cd-10fe33c6516b">
      <gml:timePosition>2014-10-04T04:19:17Z</gml:timePosition>
    </gml:TimeInstant>
  </om:resultTime>
  <om:procedure>
    <eop:EarthObservationEquipment gml:id="eoe_64dd0a6f-72bd-40c9-a8cd-
10fe33c6516b">
      <eop:platform>
        <eop:Platform>
          <eop:shortName>Seasat</eop:shortName>
          <eop:serialIdentifier>1</eop:serialIdentifier>
        </eop:Platform>
      </eop:platform>
      <eop:instrument>
        <eop:Instrument>
          <eop:shortName>SAR</eop:shortName>
        </eop:Instrument>
      </eop:instrument>
      <eop:sensor>
        <eop:Sensor>
          <eop:sensorType>RADAR</eop:sensorType>
          <eop:operationalMode>IM</eop:operationalMode>
        </eop:Sensor>
      </eop:sensor>
      <eop:acquisitionParameters>
        <sar:Acquisition>
          <eop:orbitNumber>1316</eop:orbitNumber>
        </sar:Acquisition>
      </eop:acquisitionParameters>
    </eop:EarthObservationEquipment>
  </om:procedure>
</sar:EarthObservation>
```

```

        <eop:orbitDirection>DESCENDING</eop:orbitDirection>
        <sar:polarisationMode>S</sar:polarisationMode>
        <sar:polarisationChannels>HH</sar:polarisationChannels>
        <sar:antennaLookDirection>RIGHT</sar:antennaLookDirection>
        <sar:minimumIncidenceAngle uom="deg">19.6</sar:minimumIncidenceAngle>
        <sar:maximumIncidenceAngle uom="deg">9.6</sar:maximumIncidenceAngle>
        <sar:incidenceAngleVariation
uom="deg">9.6</sar:incidenceAngleVariation>
        </sar:Acquisition>
    </eop:acquisitionParameters>
</eop:EarthObservationEquipment>
</om:procedure>
<om:observedProperty nilReason="inapplicable"/>
<om:featureOfInterest>
    <eop:Footprint gml:id="fp_64dd0a6f-72bd-40c9-a8cd-10fe33c6516b">
        <eop:multiExtentOf>
            <gml:MultiSurface gml:id="ms_64dd0a6f-72bd-40c9-a8cd-10fe33c6516b"
srsName="EPSG:4326">
                <gml:surfaceMembers>
                    <gml:Polygon gml:id="fppoly_64dd0a6f-72bd-40c9-a8cd-10fe33c6516b">
                        <gml:exterior>
                            <gml:LinearRing>
                                <gml:posList>63.261372 -2.682513 61.997604 -2.695740
61.965195 0.005087 63.227173 0.135472 63.261372 -2.682513</gml:posList>
                            </gml:LinearRing>
                        </gml:exterior>
                    </gml:Polygon>
                </gml:surfaceMembers>
            </gml:MultiSurface>
        </eop:multiExtentOf>
    </eop:Footprint>
</om:featureOfInterest>
<om:result>
    <eop:EarthObservationResult gml:id="eor_64dd0a6f-72bd-40c9-a8cd-10fe33c6516b">
        <eop:browse>
            <eop:BrowseInformation>
                <eop:type>QUICKLOOK</eop:type>
                <eop:referenceSystemIdentifier
codeSpace="EPSG">epsg:4326</eop:referenceSystemIdentifier>
                <eop:fileName>
                    <ows:ServiceReference xlink:href="http://tpm-
ds.eo.esa.int/metadata/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780
927T010445_001316_0000_2267_9B4F.BI.PNG">
                        <ows:RequestMessage/>
                    </ows:ServiceReference>
                </eop:fileName>
            </eop:BrowseInformation>
        </eop:browse>
        <eop:product>
            <eop:ProductInformation>
                <eop:fileName>
                    <ows:ServiceReference xlink:href="http://tpm-
ds.eo.esa.int/products/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780
927T010445_001316_0000_2267_9B4F.ZIP">
                        <ows:RequestMessage xmlns="http://www.opengis.net/ows/2.0"/>
                    </ows:ServiceReference>
                </eop:fileName>
                <eop:version>1.0</eop:version>
                <eop:size uom="bytes">255211520</eop:size>
            </eop:ProductInformation>
        </eop:product>
    </eop:EarthObservationResult>
</om:result>
<eop:metaDataProperty>
    <eop:EarthObservationMetaData>

        <eop:identifier>SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_226
7_9B4F</eop:identifier>
        <eop:parentIdentifier>SEA_GEC_1P</eop:parentIdentifier>
        <eop:acquisitionType>NOMINAL</eop:acquisitionType>
        <eop:acquisitionSubType>DEFAULT</eop:acquisitionSubType>
        <eop:productType>SEA_GEC_1P</eop:productType>
        <eop:status>ARCHIVED</eop:status>
        <eop:processing>
            <eop:ProcessingInformation/>

```

```

        </eop:processing>
    </eop:EarthObservationMetaData>
</eop:metaDataProperty>
</sar:EarthObservation>

```

D.1.1.2 GeoJSON

```

{
  "type": "Feature",
  "id":
"http://fedeo.esa.int/opensearch/request/?parentIdentifier=SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
  "bbox": [
    -2.69574,
    61.965195,
    0.135472,
    63.261372
  ],
  "geometry": {
    "coordinates": [
      [
        [
          -2.682513,
          63.261372
        ],
        [
          -2.69574,
          61.997604
        ],
        [
          0.005087,
          61.965195
        ],
        [
          0.135472,
          63.227173
        ],
        [
          -2.682513,
          63.261372
        ]
      ]
    ],
    "type": "Polygon"
  },
  "properties": {
    "status": "ARCHIVED",
    "parentIdentifier": "SEA_GEC_1P",
    "title":
"SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
    "identifier":
"SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
    "doi": "10.15489/mf87c2zjgo59",
    "date": "2016-07-02T18:13:41.34Z/2016-07-02T18:14:06.34Z",
    "updated": "2017-01-26T11:30:18Z",
    "links": {
      "data": [
        {
          "href": "http://tpm-
ds.eo.esa.int/products/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F.ZIP",
          "type": "application/binary",
          "title": "Download"
        }
      ],
      "previews": [
        {
          "href": "http://tpm-
ds.eo.esa.int/metadata/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F.BI.PNG",
          "type": "image/png",

```

```

        "title": "Quicklook",
        "category": "QUICKLOOK",
        "expression": "sample",
        "conformsTo": "http://www.opengis.net.def/crs/EPSG/0/4326"
    },
    "alternates": [
        {
            "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
            "type": "application/atom+xml",
            "title": "Atom format"
        }
    ],
    "acquisitionInformation": [
        {
            "platform": {
                "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/1bffe898-f4a2-458e-92c5-cd7c9c1cd5f0",
                "platformShortName": "Seasat",
                "platformSerialIdentifier": "1"
            },
            "instrument": {
                "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/a37282d4-322c-4dd0-8edc-36099b9b586c",
                "sensorType": "RADAR",
                "instrumentShortName": "SAR"
            },
            "acquisitionParameters": {
                "operationalMode": "IM",
                "polarisationMode": "S",
                "polarisationChannels": "HH",
                "beginningDateTime": "1978-09-27T01:04:30Z",
                "endingDateTime": "1978-09-27T01:04:45Z",
                "acquisitionType": "NOMINAL",
                "acquisitionSubType": "DEFAULT",
                "orbitNumber": 1316,
                "orbitDirection": "DESCENDING",
                "antennaLookDirection": "RIGHT",
                "acquisitionAngles": {
                    "minimumIncidenceAngle": 19.6,
                    "maximumIncidenceAngle": 9.6,
                    "incidenceAngleVariation": 9.6
                }
            }
        }
    ],
    "productInformation": {
        "productType": "SEA_GEC_1P",
        "size": 255211520,
        "availabilityTime": "1978-09-27T01:04:45Z"
    }
}

```

D.1.1.3 JSON-LD (Compacted)

```

{
  "@context": "http://schemas.opengis.net/eo-geojson/1.0/eo-geojson.jsonld",
  "type": "Feature",
  "id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
  "geometry": {
    "type": "Polygon",
    "coordinates": [
      [

```

```

        -2.682513,
        63.261372
    ],
    [
        -2.69574,
        61.997604
    ],
    [
        0.005087,
        61.965195
    ],
    [
        0.135472,
        63.227173
    ],
    [
        -2.682513,
        63.261372
    ]
]
    ],
    "properties": {
        "status": "ARCHIVED",
        "parentIdentifier": "SEA_GEC_1P",
        "title":
"SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
        "identifier":
"SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
        "date": "1978-09-27T01:04:30Z/1978-09-27T01:04:45Z",
        "updated": "2017-04-11T13:36:16Z",
        "links": {
            "alternates": [
                {
                    "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
                    "type": "application/atom+xml",
                    "title": "Atom format"
                },
                {
                    "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=oml0",
                    "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0",
                    "title": "O&M metadata"
                },
                {
                    "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=om",
                    "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1",
                    "title": "O&M 1.1 metadata"
                },
                {
                    "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
                    "type": "application/rdf+xml",
                    "title": "RDF/XML format"
                },
                {
                    "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
                    "type": "application/ld+json",
                    "title": "JSON-LD format"
                }
            ]
        }
    },

```

```

        {
            "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=text/turtle&parentIdentifier=EOP:
ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_000
0_2267_9B4F&recordSchema=server-choice",
            "type": "text/turtle",
            "title": "Turtle format"
        }
    ],
    "data": [
        {
            "href": "http://tpm-
ds.eo.esa.int/products/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780
927T010445_001316_0000_2267_9B4F.ZIP",
            "type": "application/x-binary",
            "title": "Download"
        }
    ],
    "previews": [
        {
            "href": "http://tpm-
ds.eo.esa.int/metadata/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780
927T010445_001316_0000_2267_9B4F.BI.PNG",
            "type": "image/png",
            "title": "Quicklook",
            "category": "QUICKLOOK",
            "expression": "sample",
            "conformsTo": "http://www.opengis.net.def/crs/EPSPG/0/4326"
        }
    ],
    "up": [
        {
            "href":
"http://fedeo.esa.int/openserach/request/?httpAccept=application/atom%2Bxml&uid=SEA_GE
C_1P&recordSchema=iso",
            "type": "application/atom+xml",
            "title": "Up"
        }
    ]
},
"acquisitionInformation": [
    {
        "platform": {
            "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/1bffe898-f4a2-
458e-92c5-cd7c9c1cd5f0",
            "platform": "Seasat",
            "platformSerialIdentifier": "1"
        },
        "instrument": {
            "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/a37282d4-322c-
4dd0-8edc-36099b9b586c",
            "instrumentShortName": "SAR",
            "sensorType": "RADAR"
        },
        "acquisitionParameters": {
            "operationalMode": "IM",
            "polarisationMode": "S",
            "polarisationChannels": "HH",
            "beginningDateTime": "1978-09-27T01:04:30Z",
            "endingDateTime": "1978-09-27T01:04:45Z",
            "orbitDirection": "DESCENDING",
            "orbitNumber": 1316,
            "acquisitionType": "NOMINAL",
            "acquisitionSubType": "DEFAULT",
            "wrsLongitudeGrid": "0",
            "antennaLookDirection": "RIGHT",
            "acquisitionAngles": {
                "minimumIncidenceAngle": 19.6,
                "maximumIncidenceAngle": 29.2,
                "incidenceAngleVariation": 9.6
            }
        }
    }
],
"productInformation": {

```

```

    "productType": "SEA_GEC_1P",
    "size": 255211520,
    "availabilityTime": "2014-10-04T04:19:17Z",
    "referenceSystemIdentifier": "epsg:4326"
  }
}

```

D.1.1.4 JSON-LD (Expanded)

```

{
  "@context": {
    "eop": "http://www.opengis.net/ont/eo-geojson/1.0/",
    "xsd": "http://www.w3.org/2001/XMLSchema#",
    "dct": "http://purl.org/dc/terms/",
    "atom": "http://www.w3.org/2005/Atom/",
    "iana": "http://www.iana.org/assignments/relation/",
    "owc": "http://www.opengis.net/ont/owc/1.0/",
    "gj": "https://purl.org/geojson/vocab#",
    "gsp": "http://www.opengis.net/ont/geosparql#",
    "ical": "http://www.w3.org/2002/12/cal/ical#",
    "media": "http://search.yahoo.com/mrss/"
  },
  "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
  "@type": [
    "gj:Feature",
    "gsp:Feature",
    "eop:EarthObservation"
  ],
  "gj:bbox": {
    "@list": [
      -2.69574,
      61.965195,
      0.135472,
      63.261372
    ]
  },
  "gsp:hasGeometry": {
    "gsp:asWKT": "Polygon((-2.682513, 63.261372, -2.695740, 61.997604, 0.005087, 61.965195, 0.135472, 63.227173, -2.682513, 63.261372))",
    "@type": "gsp:Geometry"
  },
  "gj:geometry": {
    "@type": "gj:Polygon",
    "gj:coordinates": [
      -2.682513,
      63.261372,
      -2.69574,
      61.997604,
      0.005087,
      61.965195,
      0.135472,
      63.227173,
      -2.682513,
      63.261372
    ]
  },
  "gj:properties": {
    "@type": "gj:Properties",
    "dct:date": "1978-09-27T01:04:30Z/1978-09-27T01:04:45Z",
    "dct:modified": "2017-04-11T13:36:16Z",
    "dct:title":
"SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
    "dct:identifier":
"SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F",
    "eop:acquisitionInformation": {
      "@type": "eop:AcquisitionInformation",
      "eop:acquisitionParameters": {

```

```

    "@type": "eop:AcquisitionParameters",
    "eop:operationalMode": "IM",
    "eop:polarisationChannels": {
      "@id": "eop:PolarisationChannels/HH"
    },
    "eop:polarisationMode": {
      "@id": "eop:PolarisationMode/S"
    },
    "eop:acquisitionAngles": {
      "@type": "eop:AcquisitionAngles",
      "eop:incidenceAngleVariation": 9.6,
      "eop:maximumIncidenceAngle": 29.2,
      "eop:minimumIncidenceAngle": 19.6
    },
    "eop:acquisitionSubType": "DEFAULT",
    "eop:acquisitionType": {
      "@id": "eop:AcquisitionType/NOMINAL"
    },
    "eop:antennaLookDirection": {
      "@id": "eop:RIGHT"
    },
    "eop:orbitDirection": {
      "@id": "eop:DESCENDING"
    },
    "eop:orbitNumber": 1316,
    "eop:wrsLongitudeGrid": "0",
    "ical:dtend": "1978-09-27T01:04:45Z",
    "ical:dtstart": "1978-09-27T01:04:30Z"
  },
  "eop:instrument": {
    "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/a37282d4-322c-4dd0-8edc-36099b9b586c",
    "@type": "eop:Instrument",
    "eop:instrumentShortName": "SAR",
    "eop:sensorType": {
      "@id": "eop:RADAR"
    }
  },
  "eop:platform": {
    "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/1bffe898-f4a2-458e-92c5-cd7c9c1cd5f0",
    "@type": "eop:Platform",
    "eop:platform": "Seasat",
    "eop:platformSerialIdentifier": "1"
  },
  "eop:parentIdentifier": "SEA_GEC_1P",
  "eop:productInformation": {
    "@type": "eop:ProductInformation",
    "eop:availabilityTime": "2014-10-04T04:19:17Z",
    "eop:productType": "SEA_GEC_1P",
    "eop:referenceSystemIdentifier":
"http://www.opengis.net.def/crs/EPSSG/0/4326",
    "eop:size": 255211520
  },
  "eop:status": {
    "@id": "eop:ARCHIVED"
  },
  "owc:links": {
    "@type": "owc:Links",
    "iana:alternate": [
      {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "Atom format",
        "atom:type": "application/atom+xml"
      },
      {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=oml0",

```

```

        "@type": "atom:link",
        "dct:title": "O&M metadata",
        "atom:type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=om",
        "@type": "atom:link",
        "dct:title": "O&M 1.1 metadata",
        "atom:type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "RDF/XML format",
        "atom:type": "application/rdf+xml"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "JSON-LD format",
        "atom:type": "application/ld+json"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:OADS:SEA_GEC_1P&uid=SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "Turtle format",
        "atom:type": "text/turtle"
    }
],
    "iana:enclosure": {
        "@id": "http://tpm-
ds.eo.esa.int/products/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F.ZIP",
        "@type": "atom:link",
        "dct:title": "Download",
        "atom:type": "application/x-binary"
    },
    "iana:icon": {
        "@id": "http://tpm-
ds.eo.esa.int/metadata/SEA_GEC_1P/1978/09/27/SE1_OPER_SEA_GEC_1P_19780927T010430_19780927T010445_001316_0000_2267_9B4F.BI.PNG",
        "@type": "atom:link",
        "dct:title": "Quicklook",
        "atom:type": "image/png",
        "dct:conformsTo": "http://www.opengis.net/def/crs/EPSSG/0/4326",
        "media:category": {
            "@id": "eop:QUICKLOOK",
            "@type": "media:Category"
        },
        "media:expression": "sample"
    },
    "iana:up": {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=SEA_GEC_1P&recordSchema=iso",
        "@type": "atom:link",
        "dct:title": "Up",
        "atom:type": "application/atom+xml"
    }
}
}
}

```

}

D.1.2 Example 2: Landsat (Optical)

D.1.2.1 OGC 10-157r4

```
<?xml version="1.0" encoding="UTF-8"?>
<opt:EarthObservation xmlns:opt="http://www.opengis.net/opt/2.1"
  xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:alt="http://www.opengis.net/alt/2.1"
  xmlns:atm="http://www.opengis.net/atm/2.1" xmlns:eop="http://www.opengis.net/eop/2.1"
  xmlns:lmb="http://www.opengis.net/lmb/2.1" xmlns:om="http://www.opengis.net/om/2.0"
  xmlns:opensearch="http://a9.com/-/spec/opensearch/1.1/"
  xmlns:ows="http://www.opengis.net/ows/2.0" xmlns:sar="http://www.opengis.net/sar/2.1"
  xmlns:ssp="http://www.opengis.net/ssp/2.1" xmlns:stl="http://pisa.intecs.it/stl"
  xmlns:swe="http://www.opengis.net/swe/1.0" xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" gml:id="ID_73e3e096-6446-4bc1-
  bc0e-12528b96d85a">
  <om:phenomenonTime>
    <gml:TimePeriod gml:id="tp_73e3e096-6446-4bc1-bc0e-12528b96d85a">
      <gml:beginPosition>2000-01-07T11:12:29Z</gml:beginPosition>
      <gml:endPosition>2000-01-07T11:12:58Z</gml:endPosition>
    </gml:TimePeriod>
  </om:phenomenonTime>
  <om:resultTime>
    <gml:TimeInstant gml:id="archivingdate_73e3e096-6446-4bc1-bc0e-12528b96d85a">
      <gml:timePosition>2000-01-07T11:12:58Z</gml:timePosition>
    </gml:TimeInstant>
  </om:resultTime>
  <om:procedure>
    <eop:EarthObservationEquipment gml:id="eoe_73e3e096-6446-4bc1-bc0e-
    12528b96d85a">
      <eop:platform>
        <eop:Platform>
          <eop:shortName>Landsat</eop:shortName>
          <eop:serialIdentifier>7</eop:serialIdentifier>
        </eop:Platform>
      </eop:platform>
      <eop:instrument>
        <eop:Instrument>
          <eop:shortName>ETM</eop:shortName>
        </eop:Instrument>
      </eop:instrument>
      <eop:sensor>
        <eop:Sensor>
          <eop:sensorType>OPTICAL</eop:sensorType>
          <eop:operationalMode
            codeSpace="urn:eop:PHR:sensorMode">IM</eop:operationalMode>
          </eop:Sensor>
        </eop:sensor>
        <eop:acquisitionParameters>
          <eop:Acquisition>
            <eop:orbitNumber>3886</eop:orbitNumber>
            <eop:orbitDirection>DESCENDING</eop:orbitDirection>
            <eop:wrsLongitudeGrid codeSpace="EPSG">205</eop:wrsLongitudeGrid>
            <eop:wrsLatitudeGrid codeSpace="EPSG">31</eop:wrsLatitudeGrid>
            <eop:illuminationAzimuthAngle
              uom="deg">157.128</eop:illuminationAzimuthAngle>
            <eop:illuminationZenithAngle
              uom="deg">67.5922</eop:illuminationZenithAngle>
            <eop:illuminationElevationAngle
              uom="deg">22.4078</eop:illuminationElevationAngle>
          </eop:Acquisition>
        </eop:acquisitionParameters>
      </eop:EarthObservationEquipment>
    </om:procedure>
    <om:observedProperty nilReason="inapplicable"/>
    <om:featureOfInterest>
      <eop:Footprint gml:id="fp_73e3e096-6446-4bc1-bc0e-12528b96d85a">
        <eop:multiExtentOf>
          <gml:MultiSurface gml:id="ms_73e3e096-6446-4bc1-bc0e-12528b96d85a"
            srsName="EPSG:4326">
            <gml:surfaceMembers>
```

```

        <gml:Polygon gml:id="fppoly_73e3e096-6446-4bc1-bc0e-12528b96d85a">
          <gml:exterior>
            <gml:LinearRing>
              <gml:posList>42.7054 -10.9168 42.7186 -8.19013 40.7994 -
8.21391 40.7871 -10.8605 42.7054 -10.9168</gml:posList>
            </gml:LinearRing>
          </gml:exterior>
        </gml:Polygon>
      </gml:surfaceMembers>
    </gml:MultiSurface>
  </eop:multiExtentOf>
</eop:Footprint>
</om:featureOfInterest>
<om:result>
  <opt:EarthObservationResult gml:id="eor_73e3e096-6446-4bc1-bc0e-12528b96d85a">
    <eop:browse>
      <eop:BrowseInformation>
        <eop:type>QUICKLOOK</eop:type>
        <eop:referenceSystemIdentifier
codeSpace="EPSG">epsg:4326</eop:referenceSystemIdentifier>
        <eop:fileName>
          <ows:ServiceReference xlink:href="http://landsat-
ds.eo.esa.int/metadata/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_200
00107T111258_003886_0205_0031_9261.BP.PNG">
            <ows:RequestMessage/>
          </ows:ServiceReference>
        </eop:fileName>
      </eop:BrowseInformation>
    </eop:browse>
    <eop:browse>
      <eop:BrowseInformation>
        <eop:type>THUMBNAIL</eop:type>
        <eop:referenceSystemIdentifier
codeSpace="EPSG">epsg:4326</eop:referenceSystemIdentifier>
        <eop:fileName>
          <ows:ServiceReference xlink:href="http://landsat-
ds.eo.esa.int/metadata/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_200
00107T111258_003886_0205_0031_9261.JPG">
            <ows:RequestMessage/>
          </ows:ServiceReference>
        </eop:fileName>
      </eop:BrowseInformation>
    </eop:browse>
    <eop:product>
      <eop:ProductInformation>
        <eop:fileName>
          <ows:ServiceReference xlink:href="http://landsat-
ds.eo.esa.int/products/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_200
00107T111258_003886_0205_0031_9261.ZIP">
            <ows:RequestMessage/>
          </ows:ServiceReference>
        </eop:fileName>
        <eop:version>1.0</eop:version>
        <eop:size uom="kb">165773162</eop:size>
      </eop:ProductInformation>
    </eop:product>
    <opt:cloudCoverPercentage uom="%">0</opt:cloudCoverPercentage>
  </opt:EarthObservationResult>
</om:result>
<eop:metaDataProperty>
  <eop:EarthObservationMetaData>

    <eop:identifier>LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_00
31_9261</eop:identifier>
    <eop:parentIdentifier>LANDSAT.ETM.GTC</eop:parentIdentifier>
    <eop:acquisitionType>NOMINAL</eop:acquisitionType>
    <eop:acquisitionSubType>DEFAULT</eop:acquisitionSubType>
    <eop:productType>ETM_GTC_1P</eop:productType>
    <eop:status>ARCHIVED</eop:status>
    <eop:productQualityDegradation uom="%">0</eop:productQualityDegradation>
    <eop:processing>
      <eop:ProcessingInformation>
        <eop:processingMode>NOMINAL</eop:processingMode>
      </eop:ProcessingInformation>
    </eop:processing>
  </eop:EarthObservationMetaData>

```

```

    </eop:EarthObservationMetaData>
  </eop:metaDataProperty>
</opt:EarthObservation>

```

D.1.2.2 GeoJSON

```

{
  "type": "Feature",
  "id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
  "bbox": [ -10.9168, 40.7871, -8.19013, 42.7186 ],
  "geometry": {
    "type": "Polygon",
    "coordinates": [
      [
        [
          -10.9168,
          42.7054
        ],
        [
          -10.8605,
          40.7871
        ],
        [
          -8.21391,
          40.7994
        ],
        [
          -8.19013,
          42.7186
        ],
        [
          -10.9168,
          42.7054
        ]
      ]
    ]
  },
  "properties": {
    "status": "ARCHIVED",
    "parentIdentifier": "LANDSAT.ETM.GTC",
    "title":
"LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
    "identifier":
"LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
    "date": "2000-01-07T11:12:29Z/2000-01-07T11:12:58Z",
    "updated": "2017-04-11T11:21:45Z",
    "links": {
      "alternates": [
        {
          "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
          "type": "application/atom+xml",
          "title": "Atom format"
        },
        {
          "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=oml0",
          "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0",
          "title": "O&M metadata"
        }
      ]
    }
  }
}

```

```

    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=om",
      "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1",
      "title": "O&M 1.1 metadata"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "application/rdf+xml",
      "title": "RDF/XML format"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "application/ld+json",
      "title": "JSON-LD format"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "text/turtle",
      "title": "Turtle format"
    }
  ],
  "data": [
    {
      "href": "http://landsat-
ds.eo.esa.int/products/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261.ZIP",
      "type": "application/x-binary",
      "title": "Download"
    }
  ],
  "previews": [
    {
      "href": "http://landsat-
ds.eo.esa.int/metadata/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261.BP.PNG",
      "type": "image/png",
      "title": "Quicklook"
    }
  ],
  "up": [
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=LANDSAT.ETM.GTC&recordSchema=iso",
      "type": "application/atom+xml",
      "title": "Up"
    }
  ]
},
"acquisitionInformation": [
  {
    "platform": {
      "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/c7a09e9f-3c99-4b31-a521-313c379ba2b4",
      "platform": "Landsat",
      "platformSerialIdentifier": "7"
    },
    "instrument": {
      "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/4dbe7764-a2ea-4a19-b754-696c35ac3205",
      "instrumentShortName": "ETM",

```

```

        "sensorType": "OPTICAL"
    },
    "acquisitionParameters": {
        "operationalMode": "IM",

        "beginningDateTime": "2000-01-07T11:12:29Z",
        "endingDateTime": "2000-01-07T11:12:58Z",
        "orbitDirection": "DESCENDING",
        "orbitNumber": 3886,
        "acquisitionType": "NOMINAL",
        "acquisitionSubType": "DEFAULT",
        "wrsLongitudeGrid": "205",
        "wrsLatitudeGrid": "31"
    }
},
    "productInformation": {
        "productType": "ETM_GTC_1P",
        "size": 165773162,
        "availabilityTime": "2000-01-07T11:12:58Z",
        "referenceSystemIdentifier": "epsg:4326",
        "cloudCover": 0
    }
}
}

```

D.1.2.3 JSON-LD (Compacted)

```

{
  "@context": "http://schemas.opengis.net/eo-geojson/1.0/eo-geojson.jsonld",
  "type": "Feature",
  "id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
  "geometry": {
    "type": "Polygon",
    "coordinates": [
      [
        [
          -10.9168,
          42.7054
        ],
        [
          -10.8605,
          40.7871
        ],
        [
          -8.21391,
          40.7994
        ],
        [
          -8.19013,
          42.7186
        ],
        [
          -10.9168,
          42.7054
        ]
      ]
    ]
  },
  "properties": {
    "status": "ARCHIVED",
    "parentIdentifier": "LANDSAT.ETM.GTC",
    "title":
"LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
    "identifier":
"LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
    "date": "2000-01-07T11:12:29Z/2000-01-07T11:12:58Z",
    "updated": "2017-04-11T11:21:45Z",
  }
}

```

```

"links": {
  "alternates": [
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "application/atom+xml",
      "title": "Atom format"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=om10",
      "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0",
      "title": "O&M metadata"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=om",
      "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1",
      "title": "O&M 1.1 metadata"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "application/rdf+xml",
      "title": "RDF/XML format"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "application/ld+json",
      "title": "JSON-LD format"
    },
    {
      "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261&recordSchema=server-choice",
      "type": "text/turtle",
      "title": "Turtle format"
    }
  ],
  "data": [
    {
      "href": "http://landsat-
ds.eo.esa.int/products/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_2000107T111258_003886_0205_0031_9261.ZIP",
      "type": "application/x-binary",
      "title": "Download"
    }
  ],
  "previews": [
    {
      "href": "http://landsat-
ds.eo.esa.int/metadata/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_2000107T111258_003886_0205_0031_9261.BP.PNG",
      "type": "image/png",
      "title": "Quicklook"
    }
  ],
  "up": [
    {

```

```

        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=LANDSAT.ETM.GTC&recordSchema=iso",
        "type": "application/atom+xml",
        "title": "Up"
    }
    ],
    "acquisitionInformation": [
    {
        "platform": {
            "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/c7a09e9f-3c99-4b31-a521-313c379ba2b4",
            "platformShortName": "Landsat",
            "platformSerialIdentifier": "7"
        },
        "instrument": {
            "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/4dbe7764-a2ea-4a19-b754-696c35ac3205",
            "instrumentShortName": "ETM",
            "sensorType": "OPTICAL"
        },
        "acquisitionParameters": {
            "operationalMode": "IM",
            "beginningDateTime": "2000-01-07T11:12:29Z",
            "endingDateTime": "2000-01-07T11:12:58Z",
            "orbitDirection": "DESCENDING",
            "orbitNumber": 3886,
            "acquisitionType": "NOMINAL",
            "acquisitionSubType": "DEFAULT",
            "wrsLongitudeGrid": "205",
            "wrsLatitudeGrid": "31"
        }
    }
    ],
    "productInformation": {
        "productType": "ETM_GTC_1P",
        "size": 165773162,
        "availabilityTime": "2000-01-07T11:12:58Z",
        "referenceSystemIdentifier": "epsg:4326",
        "cloudCover": 0
    }
}

```

D.1.2.4 JSON-LD (Expanded)

```

{
  "@context": {
    "eop": "http://www.opengis.net/ont/eo-geojson/1.0/",
    "xsd": "http://www.w3.org/2001/XMLSchema#",
    "dct": "http://purl.org/dc/terms/",
    "atom": "http://www.w3.org/2005/Atom/",
    "iana": "http://www.iana.org/assignments/relation/",
    "owc": "http://www.opengis.net/ont/owc/1.0/",
    "gjj": "http://purl.org/geojson/vocab#",
    "gsp": "http://www.opengis.net/ont/geosparql#",
    "ical": "http://www.w3.org/2002/12/cal/ical#",
    "media": "http://search.yahoo.com/mrss/"
  },
  "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
  "@type": [
    "gjj:Feature",
    "eop:EarthObservation"
  ],
  "gjj:geometry": {
    "@type": "gjj:Polygon",
    "gjj:coordinates": [
      -8.19013,
      42.7186,

```

```

        -8.21391,
        40.7994,
        -10.8605,
        40.7871,
        -10.9168,
        42.7054,
        -10.9168,
        42.7054
    ]
},
"gj:properties": {
    "@type": "gj:Properties",
    "dct:date": "2000-01-07T11:12:29Z/2000-01-07T11:12:58Z",
    "dct:modified": "2017-04-11T11:21:45Z",
    "dct:title":
"LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
    "dct:identifier":
"LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T111258_003886_0205_0031_9261",
    "eop:acquisitionInformation": {
        "@type": "eop:AcquisitionInformation",
        "eop:acquisitionParameters": {
            "eop:operationalMode": "IM",

            "@type": "eop:AcquisitionParameters",
            "eop:acquisitionSubType": "DEFAULT",
            "eop:acquisitionType": {
                "@id": "eop:AcquisitionType/NOMINAL"
            },
            "eop:wrsLatitudeGrid": "31",
            "eop:orbitDirection": {
                "@id": "eop:DESCENDING"
            },
            "eop:orbitNumber": 3886,
            "eop:wrsLongitudeGrid": "205",
            "ical:dtend": "2000-01-07T11:12:58Z",
            "ical:dtstart": "2000-01-07T11:12:29Z"
        },
        "eop:instrument": {
            "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/4dbe7764-a2ea-4a19-
b754-696c35ac3205",
            "@type": "eop:Instrument",
            "eop:instrumentShortName": "ETM",
            "eop:sensorType": {
                "@id": "eop:OPTICAL"
            }
        },
        "eop:platform": {
            "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/c7a09e9f-3c99-4b31-
a521-313c379ba2b4",
            "@type": "eop:Platform",
            "eop:platform": "Landsat",
            "eop:platformSerialIdentifier": "7"
        }
    },
    "eop:parentIdentifier": "LANDSAT.ETM.GTC",
    "eop:productInformation": {
        "@type": "eop:ProductInformation",
        "eop:availabilityTime": "2000-01-07T11:12:58Z",
        "eop:productType": "ETM_GTC_1P",
        "eop:referenceSystemIdentifier":
"http://www.opengis.net.def/crs/EPSSG/0/4326",
        "eop:size": 165773162,
        "eop:cloudCover": 0
    },
    "eop:status": {
        "@id": "eop:ARCHIVED"
    },
    "owc:links": {
        "@type": "owc:Links",
        "iana:alternate": [
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIden-
tifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T
111258_003886_0205_0031_9261&recordSchema=server-choice",

```

```

        "@type": "atom:link",
        "dct:title": "Atom format",
        "atom:type": "application/atom+xml"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T11258_003886_0205_0031_9261&recordSchema=oml0",
        "@type": "atom:link",
        "dct:title": "O&M metadata",
        "atom:type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T11258_003886_0205_0031_9261&recordSchema=om",
        "@type": "atom:link",
        "dct:title": "O&M 1.1 metadata",
        "atom:type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T11258_003886_0205_0031_9261&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "RDF/XML format",
        "atom:type": "application/rdf+xml"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T11258_003886_0205_0031_9261&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "JSON-LD format",
        "atom:type": "application/ld+json"
    },
    {
        "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:OADS:LANDSAT.ETM.GTC&uid=LS07_RMPS_ETM_GTC_1P_20000107T111229_20000107T11258_003886_0205_0031_9261&recordSchema=server-choice",
        "@type": "atom:link",
        "dct:title": "Turtle format",
        "atom:type": "text/turtle"
    }
],
    "iana:enclosure": {
        "@id": "http://landsat-
ds.eo.esa.int/products/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_2000107T111258_003886_0205_0031_9261.ZIP",
        "@type": "atom:link",
        "dct:title": "Download",
        "atom:type": "application/x-binary"
    },
    "iana:icon": {
        "@id": "http://landsat-
ds.eo.esa.int/metadata/LANDSAT_ETM/2000/01/07/LS07_RMPS_ETM_GTC_1P_20000107T111229_2000107T111258_003886_0205_0031_9261.BP.PNG",
        "@type": "atom:link",
        "dct:title": "Quicklook",
        "atom:type": "image/png",
        "media:category": {
            "@id": "eop:QUICKLOOK",
            "@type": "media:Category"
        }
    },
    "iana:up": {

```

```

        "@id":
        "http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=LANDSA
T.ETM.GTC&recordSchema=iso",
        "@type": "atom:link",
        "dct:title": "Up",
        "atom:type": "application/atom+xml"
    }
}
}
}
}

```

D.1.3 Example 3: Cryosat-2 (Altimetric)

D.1.3.1 OGC 10-157r4

```

<?xml version="1.0" encoding="UTF-8"?>
<alt:EarthObservation xmlns:alt="http://www.opengis.net/alt/2.1"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:atom="http://www.w3.org/2005/Atom"
xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:eo="http://a9.com/-
/opensearch/extensions/eo/1.0/" xmlns:eop="http://www.opengis.net/eop/2.1"
xmlns:fo="http://www.w3.org/1999/XSL/Format" xmlns:geo="http://a9.com/-
/opensearch/extensions/geo/1.0/" xmlns:georss="http://www.georss.org/georss"
xmlns:om="http://www.opengis.net/om/2.0" xmlns:os="http://a9.com/-
/spec/opensearch/1.1/" xmlns:ows="http://www.opengis.net/ows/2.0"
xmlns:semantic="http://a9.com/-/opensearch/extensions/semantic/1.0/"
xmlns:sru="http://a9.com/-/opensearch/extensions/sru/2.0/"
xmlns:swe="http://www.opengis.net/swe/1.0" xmlns:time="http://a9.com/-
/opensearch/extensions/time/1.0/" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_1">
  <om:phenomenonTime>
    <gml:TimePeriod
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_2">
      <gml:beginPosition>2010-07-22T12:05:23Z</gml:beginPosition>
      <gml:endPosition>2010-07-22T13:44:36Z</gml:endPosition>
    </gml:TimePeriod>
  </om:phenomenonTime>
  <om:resultTime>
    <gml:TimeInstant
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_3">
      <gml:timePosition>2016-03-09T16:39:40Z</gml:timePosition>
    </gml:TimeInstant>
  </om:resultTime>
  <om:procedure>
    <alt:EarthObservationEquipment
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_4">
      <eop:platform>
        <eop:Platform>
          <eop:shortName>Cryosat</eop:shortName>
          <eop:serialIdentifier>2</eop:serialIdentifier>
        </eop:Platform>
      </eop:platform>
      <eop:instrument>
        <eop:Instrument>
          <eop:shortName>SIRAL</eop:shortName>
        </eop:Instrument>
      </eop:instrument>
      <eop:sensor>
        <eop:Sensor>
          <eop:sensorType>ALTIMETRIC</eop:sensorType>
          <eop:operationalMode/>
        </eop:Sensor>
      </eop:sensor>
      <eop:acquisitionParameters>
        <alt:Acquisition>
          <eop:orbitNumber>001523</eop:orbitNumber>
          <eop:lastOrbitNumber>001523</eop:lastOrbitNumber>
          <eop:orbitDirection>ASCENDING</eop:orbitDirection>
          <eop:ascendingNodeDate>2010-07-22T12:04:49Z</eop:ascendingNodeDate>
        </alt:Acquisition>
      </eop:acquisitionParameters>
    </om:procedure>
  </alt:EarthObservationEquipment>
</gml:id>

```

```

        <eop:ascendingNodeLongitude uom="deg">-
169.101978</eop:ascendingNodeLongitude>
        <eop:startTimeFromAscendingNode
uom="ms">0000.761548</eop:startTimeFromAscendingNode>
        <eop:completionTimeFromAscendingNode
uom="ms">5953.440918</eop:completionTimeFromAscendingNode>
        </alt:Acquisition>
        </eop:acquisitionParameters>
        </alt:EarthObservationEquipment>
        </om:procedure>
        <om:observedProperty nilReason="inapplicable" xsi:nil="true"/>
        <om:featureOfInterest>
        <alt:Footprint
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_5">
        <eop:multiExtentOf/>
        <alt:nominalTrack>
        <gml:MultiCurve
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_6">
        <gml:curveMember>
        <gml:LineString
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_7"
srsName="EPSG:4326">
        <gml:posList>0.046332 -169.106794 -0.004573
166.040236</gml:posList>
        </gml:LineString>
        </gml:curveMember>
        </gml:MultiCurve>
        </alt:nominalTrack>
        </alt:Footprint>
        </om:featureOfInterest>
        <om:result>
        <eop:EarthObservationResult
gml:id="CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001_8">
        <eop:product>
        <eop:ProductInformation>
        <eop:fileName>
        <ows:ServiceReference xlink:href="ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T13440
3_C001.DBL">
        <ows:RequestMessage xmlns="http://www.opengis.net/ows/2.0"/>
        </ows:ServiceReference>
        </eop:fileName>
        <eop:version>C001</eop:version>
        <eop:size uom="bytes">0000000000000008612306</eop:size>
        </eop:ProductInformation>
        </eop:product>
        </eop:EarthObservationResult>
        </om:result>
        <eop:metadataProperty>
        <eop:EarthObservationMetadata>

        <eop:identifier>CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001</eop:identi
fier>
        <eop:parentIdentifier>CR2_SIR</eop:parentIdentifier>
        <eop:acquisitionType>NOMINAL</eop:acquisitionType>
        <eop:productType>SIR_GDR_2</eop:productType>
        <eop:status>ARCHIVED</eop:status>
        <eop:downlinkedTo>
        <eop:DownlinkInformation>
        <eop:acquisitionStation>KS</eop:acquisitionStation>
        </eop:DownlinkInformation>
        </eop:downlinkedTo>

        <eop:productQualityDegradationQuotationMode>AUTOMATIC</eop:productQualityDegradatio
nQuotationMode>
        <eop:productQualityStatus>DEGRADED</eop:productQualityStatus>

        <eop:productQualityReportURL>CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C00
1.QR.XML</eop:productQualityReportURL>
        <eop:processing>
        <alt:ProcessingInformation>
        <eop:processingCenter>PDS</eop:processingCenter>
        <eop:processingDate>2016-03-09T16:39:40Z</eop:processingDate>
        <eop:processorVersion>3.1</eop:processorVersion>
        <eop:shortName>2</eop:shortName>

```

```

        </alt:ProcessingInformation>
    </eop:processing>
    <eop:vendorSpecific>
        <eop:SpecificInformation>
            <eop:localAttribute>missionPhase</eop:localAttribute>
            <eop:localValue>1</eop:localValue>
        </eop:SpecificInformation>
    </eop:vendorSpecific>
</eop:EarthObservationMetaData>
</eop:metaDataProperty>
</alt:EarthObservation>

```

D.1.3.2 GeoJSON

```

{
  "type": "Feature",
  "id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
  "bbox": [
    -0.004573,
    -169.106794,
    0.046332,
    166.040236
  ],
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        -169.106794,
        0.046332
      ],
      [
        166.040236,
        -0.004573
      ]
    ]
  },
  "properties": {
    "status": "ARCHIVED",
    "parentIdentifier": "CR2_SIR",
    "title": "CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
    "identifier": "CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
    "date": "2010-07-22T12:05:23Z/2010-07-22T13:44:36Z",
    "updated": "2017-04-11T14:37:41Z",
    "links": {
      "alternates": [
        {
          "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
          "type": "application/atom+xml",
          "title": "Atom format"
        },
        {
          "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=oml0",
          "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0",
          "title": "O&M metadata"
        },
        {
          "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=om",

```

```

        "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1",
        "title": "O&M 1.1 metadata"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
        "type": "application/rdf+xml",
        "title": "RDF/XML format"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
        "type": "application/ld+json",
        "title": "JSON-LD format"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
        "type": "text/turtle",
        "title": "Turtle format"
    }
],
"data": [
    {
        "href": "ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001.DBL",
        "type": "application/x-binary",
        "title": "Download"
    }
],
"via": [
    {
        "href": "ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001.HDR",
        "type": "application/xml",
        "title": "Via"
    }
],
"up": [
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=CR2_SIR&recordSchema=iso",
        "type": "application/atom+xml",
        "title": "Up"
    }
]
},
"acquisitionInformation": [
    {
        "platform": {
            "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/a915ab2f-46c5-493b-9f18-aeb3383ee72b",
            "platformShortName": "Cryosat",
            "platformSerialIdentifier": "2"
        },
        "instrument": {
            "id": "https://gcmdservices.gsfc.nasa.gov/kms/concept/30787b9f-a407-47a5-b69b-5b9e1d1b1144",
            "instrumentShortName": "SIRAL",
            "sensorType": "ALTIMETRIC"
        },
        "acquisitionParameters": {
            "operationalMode": "",
            "beginningDateTime": "2010-07-22T12:05:23Z",
            "endingDateTime": "2010-07-22T13:44:36Z",

```

```

        "orbitDirection": "ASCENDING",
        "orbitNumber": 1523,
        "lastOrbitNumber": 1523,
        "ascendingNodeDate": "2010-07-22T12:04:49Z",
        "ascendingNodeLongitude": -169.101978,
        "acquisitionType": "NOMINAL",
        "startTimeFromAscendingNode": 761,
        "completionTimeFromAscendingNode": 5953440,
        "acquisitionStation": "KS"
    }
},
    "productInformation": {
        "productType": "SIR_GDR_2_",
        "size": 8612306,
        "availabilityTime": "2016-03-09T16:39:40Z",
        "version": "C001",
        "processingCenter": "PDS",
        "processingDate": "2016-03-09T16:39:40Z",
        "processorVersion": "3.1",
        "qualityInformation": {
            "qualityStatus": "DEGRADED"
        }
    }
}
}
}

```

D.1.3.3 JSON-LD (Compacted)

```

{
  "@context": "http://schemas.opengis.net/eo-geojson/1.0/eo-geojson.jsonld",
  "type": "Feature",
  "id": "http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
  "bbox": [
    -0.004573,
    -169.106794,
    0.046332,
    166.040236
  ],
  "geometry": {
    "type": "LineString",
    "coordinates": [
      [
        -169.106794,
        0.046332
      ],
      [
        166.040236,
        -0.004573
      ]
    ]
  },
  "properties": {
    "status": "ARCHIVED",
    "parentIdentifier": "CR2_SIR",
    "title": "CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
    "identifier": "CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
    "date": "2010-07-22T12:05:23Z/2010-07-22T13:44:36Z",
    "updated": "2017-04-11T14:37:41Z",
    "links": {
      "alternates": [
        {
          "href": "http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",

```

```

        "type": "application/atom+xml",
        "title": "Atom format"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=oml0",
        "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0",
        "title": "O&M metadata"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=om",
        "type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1",
        "title": "O&M 1.1 metadata"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
        "type": "application/rdf+xml",
        "title": "RDF/XML format"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
        "type": "application/ld+json",
        "title": "JSON-LD format"
    },
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
        "type": "text/turtle",
        "title": "Turtle format"
    }
],
"data": [
    {
        "href": "ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001.DBL",
        "type": "application/x-binary",
        "title": "Download"
    }
],
"via": [
    {
        "href": "ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001.HDR",
        "type": "application/xml",
        "title": "Via"
    }
],
"up": [
    {
        "href":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=CR2_SIR&recordSchema=iso",
        "type": "application/atom+xml",
        "title": "Up"
    }
]
},
"acquisitionInformation": [

```

```

    {
      "platform": {
        "id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/a915ab2f-46c5-493b-9f18-aeb3383ee72b",
        "platformShortName": "Cryosat",
        "platformSerialIdentifier": "2"
      },
      "instrument": {
        "id": "https://gcmdservices.gsfc.nasa.gov/kms/concept/30787b9f-a407-47a5-b69b-5b9e1d1b1144",
        "instrumentShortName": "SIRAL",
        "sensorType": "ALTIMETRIC"
      },
      "acquisitionParameters": {
        "operationalMode": "",
        "beginningDateTime": "2010-07-22T12:05:23Z",
        "endingDateTime": "2010-07-22T13:44:36Z",
        "orbitDirection": "ASCENDING",
        "orbitNumber": 1523,
        "lastOrbitNumber": 1523,
        "ascendingNodeDate": "2010-07-22T12:04:49Z",
        "ascendingNodeLongitude": -169.101978,
        "acquisitionType": "NOMINAL",
        "startTimeFromAscendingNode": 761548,
        "completionTimeFromAscendingNode": 5953,
        "acquisitionStation": "KS"
      }
    },
    "productInformation": {
      "productType": "SIR_GDR_2_",
      "size": 8612306,
      "availabilityTime": "2016-03-09T16:39:40Z",
      "version": "C001",
      "processingCenter": "PDS",
      "processingDate": "2016-03-09T16:39:40Z",
      "processorVersion": "3.1",
      "qualityInformation": {
        "qualityStatus": "DEGRADED"
      }
    }
  }
}

```

D.1.3.4 JSON-LD (Expanded)

```

{
  "@context": {
    "eop": "http://www.opengis.net/ont/eo-geojson/1.0/",
    "xsd": "http://www.w3.org/2001/XMLSchema#",
    "dct": "http://purl.org/dc/terms/",
    "atom": "http://www.w3.org/2005/Atom/",
    "iana": "http://www.iana.org/assignments/relation/",
    "owc": "http://www.opengis.net/ont/owc/1.0/",
    "gjj": "https://purl.org/geojson/vocab#",
    "gsp": "http://www.opengis.net/ont/geosparql#",
    "ical": "http://www.w3.org/2002/12/cal/ical#",
    "media": "http://search.yahoo.com/mrss/"
  },
  "@id": "http://fedeo.esa.int/opensearch/request/?httpAccept=application/geo%2Bjson&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
  "@type": [
    "gjj:Feature",
    "eop:EarthObservation"
  ],
  "gjj:bbox": {
    "@list": [
      -0.004573,
      -169.106794,

```

```

        0.046332,
        166.040236
    ]
},
"gj:geometry": {
    "@type": "gj:LineString",
    "gj:coordinates": [
        -169.106794,
        0.046332,
        166.040236,
        -0.004573
    ]
},
"gj:properties": {
    "@type": "gj:Properties",
    "dct:date": "2010-07-22T12:05:23Z/2010-07-22T13:44:36Z",
    "dct:modified": "2017-04-11T14:37:41Z",
    "dct:title": "CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
    "dct:identifier": "CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001",
    "eop:acquisitionInformation": {
        "@type": "eop:AcquisitionInformation",
        "eop:acquisitionParameters": {
            "@type": "eop:AcquisitionParameters",
            "eop:operationalMode": "",
            "eop:acquisitionStation": "KS",
            "acquisitionType": {
                "@id": "eop:AcquisitionType/NOMINAL"
            },
            "eop:ascendingNodeDate": "2010-07-22T12:04:49Z",
            "eop:ascendingNodeLongitude": -169.101978,
            "eop:completionTimeFromAscendingNode": "5953.440918",
            "eop:lastOrbitNumber": 1523,
            "eop:orbitDirection": {
                "@id": "eop:ASCENDING"
            },
            "eop:orbitNumber": 1523,
            "eop:startTimeFromAscendingNode": "0000.761548",
            "ical:dtend": "2010-07-22T13:44:36Z",
            "ical:dtstart": "2010-07-22T12:05:23Z"
        },
        "eop:instrument": {
            "@type": "eop:Instrument",
            "@id": "https://gcmdservices.gsfc.nasa.gov/kms/concept/30787b9f-a407-47a5-b69b-5b9e1db1144",
            "eop:instrumentShortName": "SIRAL",
            "eop:sensorType": {
                "@id": "eop:ALTIMETRIC"
            }
        },
        "eop:platform": {
            "@id": "http://gcmdservices.gsfc.nasa.gov/kms/concept/a915ab2f-46c5-493b-9f18-aeb3383ee72b",
            "@type": "eop:Platform",
            "eop:platformShortName": "Cryosat",
            "eop:platformSerialIdentifier": "2"
        }
    },
    "eop:parentIdentifier": "CR2_SIR",
    "eop:productInformation": {
        "@type": "eop:ProductInformation",
        "eop:availabilityTime": "2016-03-09T16:39:40Z",
        "eop:processingCenter": "PDS",
        "eop:processingDate": "2016-03-09T16:39:40Z",
        "eop:processorVersion": "3.1",
        "eop:productType": "SIR_GDR_2_",
        "eop:qualityInformation": {
            "eop:qualityStatus": "DEGRADED"
        },
        "eop:size": 8612306,
        "eop:version": "C001"
    },
    "eop:status": {
        "@id": "eop:ARCHIVED"
    },
    "owc:links": {

```

```

        "@type": "owc:Links",
        "iana:alternate": [
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
                "@type": "atom:link",
                "dct:title": "Atom format",
                "atom:type": "application/atom+xml"
            },
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=oml0",
                "@type": "atom:link",
                "dct:title": "O&M metadata",
                "atom:type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.0"
            },
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/gml%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=om",
                "@type": "atom:link",
                "dct:title": "O&M 1.1 metadata",
                "atom:type":
"application/gml+xml;profile=http://www.opengis.net/spec/EOMPOM/1.1"
            },
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/rdf%2Bxml&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
                "@type": "atom:link",
                "dct:title": "RDF/XML format",
                "atom:type": "application/rdf+xml"
            },
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/ld%2Bjson&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
                "@type": "atom:link",
                "dct:title": "JSON-LD format",
                "atom:type": "application/ld+json"
            },
            {
                "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=text/turtle&parentIdentifier=EOP:ESA:CRYOSAT:CR2_SIR&uid=CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001&recordSchema=server-choice",
                "@type": "atom:link",
                "dct:title": "Turtle format",
                "atom:type": "text/turtle"
            }
        ],
        "iana:enclosure": {
            "@id": "ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T134403_C001.DBL",
            "@type": "atom:link",
            "dct:title": "Download",
            "atom:type": "application/x-binary"
        },
        "iana:up": {
            "@id":
"http://fedeo.esa.int/opensearch/request/?httpAccept=application/atom%2Bxml&uid=CR2_SIR&recordSchema=iso",
            "@type": "atom:link",
            "dct:title": "Up",
            "atom:type": "application/atom+xml"
        }
    },

```

```

        "iana:via": {
            "@id": "ftp://science-
pds.cryosat.esa.int//SIR_GDR/2010/07/CS_LTA__SIR_GDR_2__20100722T120449_20100722T13440
3_C001.HDR",
            "@type": "atom:link",
            "dct:title": "Via",
            "atom:type": "application/xml"
        }
    }
}

```

Annex E: GEOJSON SCHEMAS (NORMATIVE)

E.1 Schemas for EO GeoJSON validation

JSON Schema [OR18] representation (Draft 04) is used to define the schemas. This specification is supported by several tools (including Altova XML Spy 2016, JSONBuddy 3.5 and also Web-based tools²¹) and is also used to define data types in the OpenAPI specification²². It does not allow to easily model composition of schemas or inheritance without relaxing the schemas. Therefore, the property **"additionalProperties"** is set to **true** in some schema definitions to allow using the **"allOf"** operator to model inheritance. A future version v5 of JSON Schema is expected to propose a \$merge operator to better support this. Other schema languages (e.g. SJOT²³) have better support for this, but have less tool support.

The schemas below assume that numbers are not surrounded by double quotes as per the JSON Style Guidelines [OR16].

The file is available at <http://schemas.opengis.net/eo-geojson/1.0/eo-geojson-schema.json> (See Annex E:).

```
{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "title": "GeoJSON encoding of OGC 17-003 Earth Observation Metadata",
  "description": "Definition of EO Dataset document. Note that numbers in the
instance should not be surrounded by double-quotes to validate against this schema.",
  "$ref": "#/definitions/EarthObservation",
  "definitions": {
```

E.1.1 Definitions/MetadataInformation

```
"MetadataInformation": {
  "description": "Subset of Properties",
  "type": "object",
  "properties": {
    "lang": {
      "description": "RFC3066",
      "type": "string",
      "minLength": 2,
      "maxLength": 3
    },
    "updated": {
      "type": "string",
      "pattern": "^[0-9]{4}-[0-9]{2}-[0-9]{2}T[0-9]{2}:[0-9]{2}:[0-9]{2}(\\. [0-9]{2,3})?(Z|\\+\\-\\+\\- [0-9]{2}:[0-9]{2})$",
      "format": "date-time"
    },
    "published": {
      "type": "string",
      "format": "date-time"
    },
    "creationDate": {
      "type": "string",
      "format": "date-time"
    }
  },
  "required": [
    "updated"
  ]
}
```

²¹ E.g. <https://jsonschemalint.com/#/version/draft-04/markup/json> or <http://www.jsonschemavalidator.net/>

²² <https://www.openapis.org/specification/repo>

²³ "SJOT: Schemas for JSON Objects", <https://www.genivia.com/sjot.html>

```
},
```

E.1.2 Definitions/DataIdentification

```
"DataIdentification": {
  "description": "Subset of Properties",
  "type": "object",
  "properties": {
    "parentIdentifier": {
      "type": "string"
    },
    "doi": {
      "type": "string"
    },
    "title": {
      "type": "string"
    },
    "identifier": {
      "type": "string"
    },
    "date": {
      "type": "string"
    },
    "created": {
      "type": "string",
      "format": "date-time"
    },
    "available": {
      "type": "string"
    },
    "additionalAttributes": {
      "type": "object",
      "minProperties": 1
    }
  },
  "required": [
    "title",
    "identifier",
    "date"
  ]
},
```

E.1.3 Definitions/ProcessingInformation

```
"ProcessingInformation": {
  "description": "Subset of ProductInformation",
  "type": "object",
  "properties": {
    "processingLevel": {
      "type": "string",
      "enum": [
        "1A",
        "1B",
        "1C",
        "2",
        "3"
      ]
    },
    "processorName": {
      "type": "string"
    },
    "processorVersion": {
      "type": "string"
    },
    "processingCenter": {
      "description": "Codelist",
      "type": "string"
    },
    "processingDate": {
      "type": "string",
      "format": "date-time"
    }
  },
}
```

```

        "processingMode": {
            "description": "Codelist",
            "type": "string"
        },
        "compositeType": {
            "type": "string"
        },
        "format": {
            "type": "string"
        },
        "productContentsType": {
            "type": "string"
        },
        "processingMethod": {
            "type": "string"
        },
        "processingMethodVersion": {
            "type": "string"
        }
    },
    },
},

```

E.1.4 Definitions/Links

```

    "Links": {
        "title": "Links",
        "description": "Objects with Links grouped by \"relation\" (i.e. Atom \"rel\" attribute).",
        "type": "object",
        "properties": {
            "type": {
                "type": "string",
                "enum": [
                    "Links"
                ]
            },
            "qualityReport": {
                "type": "array",
                "items": {
                    "$ref": "#/definitions/Link"
                }
            },
            "previews": {
                "type": "array",
                "items": {
                    "$ref": "#/definitions/Link"
                }
            },
            "via": {
                "type": "array",
                "items": {
                    "$ref": "#/definitions/Link"
                }
            },
            "data": {
                "type": "array",
                "items": {
                    "$ref": "#/definitions/Link"
                }
            },
            "up": {
                "type": "array",
                "items": {
                    "$ref": "#/definitions/Link"
                }
            },
            "related": {
                "type": "array",
                "items": {
                    "$ref": "#/definitions/Link"
                }
            },
            "alternates": {

```

```

        "type": "array",
        "items": {
            "$ref": "#/definitions/Link"
        }
    }
}
},

```

E.1.5 Definitions/Properties

```

"Properties": {
    "title": "Properties",
    "type": "object",
    "allOf": [
        {
            "type": "object",
            "properties": {
                "type": {
                    "type": "string",
                    "enum": [
                        "Properties"
                    ]
                },
                "status": {
                    "type": "string",
                    "enum": [
                        "ARCHIVED",
                        "PLANNED",
                        "ACQUIRED",
                        "CANCELLED",
                        "FAILED",
                        "POTENTIAL",
                        "REJECTED",
                        "QUALITYDEGRADED"
                    ]
                },
                "acquisitionInformation": {
                    "type": "array",
                    "items": {
                        "$ref": "#/definitions/AcquisitionInformation"
                    }
                },
                "productInformation": {
                    "$ref": "#/definitions/ProductInformation"
                },
                "links": {
                    "$ref": "#/definitions/Links"
                },
                "offerings": {
                    "description": "OGC 14-055r2",
                    "type": "array",
                    "items": {
                        "$ref": "http://schemas.opengis.net/eo-geojson/1.0/owc-geojson-schema.json#/definitions/Offering"
                    }
                }
            }
        },
        {
            "required": [
                "status",
                "acquisitionInformation",
                "links"
            ]
        },
        {
            "$ref": "#/definitions/DataIdentification"
        },
        {
            "$ref": "#/definitions/MetadataInformation"
        }
    ]
},

```

E.1.6 Definitions/EarthObservation

```
"EarthObservation": {
  "description": "GeoJSON Feature",
  "type": "object",
  "properties": {
    "@context": {
      "type": "string"
    },
    "type": {
      "title": "type",
      "type": "string",
      "enum": [
        "Feature"
      ]
    },
    "id": {
      "type": "string",
      "format": "uri"
    },
    "geometry": {
      "oneOf": [
        {
          "$ref": "http://schemas.opengis.net/eo-geojson/1.0/owc-geojson-
schema.json#/definitions/Geometry"
        },
        {
          "type": "null"
        }
      ]
    },
    "properties": {
      "$ref": "#/definitions/Properties"
    },
    "bbox": {
      "type": "array",
      "minItems": 4,
      "maxItems": 4,
      "items": {
        "type": "number"
      }
    }
  },
  "required": [
    "type",
    "id",
    "geometry",
    "properties"
  ],
  "additionalProperties": false
},
```

E.1.7 Definitions/Platform

```
"Platform": {
  "type": "object",
  "minProperties": 1,
  "properties": {
    "type": {
      "type": "string",
      "enum": [
        "Platform"
      ]
    },
    "id": {
      "type": "string",
      "format": "uri"
    },
    "platformShortName": {
      "type": "string"
    },
    "platformSerialIdentifier": {
```

```

        "type": "string"
    },
    "orbitType": {
        "type": "string",
        "enum": [
            "GEO",
            "LEO"
        ]
    }
},
"required": [
    "platformShortName"
],
"additionalProperties": false
},

```

E.1.8 Definitions/Instrument

```

"Instrument": {
    "type": "object",
    "properties": {
        "type": {
            "type": "string",
            "enum": [
                "Instrument"
            ]
        },
        "id": {
            "type": "string",
            "format": "uri"
        },
        "sensorType": {
            "type": "string",
            "enum": [
                "OPTICAL",
                "RADAR",
                "ATMOSPHERIC",
                "ALTIMETRIC",
                "LIMB"
            ]
        },
        "instrumentShortName": {
            "type": "string"
        },
        "description": {
            "type": "string"
        }
    },
    "required": [
        "instrumentShortName"
    ],
    "additionalProperties": false
},

```

E.1.9 Definitions/AcquisitionParameters

```

"AcquisitionParameters": {
    "type": "object",
    "allof": [
        {
            "type": "object",
            "properties": {
                "acquisitionType": {
                    "type": "string",
                    "enum": [
                        "NOMINAL",
                        "CALIBRATION",
                        "OTHER"
                    ]
                },
                "acquisitionSubType": {

```

```

        "type": "string"
    },
    "startTimeFromAscendingNode": {
        "type": "integer",
        "minimum": 0
    },
    "completionTimeFromAscendingNode": {
        "type": "integer",
        "minimum": 0
    },
    "relativeOrbitNumber": {
        "type": "integer"
    },
    "wrsLongitude": {
        "type": "string"
    },
    "wrsLatitude": {
        "type": "string"
    },
    "tileId": {
        "type": "string"
    },
    "groundTrackUncertainty": {
        "type": "number"
    },
    "cycleNumber": {
        "type": "integer",
        "minimum": 0
    },
    "antennaLookDirection": {
        "type": "string",
        "enum": [
            "LEFT",
            "RIGHT"
        ]
    },
    "acquisitionStation": {
        "type": "string"
    },
    "acquisitionAngles": {
        "$ref": "#/definitions/AcquisitionAngles"
    },
    "operationalMode": {
        "type": "string"
    },
    "swathIdentifier": {
        "type": "string"
    },
    "polarisationMode": {
        "description": "Sar",
        "type": "string",
        "enum": [
            "S",
            "D",
            "T",
            "Q",
            "UNDEFINED"
        ]
    },
    "polarisationChannels": {
        "description": "Sar",
        "type": "string"
    },
    "resolution": {
        "type": "number"
    },
    "verticalResolution": {
        "description": "Atm, Lmb",
        "type": "number"
    },
    "waveLengths": {
        "type": "array",
        "minItems": 1,
        "items": {
            "$ref": "#/definitions/WavelengthInformation"
        }
    }
}

```

```

    },
    "measurementType": {
      "type": "string",
      "enum": [
        "ABSORPTION",
        "EMISSION"
      ]
    },
    "dopplerFrequency": {
      "description": "Sar",
      "type": "number",
      "minimum": 0,
      "exclusiveMinimum": true
    },
    "samplingRates": {
      "description": "Alt",
      "type": "array",
      "items": {
        "type": "number",
        "minimum": 0,
        "exclusiveMinimum": true
      }
    }
  },
  "required": [
    "acquisitionType"
  ]
},
{
  "$ref": "#/definitions/TemporalInformation"
},
{
  "$ref": "#/definitions/VerticalSpatialDomain"
},
{
  "$ref": "#/definitions/OrbitParameters"
}
],
},

```

E.1.10 Definitions/Link

```

"Link": {
  "type": "object",
  "properties": {
    "href": {
      "type": "string",
      "format": "uri"
    },
    "type": {
      "type": "string"
    },
    "title": {
      "type": "string"
    },
    "length": {
      "type": "integer",
      "minimum": 0
    },
    "category": {
      "description": "Media category property defined by MediaRSS.",
      "type": "string",
      "enum": [
        "THUMBNAI",
        "QUICKLOOK",
        "ALBUM",
        "CLOUD",
        "SNOW",
        "QUALITY"
      ]
    },
    "expression": {

```

```

        "description": "Media expression property defined by MediaRSS.",
        "type": "string",
        "enum": [
            "full",
            "sample"
        ]
    },
    "conformsTo": {
        "type": "string",
        "format": "uri"
    }
},
"required": [
    "href"
],
"additionalProperties": false
},

```

E.1.11 Definitions/ProductInformation

```

"ProductInformation": {
    "type": "object",
    "allOf": [
        {
            "type": "object",
            "properties": {
                "type": {
                    "type": "string",
                    "enum": [
                        "ProductInformation"
                    ]
                },
                "productType": {
                    "type": "string"
                },
                "size": {
                    "type": "integer"
                },
                "productVersion": {
                    "type": "string"
                },
                "statusSubType": {
                    "type": "string",
                    "enum": [
                        "ON-LINE",
                        "OFF-LINE"
                    ]
                }
            },
            "qualityInformation": {
                "$ref": "#/definitions/QualityInformation"
            },
            "statusDetail": {
                "type": "string"
            },
            "availabilityTime": {
                "type": "string",
                "format": "date-time"
            },
            "timeliness": {
                "type": "string"
            },
            "productGroupId": {
                "type": "string"
            },
            "archivingCenter": {
                "type": "string"
            },
            "referenceSystemIdentifier": {
                "type": "string"
            },
            "archivingDate": {
                "type": "string",
                "format": "date-time"
            }
        }
    ]
}

```

```

        }
      },
      "required": [
        "availabilityTime"
      ]
    },
    {
      "$ref": "#/definitions/ProcessingInformation"
    },
    {
      "$ref": "#/definitions/CoverageDescription"
    }
  ]
},

```

E.1.12 Definitions/AcquisitionAngles

```

"AcquisitionAngles": {
  "type": "object",
  "properties": {
    "illuminationAzimuthAngle": {
      "type": "number"
    },
    "illuminationZenithAngle": {
      "type": "number"
    },
    "illuminationElevationAngle": {
      "type": "number"
    },
    "incidenceAngle": {
      "type": "number"
    },
    "minimumIncidenceAngle": {
      "type": "number"
    },
    "maximumIncidenceAngle": {
      "type": "number"
    },
    "incidenceAngleVariation": {
      "type": "number"
    },
    "acrossTrackIncidenceAngle": {
      "type": "number"
    },
    "alongTrackIncidenceAngle": {
      "type": "number"
    },
    "instrumentAzimuthAngle": {
      "type": "number"
    },
    "instrumentZenithAngle": {
      "type": "number"
    },
    "instrumentElevationAngle": {
      "type": "number"
    },
    "pitch": {
      "type": "number"
    },
    "roll": {
      "type": "number"
    },
    "yaw": {
      "type": "number"
    }
  },
  "additionalProperties": false
},

```

E.1.13 Definitions/QualityInformation

```

"QualityInformation": {
  "type": "object",
  "properties": {
    "qualityStatus": {
      "type": "string",
      "enum": [
        "NOMINAL",
        "DEGRADED"
      ]
    },
    "qualityDegradation": {
      "description": "Percentage",
      "type": "number"
    },
    "qualityDegradationTag": {
      "type": "string"
    },
    "qualityDegradationQuotationMode": {
      "type": "string",
      "enum": [
        "AUTOMATIC",
        "MANUAL"
      ]
    }
  },
  "additionalProperties": true
},

```

E.1.14 Definitions/CoverageDescription

```

"CoverageDescription": {
  "description": "Subset of ProductInformation",
  "type": "object",
  "properties": {
    "cloudCover": {
      "type": "number"
    },
    "snowCover": {
      "type": "number"
    }
  }
},

```

E.1.15 Definitions/FeatureCollection

```

"FeatureCollection": {
  "description": "GeoJSON FeatureCollection",
  "type": "object",
  "properties": {
    "type": {
      "type": "string",
      "enum": [
        "FeatureCollection"
      ]
    },
    "bbox": {
      "type": "array"
    },
    "features": {
      "type": "array",
      "minItems": 0,
      "items": {
        "$ref": "#/definitions/EarthObservation"
      }
    }
  },
  "required": [
    "type",
    "features"
  ]
},

```

E.1.16 Definitions/WavelengthInformation

```
"WavelengthInformation": {
  "type": "object",
  "minProperties": 1,
  "properties": {
    "type": {
      "type": "string",
      "enum": [
        "WavelengthInformation"
      ]
    },
    "discreteWavelengths": {
      "type": "array",
      "minItems": 1,
      "items": {
        "type": "number",
        "minimum": 0,
        "exclusiveMinimum": true
      }
    },
    "endWavelength": {
      "type": "number",
      "minimum": 0,
      "exclusiveMinimum": true
    },
    "spectralRange": {
      "type": "string",
      "enum": [
        "INFRARED",
        "NIR",
        "SWIR",
        "MWIR",
        "LWIR",
        "FIR",
        "UV",
        "VISIBLE",
        "MICROWAVE",
        "OTHER"
      ]
    },
    "startWavelength": {
      "type": "number",
      "minimum": 0,
      "exclusiveMinimum": true
    },
    "wavelengthResolution": {
      "type": "number"
    }
  },
  "additionalProperties": false
},
```

E.1.17 Definitions/VerticalSpatialDomain

```
"VerticalSpatialDomain": {
  "description": "Subset of AcquisitionParameters",
  "type": "object",
  "properties": {
    "highestLocation": {
      "type": "string"
    },
    "lowestLocation": {
      "type": "string"
    },
    "locationUnit": {
      "type": "string",
      "enum": [
        "bar",
        "m"
      ]
    }
  }
}
```

```
    },
  },
}
```

E.1.18 Definitions/TemporalInformation

```
"TemporalInformation": {
  "description": "Subset of AcquisitionParameters",
  "type": "object",
  "properties": {
    "beginningDateTime": {
      "type": "string",
      "format": "date-time"
    },
    "endingDateTime": {
      "type": "string",
      "format": "date-time"
    }
  },
  "required": [
    "beginningDateTime",
    "endingDateTime"
  ]
},
```

E.1.19 Definitions/AcquisitionInformation

```
"AcquisitionInformation": {
  "type": "object",
  "properties": {
    "type": {
      "type": "string",
      "enum": [
        "AcquisitionInformation"
      ]
    },
    "platform": {
      "$ref": "#/definitions/Platform"
    },
    "instrument": {
      "$ref": "#/definitions/Instrument"
    },
    "acquisitionParameters": {
      "$ref": "#/definitions/AcquisitionParameters"
    }
  }
},
```

E.1.20 Definitions/OrbitParameters

```
"OrbitParameters": {
  "description": "Subset of AcquisitionParameters",
  "type": "object",
  "properties": {
    "orbitDirection": {
      "type": "string",
      "enum": [
        "ASCENDING",
        "DESCENDING"
      ]
    },
    "lastOrbitDirection": {
      "type": "string",
      "enum": [
        "ASCENDING",
        "DESCENDING"
      ]
    },
    "orbitDuration": {
```

```

        "type": "integer"
    },
    "ascendingNodeDate": {
        "type": "string",
        "format": "date-time"
    },
    "ascendingNodeLongitude": {
        "type": "number"
    },
    "orbitNumber": {
        "type": "integer",
        "minimum": 0
    },
    "lastOrbitNumber": {
        "type": "number"
    }
}
}
}
}
}

```

E.2 Schemas for OWC GeoJSON validation

The JSON schema definitions in the current section are “imported” by the schemas presented in the previous section. They represent a JSON Schema encoding of selected OGC 14-055r2 resources which are reused by the OGC 17-003 GeoJSON encoding without modification.

The file is available at <http://schemas.opengis.net/eo-geojson/1.0/owc-geojson-schema.json> (See Annex E:).

```

{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "title": "GeoJSON encoding of OGC 14-055r2 subset required by OGC 17-003 JSON Schema",
  "description": "Definition of OGC 14-055r2 and GeoJSON elements required by GeoJSON encoding of EO Dataset Metadata. Note that numbers in the instance should not be surrounded by double-quotes to validate against this schema. ",
  "definitions": {

```

E.2.1 Definitions/Point (GeoJSON)

```

    "Point": {
      "title": "Point",
      "type": "object",
      "properties": {
        "coordinates": {
          "title": "gj:coordinates",
          "description": "One position (longitude, latitude)",
          "type": "array",
          "minItems": 2,
          "maxItems": 2,
          "items": {
            "type": "number"
          }
        },
        "type": {
          "type": "string",
          "enum": [
            "Point"
          ]
        }
      },
      "required": [
        "coordinates",
        "type"
      ],
      "additionalProperties": false
    },

```

E.2.2 Definitions/MultiPoint (GeoJSON)

```
"MultiPoint": {
  "title": "point",
  "type": "object",
  "properties": {
    "coordinates": {
      "title": "gj:coordinates",
      "description": "Array of positions",
      "type": "array",
      "minItems": 1,
      "items": [
        {
          "description": "One position",
          "type": "array",
          "minItems": 2,
          "maxItems": 2,
          "items": {
            "type": "number"
          }
        }
      ],
      "additionalItems": false
    },
    "type": {
      "type": "string",
      "enum": [
        "MultiPoint"
      ]
    }
  },
  "required": [
    "coordinates",
    "type"
  ],
  "additionalProperties": false
},
```

E.2.3 Definitions/LineString (GeoJSON)

```
"LineString": {
  "title": "LineString",
  "type": "object",
  "properties": {
    "coordinates": {
      "title": "coordinates",
      "description": "Array of positions",
      "type": "array",
      "minItems": 2,
      "items": {
        "description": "One position",
        "type": "array",
        "minItems": 2,
        "maxItems": 2,
        "items": {
          "type": "number"
        }
      }
    },
    "type": {
      "type": "string",
      "enum": [
        "LineString"
      ]
    }
  },
  "required": [
    "coordinates",
    "type"
  ],
  "additionalProperties": false
},
```

E.2.4 Definitions/MultiLineString (GeoJSON)

```
"MultiLineString": {
  "title": "MultiLineString",
  "type": "object",
  "properties": {
    "coordinates": {
      "title": "coordinates",
      "description": "Array of linestring",
      "type": "array",
      "minItems": 1,
      "items": {
        "description": "Linestring, i.e. array of positions",
        "type": "array",
        "minItems": 2,
        "items": {
          "description": "Position (longitude, latitude)",
          "type": "array",
          "minItems": 2,
          "maxItems": 2,
          "items": {
            "type": "number"
          }
        }
      }
    },
    "type": {
      "type": "string",
      "enum": [
        "MultiLineString"
      ]
    }
  },
  "required": [
    "coordinates",
    "type"
  ],
  "additionalProperties": false
},
```

E.2.5 Definitions/Polygon (GeoJSON)

```
"Polygon": {
  "title": "Polygon",
  "type": "object",
  "properties": {
    "coordinates": {
      "title": "coordinates",
      "description": "Array of linestrings",
      "type": "array",
      "minItems": 1,
      "items": {
        "description": "Linear ring, i.e. linestring or array of positions",
        "type": "array",
        "minItems": 1,
        "items": {
          "description": "One position",
          "type": "array",
          "minItems": 2,
          "maxItems": 2,
          "items": {
            "type": "number"
          }
        }
      }
    },
    "type": {
      "type": "string",
```

```

        "enum": [
            "Polygon"
        ]
    },
    "required": [
        "coordinates",
        "type"
    ],
    "additionalProperties": false
},

```

E.2.6 Definitions/MultiPolygon (GeoJSON)

```

"MultiPolygon": {
    "title": "MultiPolygon",
    "type": "object",
    "properties": {
        "coordinates": {
            "title": "coordinates",
            "description": "Array of Polygons",
            "type": "array",
            "minItems": 1,
            "items": {
                "description": "Array of linestrings",
                "type": "array",
                "minItems": 1,
                "items": {
                    "description": "Linear ring, i.e. linestring or array of
positions",
                    "type": "array",
                    "items": {
                        "description": "One position",
                        "type": "array",
                        "minItems": 2,
                        "maxItems": 2,
                        "items": {
                            "type": "number"
                        }
                    }
                }
            }
        },
        "type": {
            "type": "string",
            "enum": [
                "MultiPolygon"
            ]
        }
    },
    "required": [
        "coordinates",
        "type"
    ],
    "additionalProperties": false
},

```

E.2.7 Definitions/Geometry (GeoJSON)

```

"Geometry": {
    "title": "Geometry",
    "type": "object",
    "oneOf": [
        {
            "$ref": "#/definitions/Point"
        },
        {
            "$ref": "#/definitions/MultiPoint"
        }
    ],

```

```

    {
      "$ref": "#/definitions/LineString"
    },
    {
      "$ref": "#/definitions/MultiLineString"
    },
    {
      "$ref": "#/definitions/Polygon"
    },
    {
      "$ref": "#/definitions/MultiPolygon"
    }
  ]
},

```

E.2.8 Definitions/Offering (OGC 14-055r2)

```

"Offering": {
  "title": "Offering",
  "description": "Offering as defined in OGC 14-055r2",
  "type": "object",
  "properties": {
    "code": {
      "type": "string",
      "format": "uri"
    },
    "operations": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/Operation"
      }
    },
    "contents": {
      "type": "array"
    },
    "styles": {
      "type": "array"
    }
  },
  "required": [
    "code"
  ]
},

```

E.2.9 Definitions/Operation (OGC 14-055r2)

```

"Operation": {
  "description": "OGC 14-055r2",
  "type": "object",
  "properties": {
    "code": {
      "type": "string",
      "format": "uri"
    },
    "method": {
      "type": "string",
      "enum": [
        "GET",
        "POST",
        "PUT",
        "HEAD",
        "PATCH",
        "DELETE"
      ]
    },
    "type": {
      "description": "Media type",
      "type": "string"
    }
  },

```

```

        "href": {
            "type": "string",
            "format": "uri"
        },
        "request": {
            "type": "object"
        },
        "result": {
            "type": "object"
        }
    },
    "required": [
        "code",
        "method",
        "href"
    ]
}

```

Annex F: SCHEMAS AND EXAMPLES

The following schema file, vocabulary definitions, context file and selected examples are provided in the OGC schema repository:

- eo-geojson-schema-standalone.json
- eo-geojson-schema.json
- owc-geojson-schema.json
- eo-geojson-vocabulary.owl
- eo-geojson-vocabulary.ttl
- owc-geojson-vocabulary.owl
- eo-geojson.jsonld
- example-1-seasat.json
- example-1-seasat.jsonld
- example-2-landsat.json
- example-2-landsat.jsonld
- example-3-cryosat.json
- example-3-cryosat.jsonld
- example-4-sentinel.json
- example-4-sentinel.jsonld

They are available at <http://schemas.opengis.net/eo-geojson/1.0>.

Annex G: REVISION HISTORY

Date	Version	Editor	Sections modified	Description
10/02/2017	0.0.1 Draft D6	Y. Coene	All	Initialised Draft Document.
28/02/2017	0.0.2 Draft D7	Y. Coene	All	Updated draft version provided to CEOS WGISS members.
21/04/2017	0.0.3 Draft D8	Y. Coene	All	JSON-LD content removed or moved to annexes.
			7.8	FeatureCollection encoding example added.
			Annex D	Original Annex C examples presented as GeoJSON, JSON-LD (Compacted) and JSON-LD (Expanded).
			Annex B	Original Annex D updated with content moved from inside document to this annex. Original section 5.2.2 "[JSON-LD] instance diagrams" removed. This Annex moved as Annex B as info is needed to understand following annexes with JSON-LD examples and properties.
			All	mediaType property replaced by "type" and local context added to map "type" to "atom:type" in the scope of the "links" object.
			7.1.4	Offering example added for WMS and WCS.
			Table 4	Clarification added that geometry element can be a "null" value according to RFC 7946 to address comment from CWIC team (Eugene Yu and Linjun Kang) dated 17/03/2017.
			Table 9	Multiplicity of "title" (Data Identification) corrected as per CWIC team comments 17/03/2017.
			7.1	"properties": {} replaced by "properties": {...} and "geometry": {} replaced by "geometry": {...} in JSON examples as per CWIC team comments 17/03/2017.
			Error! Reference source not found.	"spectralRange" removed from Instrument table as included in WavelengthInformation.
			7.4.1.4	JSON schema diagram for LineString corrected.

Date	Version	Editor	Sections modified	Description
			5.2.2	Section explaining JSONPath added.
			7	JSONPath information added in dictionary tables.
25/04/2017	0.0.4 Draft D9	Y. Coene	Annex C2	Mapping on UMM improved with inputs from John Taylor.
			7.7.2	Reference to ISO 8601 Duration added for CompositeType property
			Table 7	media:* properties added and examples of quicklook, thumbnail and masks added below.
			Annex B: Annex D:	Mappings added for media:* properties. media: namespace added to "expanded" examples.
24/05/2017	0.0.5 Draft D10	Y. Coene	Annex B	Annex C.3 with EO vocabulary definition (RDFS) updated and moved into JSON-LD Annex as B.3. Included in Turtle format as more compact than RDF/XML format.
			1.2	Aligned with modified table of content (Annex C.3 moved to B.3).
			7.1.3	Example of local access link with "file" URI scheme added as per RFC8089.
			7.7	format and archivingDate properties added in tables and figures.
			Annex C	GeoJSON column in Annex C.2 moved to first column of table. All tables from Annex C merged into a single table.
			All	Single namespace eop: used instead of opt:, sar:, lmb: etc.
13/06/2017	0.0.6 Draft D11	Y. Coene	7.1	Figure 3 updated to allow for geometry=null in JSON Schema.
			2.2	Description column filled in table with conformance classes.

Date	Version	Editor	Sections modified	Description
			7.6, 7.6	Requirement class ""instrument" added (7.5.1). Requirement "wavelength-information" added (7.5.2). Requirement acquisition-angles added as dependency in 7.5.4. requirement quality-information added as dependency in 7.6.
			Annex A	Conformance classes specified in same way as OGC 15-100r1. Diagram with requirement (class) dependencies added.
			Annex E	E.1.12: JSON Schema in E.1.12 (Geometry) updated to allow for geometry=null. E.1.16: JSON Schema for Link aligned with content of document (e.g. category, expression, conformsTo). E.1.17: JSON Schema for ProductInformation aligned with content of document (e.g. archivingDate).
21/06/2017	0.0.7 Draft D12	Y. Coene	7.4.1.5	MultiLineString example added.
			7.1.4	Offering example for WPS added.
			7.3	"lang" added to map UMM metadata language information.
			9	typos "Application" corrected into "application".
			B.2	eop: namespace corrected in JSON-LD context definitions.
			B.3	Vocabulary updated to encode the individuals in a different way using intermediate classes for the enumerations.
			C.1	Mapping table completed/corrected for: - lang - alt:cycleNumber - discreteWavelengths - Spatial option 5. - Spatial option 7. - updated (EarthObservationMetadata/creationDate)
			E.1.12	bbox JSON schema definition updated.

Date	Version	Editor	Sections modified	Description
06/09/2017	0.0.8 Draft D13	Y. Coene		Integration of comments received from CEOS WGISS NASA team (Allan Doyle, Michael Morahan, and Archie Warnock) on draft D12 as agreed during CEOS WGISS SLT teleconference 24/08/2017:
			i	Comment AD2 (A. Doyle): "improvement" clarified. Comment AD3: reference to definition of compaction added as footnote. Comment AD4: added reference to OGC Simple Features.
			1.1	Comment AD6: rephrase sentence confirming that CEOS WGISS review comments are taken into account. CEOS added to list of submitting organisations in section iv as well.
			Table 1	Comment AD8: caption updated to avoid "EO GeoJSON" term.
			3	Comment AD9: Reference NR4 moved to OR33 to become non-normative.
			4	Comment AD10: datastrip, swath, granule, dataset definitions added or improved.
			6.2	Comment AD11: Sentence reworded.
			Table 4 and other tables.	Comment AD13: title of first column in properties table changed from "GeoJSON Property" into "JSON Property".
			Figure 4 and other figures.	Comment AD15: Remove "(GeoJSON)" from caption of JSON Schema figures except when appropriate.
			Example 3 and others.	Comment AD18: Remove "(GeoJSON)" from caption of examples except where appropriate.
			7.1.2	Comment AD21: Changed {} into {...}.
			Example 12	Comment AD33: Added remark about line breaks which were added for readability of WPS example. Comment MM4: invalid date corrected.
			7.6.3	Comment AD57: Added missing caption.
			D.1.2.2	Comment AD80: Made first and last position contain identical values in example.

Date	Version	Editor	Sections modified	Description
			6.1	Comment MM5: Sentence added to clarify that ordering of members of any JSON object is irrelevant.
			7.4.2	Comment MM6: Example added for VerticalSpatialDomain encoding.
			7.7	Comment MM6: Example of ProductInformation encoding extended with more properties.
			C.1	Comment MM10: UMM-C property "Collection Status" mapped to "status".
			Table 11 C.1 B.3	Comment AW3: definition of lower/upper bound corrected. locationUnit added. minimumAltitude and maximumAltitude replaced by lowestLocation and highestLocation. locationUnit added to allow use of distance or pressure for expressing vertical spatial domain. locationUnit added to vocabulary definition in Turtle.
			[OR13]	Reference to CEOS Best Practice document OR13 removed (together with two related footnotes) in list of non-normative references as agreed in SWG telco 30/08/2017.
			All	Editorial comments on previous version from John Taylor addressed.
22/01/2018	1.0.0 Draft D1	Y. Coene		
			B.2.2	JSON-LD 1.1 context updated to allow constants to be interpreted as relative/local URI and be expanded using @base URI.
			All	atom: replaced by "iana:" to align URI of relations with [NR11] and OGC JSON Best Practice Candidate Alpha version. Added definition of "iana:" namespace.
			7.1.5.	JSON Schema for OGC 14-055r2 Operation object added.
			All	Reference to UMM-C added as [OR04]. Existing OR04 moved to OR13.
			Annex F	Annex with download location for schemas and examples added.

Date	Version	Editor	Sections modified	Description
			Table 18, Annex B.3, C.1, E.1.15	Comment OB1 (22/12/2017) addressed: track/frame renamed into wrsLongitudeGrid/wrsLatitudeGrid.
			Table 18, Annex B.3, C.1, E.1.15	Comment OB2 (22/12/2017) addressed: relativePassNumber renamed into relativeOrbitNumber.
			Section 7.1.1	Mandatory “identifier” added in example.
			Section 7.3	“identifier” added in figure. Mandatory “identifier” added in example.
			Annex D	“identifier” and “dct:identifier” property added in all examples.
			Annex E.1.1	“identifier” added in JSON schema fragment.
			Table 9, Table 12, Table 13, Table 20, Table 22	Properties of type DateTime better defined referring to footnote with RFC3339 pattern to be used as discussed via OGC SWG email exchange.
			Table 4	Comment AD37 closed in same way as in OGC 17-047: bbox definition updated reducing dimensions to n=2.
			All and Annex A	Relative URI of requirement classes and requirements updated (“class” removed and “eo-geojson” removed as already part of common part of URI. Core conformance class added as a choice of either a single object or collection of objects.
			Section 2.2 and Annex A	Offering conformance class added.
			Section 7.4.3. Annex B.3 Annex C.1 Annex E.1.	Optional lastOrbitDirection added to close comment JG-01 (NASA).

01/02/2018	1.0.0 Draft D2	Y. Coene	All DateTim e occuranc es and footnote 10.	dateTime format explanation updated as decided in SWG of 31/01/2018. The definition is identical to the definition of dateTime in JSON Schema, i.e. refers to section 5.6 of RFC3339. Non-UTC times are allowed again.
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2018-10-24	1.0.0 Draft D4	Y. Coene	All	Integrated comments from OAB and Public Comments: - AA-1 - AA-3 - AA-4 - Carl Reed (OAB Review). - DLR-1 - DLR-2 - DLR-3 (Partly) - DLR-4 - DLR-5 (Partly) - DLR-6 - DLR-7 - DLR-8 - DLR-9 (Partly) - DLR-10 - DLR-12 - DLR-14 - DLR-15 - DLR-17 - DLR-62 - DLR-63 - OGC-1 - OGC-2: http://www.opengis.net/owc/1.0/ and http://www.opengis.net/eo-geojson/1.0/ ontology namespaces renamed into http://www.opengis.net/ont/owc/1.0/ and http://www.opengis.net/ont/eo-geojson/1.0/ as per OGC 12-081. - VITO-2 Remain to be done: - DLR-11, - DLR-13 (no action) - DLR-16, - DLR-18 (no action) - DLR-61 - AA-2 (no action)
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Date	Version	Editor	Sections modified	Description
2018-11-23	1.0.0 Draft D5	Y. Coene	All	Implemented decisions from SWG telco on 2018-11-06: - DLR-3: domain and range restrictions removed for remaining “iana” and “media” in Annex B.3. - DLR-5: line 1134 in OWL file (Annex B.3): antennaLookDirection changed into ObjectProperty. - DLR-9: line 896 in OWL file. Eop:discreteWavelengths has “s” removed in its URI. The explanation in the OWL file that it is a “list of something” is reworded as there are no lists/arrays in JSON-LD. eop:samplingRates also changed into eop:samplingRate for same reason. - DLR-11: JSON-LD 1.0 @context removed from document (and Annex B.2). Explanation added why a JSON-LD 1.0 @context was not considered. - DLR-16: “Unit of measure (m) is SI base unit (m) without prefix.”. Two times “(m)” inside this description is unnecessary. All similar sentences were modified. - DLR-16: altitudeUnit made a URI in JSON-LD in eop: namespace and two individuals created corresponding to “m” and “bar”. - DLR-61: Instrument object is split into Instrument (§7.6.2) (containing id, sensorType, instrumentShortName and description) and InstrumentParameters, both below the same parent object AcquisitionInformation. Refactored JSON Schema in Annex E by isolating reusable definitions corresponding to lower level specifications in Annex E.2. SpectralRange constants updated with values proposed by DLR (§7.6.3, B.3.1, E.1.16).

Date	Version	Editor	Sections modified	Description
2019-02-07	1.0.0 Draft D6	Y. Coene	Annex A Annex C: Annex E.1	Aligned data and metadata dates with OGC 13-026r9 version uploaded after SWG telco on 16/01/2019. Added in tables and XMLSpy diagrams: - published (metadata - Section 7.2) - creationDate (metadata - Section 7.2) - lang (metadata) – was missing. - created (data - Section 7.3) - available (data - Section 7.3) Isolated metadata dates in separate MetadataInformation object (Section 7.2) for closer alignment with UMM-G metadata model. Added conformance class for Section 7.3 in Annex A and figure in Annex A.1. conformsTo and referenceSystemIdentifier entries corrected. Updated JSON Schema for Properties, MetadataInformation and DataIdentification.
2019-02-19	1.0.0 Draft D7	Y. Coene	All	Solution for DLR-61 improved: Moved all InstrumentParameters properties to AcquisitionParameters as decided during the SWG telco on 18/02/2019. conformsTo and referenceSystemIdentifier entries in JSON-LD context updated (“@id”) as the properties are of type “URI”.