

EMSA Earth Observation Data Centre

Appendix 5 - External Interface Control Document

V2.0

[EICD]

Version: 2.0

Date: 28/10/2020

8 Document Change Record

| Version | Date | Reason for Change | Changed Pages/Paragraphs |
|---------|------------|--|---|
| 2.0 | 29/10/2018 | New IECD aligning with EODC-LOT-1 and EICD 2.0.0 | Major release. Full re-structure of the document (Draft) |
| 2.0 | 17/12/2018 | Formatting changes Changes identified by EMSA and Service Providers | <p>All references to Extended Vessel Service were replaced by Enriched Vessel Service (artf57284)</p> <p>All references to Extended Feature Service were replaced by Enriched Feature Service (artf57284)</p> <p>All references to ship were changed to vessel</p> <p>All references to the package OSW were removed (artf56038)</p> <p>All references to EVS were aligned with EMSA/OP/06/2018 tender specifications artf57284</p> <p>Section 2.7- 1st paragraph: clarification of text and formatting</p> <p>Section 3.2.2- minor formatting of table</p> <p>Section 3.2.2- removed the reference to clip images under vessel detection service (artf56299)</p> <p>Table in section 3.3.1- corrected the reference to stop acquisition time (artf56270)</p> <p>Table in section 3.3.2.1- corrected the reference for VAP's naming structure (artf56270)</p> <p>Section 3.3.2.1: references to detection, classification and characterisation were replaced by : VAP-1; VAP-2; and VAP-3 (artf57239)</p> <p>Section 3.3.2.1: ACT and CDS are not progressive packages so the names needed to be updated (artf57240)</p> <p>Section 3.3.2.2: Removed the reference to OSW and simplified the naming convention of OSN.</p> |
| 2.0 | 31/01/2019 | Changes identified by EMSA and Service Providers | <p>Section 3.3.2.1: ACT and CDS are not progressive packages so the names needed to be updated (artf57240)</p> <p>Section 3.2.2: CDS]: Comparing products from different levels (artf58126)</p> <p>Section 3.2.2: EO native image file is not only Level 1b- also level 2 and 3 (artf56035)</p> <p>Section 3.2.2: Align OSN nomenclature (artf56038)</p> <p>Section 3.3.2.2: Image ID in case of not delivery of a DTO (artf57600)</p> <p>Section 3.2.2: Location to place clip image (artf56437)</p> <p>Section 3.2.2: reference to clip.tif replaced by CLIP-tif (artf58158)</p> <p>Section 2.6: clarifications to requirement EOS_GENE_0320- Horizontal requirements to clip images (artf58167)</p> |

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| 2.0 | 08/02/2019 | <p>Clarifications on clip images file naming structure Section 3.2.1</p> <p>Clarification on the name of the "OS_NOTIFICATION" – renamed from "OSN_NOTIFICATION" to "OS_NOTIFICATION"</p> | <p>artf58097 : EICD 2.0.0: Clip Images - File nomenclature</p> <p>artf58285 : Synthetic Package: Clip Images not correctly located</p> <p>artf58308 : EICD 2.0 Synthetic Packages - ACT example</p> <p>artf58323: [PKG] EICD 2.0 EO package - OSN_Notification is not supported</p> |
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| 2.0 | 30/10/2019 | <p>Document: Changes identified by EMSA and Service Providers</p> <p>Schema documentation: Changes identified by EMSA and Service Providers</p> | <p>Section 1: artf59494 : EICD 2.0 Part 2 – Reference to Schemas file was updated.</p> <p>Section 3.3.1, Section 3.2.2 and Section 3.3.2.1- Filename nomenclatures for SAR acquisition was corrected- artf59038 : Lot-1: Synthetic Package and filename: beam mode was used instead of Sensor Mode</p> <p>Section 2.6.1- artf58569 and artf58949 : Clip Images: Table with a matrix of Clip images VAPs and Lots and which are mandatory</p> <p>Section 2.6: Updated the definition of Clip images (artf56427; artf59059; artf59544)</p> <p>Schema eodc_qua.xsd: artf59082 : [QUA]- Ancillary data information for the cases where no VAP was delivered</p> <p>Section 2.4- text was updated</p> <p>Section 2.5- text was updated</p> <p>Section 3.2.1- text was updated</p> <p>Section 3.2.2- table was updated</p> <p>Schema eodc_evs.xsd: List of vessel types aligned with EMSA/OP/06/2018 Technical Specifications (artf59398)</p> <p>Schema eodc_planning.xsd: List of Planning modes was updated (artf56183)</p> <p>Schema eodc_planning.xsd; eodc_eop.xsd: Updated the nomenclature for PAZ satellite (artf59291)</p> <p>Schema eodc_eop.xsd: updated documentation on EarthObservationResult/product/ProductInformation/filename (artf60651)</p> <p>Schema eodc_osn.xsd: updated documentation for Oil Spills reported in previous EO Services (artf59992)</p> <p>Section 3.3.2.2 and eodc_qua.xsd: Updated for non-delivered EO Services or due to cloud protection (artf57600; artf56341; artf58974)</p> <p>Section 2.6- updated with content from artf58401</p> <p>Schemas eodc_vds.xsd; eodc_evs.xsd; eodc_fds.xsd; eodc_efs.xsd; eodc_wds.xsd; eodc_act.xsd; eodc_cds.xsd- Clarification on decimal cases for all confidence level attributes (artf58399)</p> <p>Schema eodc_pkg.xsd: Comment on the need to have total number of elements for each delivered Value Added Product (artf59252)</p> <p>Schemas eodc_qua.xsd; eodc_qno.xsd: Updated documentation on ProductIdentifier (artf57358)</p> <p>Schema eodc_eop.xsd: swathIdentifier attribute must be provided by Service Providers (artf60990)</p> <p>Schema eodc_wds.xsd: Updated documentation on element vesselID (artf59343)</p> <p>Section 3.3: changes in Value Added Products filenames (artf56733)- already addressed on release from 08/02/2019</p> <p>Section 3.2.1- Clip image naming convention (artf57799) - already addressed on release from 08/02/2019</p> <p>Section 3.3.1 and New Section 4.1 and 4.2: List of sensor modes SAR: artf58863; Optical: artf60067)</p> <p>New Section 3.3.2.3 – Data Take Opportunity (artf60682)</p> <p>Schema eodc_qua.xsd: Provider's notation was updated (artf58638)</p> |
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| | | | <p>Schemas eodc_fds.xsd; eodc_vds.xsd: Updated description on ID- taking in consideration the delivery of EVS/EFS.</p> <p>Schemas eodc_qua.xsd: Updated instructions on cloud coverage elements (cloudCoverPercentage; cloudCoverPercentageConfidence) (artf58397)</p> <p>Schema eodc_eop.xsd: Updated the documentation related with ProductType (artf59319)</p> <p>Added row "string elements" to table of</p> |
| 2.0 | 04/02/2020 | Updated content on AIS WebService | <p>Updates section 2.1 :</p> <ul style="list-style-type: none"> - WebService address - Methodology to access Webservice. |

Table of Contents

| | | |
|----------|--|-----------|
| 1 | INTRODUCTION..... | 7 |
| 2 | EXTERNAL INTERFACES..... | 8 |
| 2.1 | VESSEL TRAFFIC INFORMATION | 8 |
| 2.2 | ACCESS TO EODC OGC WEBSERVICES | 8 |
| 2.3 | BASIC AND VALUE ADDING PRODUCTS..... | 9 |
| 2.4 | FORMATS OF PLANNING FILES | 9 |
| 2.5 | EO DATA TRANSMISSION..... | 9 |
| 2.6 | CLIP IMAGES..... | 10 |
| 2.6.1 | Traceability between Value Added Products and Clip Images..... | 11 |
| 2.7 | NAUTICAL CHARTS | 13 |
| 2.8 | OIL SPILL DRIFT MODELLING | 14 |
| 3 | EARTH OBSERVATION PACKAGES | 15 |
| 3.1 | GENERAL INFORMATION..... | 15 |
| 3.2 | PACKAGE INFORMATION..... | 17 |
| 3.2.1 | Overview | 17 |
| 3.2.2 | Package Structure..... | 17 |
| 3.2.3 | Miscellaneous features and examples | 24 |
| 3.3 | NAMING CONVENTIONS | 25 |
| 3.3.1 | Identifier conventions | 25 |
| 3.3.2 | File naming conventions..... | 28 |
| 4 | LIST OF ATTRIBUTES | 32 |
| 4.1 | FILENAME: SENSOR MODES (SAR)..... | 32 |
| 4.2 | FILENAME: SENSOR MODES (OPTICAL) | 32 |
| | ABBREVIATIONS AND ACRONYMS | 34 |

1 Introduction

This is the External Interface Control Document describing EODC interfaces.

The document is divided in 2 main parts:

- 1) Part 1 contains information about the external interfaces, including the detailed definition the interface protocol and the exchanged information.
- 2) Part 2 includes the different schemas for all available products, as well description and mapping providing additional information on the different schema elements. Format: HTML files as annexes to this document.

As any interface control document, it is constantly being improved and updated. Thus there are in certain sections the following indications:

- **TBD:** indicates areas of the specification that cannot be completed at this stage because some information is missing or some elements still need to be defined/agreed

2 External interfaces

2.1 Vessel traffic information

Vessel Traffic Information (AIS) The protocol to be used is the OGC WFS 1.1.0 (HTTP binding). In particular, following service requests shall be supported:

- *GetCapabilities*
- *GetFeatures*

Endpoints for this service are:

Pre-production (<https://eodc-pp.emsa.europa.eu:444/luciad-wfs/wfs>)

Production: (<https://eodc.emsa.europa.eu:444/luciad-wfs/wfs>)

The AIS information can be consulted by calling the WFS web service. The AIS information starts to be populated 6 hours before the acquisition time and stops when the acquisition time is reached. The information can be queried passing the service ID and a time interval. It is advisable, due to the quantity of information retrieved by the web service, that the providers fetch the AIS information periodically, starting 5 hours before the acquisition time and not retrieving the entire dataset with a single request at the end. The period may depend on the internet connection, but once every 30 min is the the maximum advised.

2.2 Access to EODC OGC webservice

The images shall be made available through an OGC WMS 1.3.0 (HTTP binding). Each image will be presented as a WMS layer named with the EO image uid. The WMS shall support following service requests:

- *GetCapabilities*
- *GetMap*

GetMap operation shall support, at least, JPG and PNG output formats.

The protocols to be used for searches on external catalogues are:

- OGC CSW version 3.0.0
- OGC WFS version 1.1.0

The URL to access the OGC web services are:

| Web service | Pre-Production | Production |
|-------------|---|---|
| WFS | https://eodc-pp.emsa.europa.eu:444/luciad-wfs/wfs | https://eodc.emsa.europa.eu:444/luciad-wfs/wfs |
| CSW | https://eodc-pp.emsa.europa.eu:444/luciad-csw/csw | https://eodc.emsa.europa.eu:444/luciad-csw/csw |
| WMS | https://eodc-pp.emsa.europa.eu:444/luciad-wms/ | https://eodc.emsa.europa.eu:444/luciad-wms/ |

2.3 Basic and value adding products.

Each package could be part of a set of packages related to the processing of a given EO product: not all the information are produced and transmitted at the same time.

Currently, following types of packages are expected:

| | |
|---------------------------------------|---------------|
| Activity detection | eodc_act.html |
| Feature Detection | eodc_fds.html |
| Enriched Feature Service | eodc_efs.html |
| EO Image | eodc_eop.html |
| Oil Spill Notifications | eodc_osn.html |
| SAR Derived- SAR Wind and Wave | See 3.2.3.1 |
| Vessel Detection | eodc_vds.html |
| Enriched Vessel Detection | eodc_evs.html |
| Wake Detection | eodc_wds.html |
| Change Detection | eodc_cds.html |
| Quality Report | eodc_qua.html |
| Quality Notification | eodc_qno.html |

Please Note: in case of no detections the EODC expects to receive an a package with no feature GML files and the Package info XML file explicitly stating 0 total features. In case that the image is cancelled a quality report package should be sent to EMSA.

2.4 Formats of planning files

EODC system ingests 2 different planning formats:

- APT ACP format- used for RADARSAT-2 acquisitions;
- EODC Planning format (XML).

The EODC planning file schema can be found in the following link: [eodc_planning.html](#).

2.5 EO data transmission

All EO packages shall be delivered using AXWAY application. The installation manuals can be found in Teamforge (https://sf.emsa.europa.eu/ctf/documents/list/projects.op_06_2018_sar_and_optical_earth/docman.root.02_interface_documentation.01_transfer_protocols_documentat).

The EO Package file format shall be .zip. No compressed files shall be present inside the main package compressed package (i.e. no nesting of .zip contained inside the .zip of the EO package).

2.6 Clip Images

The clip image shall be produced by the service providers as a GEOTIFF image in UTM projection. It is expected that size of the clip images shall be of a few KBs and in any case not greater than 1 MB.

The clip image design for Oil Spills is displayed below.

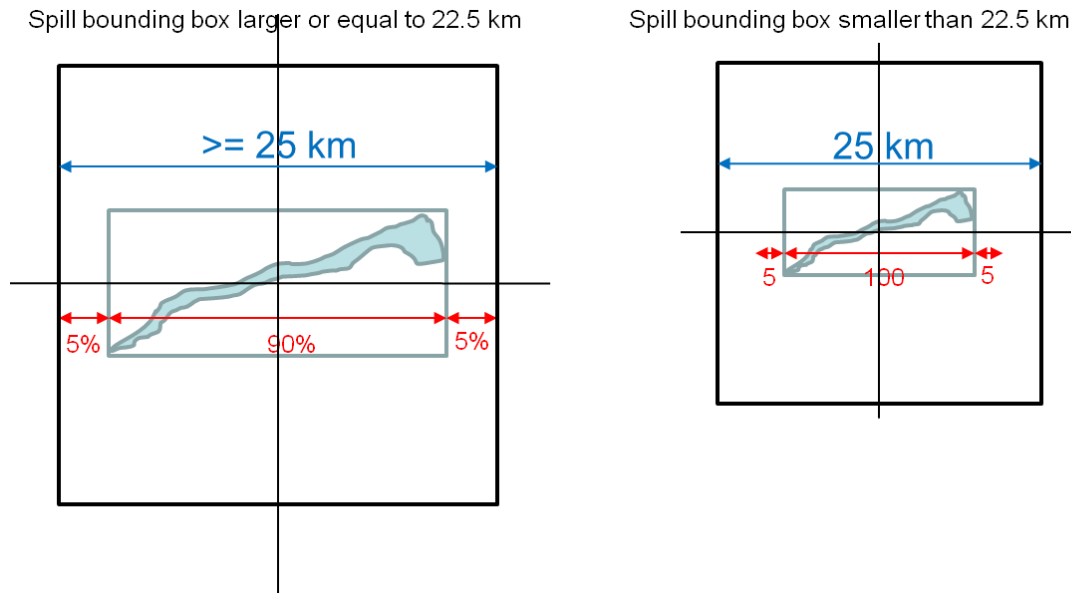


Figure 1- Oil Spill clip image approach (size and coverage).

An example is displayed below

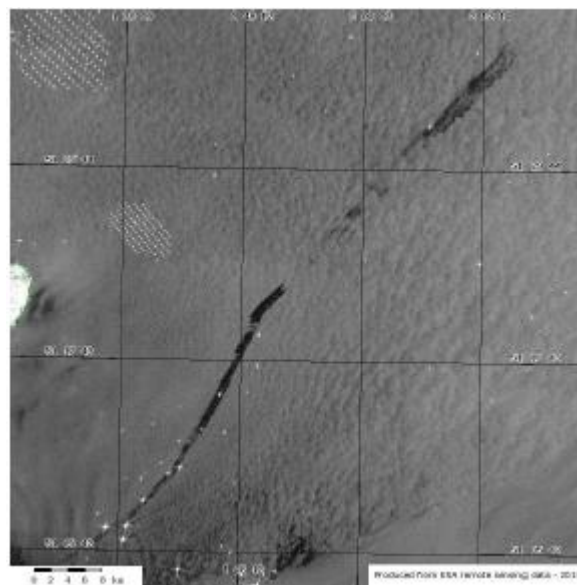


Figure 2- Example of Clip image for Oil Spill

The clip image design for the remaining Value Added Products is displayed below.

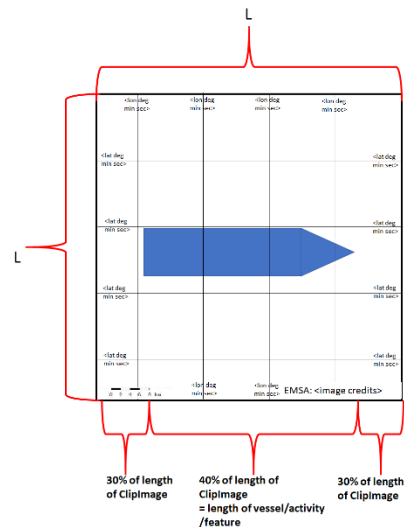


Figure 3- Remaining Value Added Products clip image approach (size and coverage).
An example is displayed below

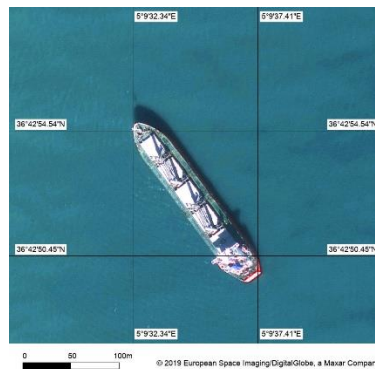


Figure 4- Example of Clip image for Vessel Detection

Below, EO Service providers can find additional comments and approach to the clip images:

- extracted from the full resolution image in a UTM map projection- dependent on changes under requirement EOS_GENE_0300 of Tender Specifications of FWC EMSA/OP/06/2018;
- Clip image provided in GeoTIFF format;
- Clip image overlaid with a geographic grid and scale;
- Clip image overlaid with image credits;
- For Optical products: Clip images it shall be produced from the delivered Optical Products;
- No line contour is requested for clip images;
- Scale bar and image credits shall be placed on the bottom of the clip image. It is accepted outside the image as long as it is on the bottom
- Font: Arial ; Font Colour: black; bold;
- Grid : line colour: Black;
- Coordinates: units format: deg min sec (e.g. 21°22'00"N)- see Figure 4
- Coordinates: labels design: colour black inside a white box - see Figure 4
- Scale bar design- - see Figure 4.

2.6.1 Traceability between Value Added Products and Clip Images

The following table summarizes to which Value Added Product and sensor type is mandatory to deliver clip images.

Table 1- Traceability between Value Added Products and Sensor Types

| Value Added Product | SAR | Optical |
|---------------------|----------------------------------|--------------------------------|
| OSN | Mandatory | Mandatory |
| VDS | Not Mandatory | Mandatory |
| FDS | Not Mandatory | Mandatory |
| ACT | Mandatory | Mandatory |
| EVS | Mandatory (VHR1 and VHR2) | Mandatory(VHR0, VHR1 and VHR2) |
| | Not Mandatory (HR1, HR2 and MR1) | |
| EFS | Mandatory | Mandatory |
| WDS | Mandatory (VHR1 and VHR2) | Mandatory(VHR0, VHR1 and VHR2) |
| | Not Mandatory (HR1, HR2 and MR1) | |
| CDS | Mandatory | Mandatory |

Note: this rules are not enforced in the EODC EO-Processing, which means that packages are not rejected just because clip image is not available.

2.7 Nautical Charts

The protocol to be used is OGC WMS (HTTP binding). In particular, following service requests shall be supported:

- *GetCapabilities*

Endpoint for this service is: <http://nms.emsa.europa.eu/geoserver/wms>

2.8 Oil spill drift modelling

This section will be further completed in future releases of EICD document.

3 Earth Observation Packages

3.1 General information

This section contains indications that are common to any of the xsd schemas contained in this document. The following table presents a summary of the common elements.

| Parameter | Description |
|--|--|
| XML encoding | <p>Any schema presented here is assumed to be encoded as UTF-8. Any XML document to be used in the EODC interfaces is assumed to be encoded as UTF-8.</p> <p>Any XML document used in this EICD shall be syntactically correct and shall follow the XML domain best-practices and common rules. In particular:</p> <ul style="list-style-type: none"> - XML documents shall validate against the appropriate XML schema definition (EODC specific schemas are published by EMSA on http://eodc.emsa.europa.eu/schemas/eodc/2.0/). - XML namespaces have to be declared using the reserved XML pseudo-attribute xmlns, the value of which must be a valid namespace name with a prefix. <p>Please note: the namespace prefix shall always be explicitly used (default namespace or namespace undeclaration shall not be used).</p> |
| String elements | <p>String elements have a maximum length of 250 characters.</p> <p>There are some exceptions to the general rule for elements containing comments or lengthy descriptions. These exceptionally long text elements and their maximum lengths are identified on the respective schema definitions.</p> |
| Version of GML | <p>The xsd schemas presented in this document (are directly or indirectly leveraging GML language version 3.1.1.</p> |
| Coordinate Reference system in GML elements | <p>GML elements that are indirectly or directly using gml:_Geometry object allow for the specification of a coordinate reference system through the attribute 'srsName'. As stated in GML specs "In general this reference points to a CRS instance of gml:CoordinateReferenceSystemType [...]. For well known references it is not required that the CRS description exists at the location the URI points to. If no srsName attribute is given, the CRS <u>must</u> be specified as part of the larger context this geometry element is part of, e.g. a geometric element like point, curve, etc. It is expected that this attribute will be specified at the direct position level only in rare cases."</p> <p>In the scope of EODC, it is recommended to use 'EPSG:4326'. In this coordinate system the order of coordinates is latitude – longitude. Coordinates triples, e.g. including altitude, although compliant with the GML specification are not supported.</p> <p>Moreover scientific notations for the coordinates (e.g. 5.4597258e-05) should not be used.</p> |
| Date and time | <p>If not differently and explicitly written, all date and time elements have to be expressed as UTC in a ISO 8601 compliant format such as: 2010-06-03T20:35:25Z or 2010-06-03T20:35:25.000Z etc</p> <p>As usual with date and time representations, omitting the 'T' separator is also allowed (e.g. 2010-06-03 20:35:25Z).</p> <p>Unfortunately the ISO 8601 profile has some ambiguities that EODC needs to fix:</p> <ul style="list-style-type: none"> ▪ The profile does not specify how many digits may be used to represent the decimal fraction of a second. For the purpose of EODC the maximum number of digits for the decimal part of a second is set to 3. ▪ The profile does not prevent to indicate the UTC zone with '+00:00' instead of 'Z' (e.g. 2003-04-01T13:01:02+00:00). |
| Polygons describing Areas | <p>The polygon describing a boundary area (e.g. for an oil spill) shall be expressed as gml:Polygon which can be found at the xml path:</p> <p style="padding-left: 40px;">gml:Polygon/gml:exterior/gml:LinearRing/gml:posList.</p> |

| | |
|--|---|
| | <p>All polygons shall be closed (meaning the first point has to be repeated at the end of the list) and drawing segments following the order of the points in the list shall not result in intersecting segments. The maximum number of vertexes for each polygon shall be < 450 points.</p> <p>Feature Package - The “perimeter” element contains a geometry in the format: Sequence of point coordinates in decimal degrees with at least 6 decimal cases in latLon order. Must have at least 2 points (4 coordinates) and be a closed polygon (1st and last points must be the same)</p> <p>Wake Package The “wakeGeometry” element contains a geometry in the format: Open polygon describing a linear geometry. Sequence of point coordinates, in decimal degrees with at least 6 decimal cases, in latLon order. Must have at least 2 points (4 coordinates)</p> |
|--|---|

3.2 Package information

3.2.1 Overview

This section contains the description of the different schemas and mapping elements for all the existing EODC packages, files and modules. These are organized by:

- 1) Package info XML (eodc_pkg.xsd)
- 2) EO Product (eodc_eop.xsd)
- 3) Earth Observation valud added product
 - a. Oil spill feature (eodc_osn.xsd)
 - b. Detected Vessel (eodc_vds.xsd)
 - c. Enriched Vessel (eodc_evs.xsd)
 - d. Detected Features (eodc_fds.xsd)
 - e. Enriched Feature (eodc_efs.xsd)
 - f. Detected Wake (eodc_wds.xsd)
 - g. Activity detection feature (eodc_act.xsd)
 - h. Change detection feature (eodc_cds.xsd)
 - i. Sar wind and Sar wave
- 4) Image quality
 - a. Quality notification schema (eodc_qno.xsd)
 - b. Quality report schema (eodc_qua.xsd)
- 5) Planning file (eodc_planning.xsd)
- 6) Ancillary information
 - a. Vessel traffic information feature
- 7) Model related features
 - a. Model output description Schema (eodc_msp_output.xsd)
 - b. Model output NetCDF format Specification
- 8) Miscellaneous features and examples
 - a. Clip images

3.2.2 Package Structure

A package has the following folder structure compressed into a zip file:

- Package file (XML file) respecting the eodc_pck.xsd schema
- Directory called "ImageData" where the provider should put all geographical data(tiffs, raster images, etc...)
- Directory called "Metadata" where the provider should put all information regarding the features (OilSpills, VDS, etc..) or Image information (eop.xml)

Zip is the only copression format supported since this allows for efficient browsing of the package without decompressing the whole file while being Linux and Windows compatible.

Within the package, no files or folders should be compressed.

Any file that contains references to another file or directory inside the package, must prefix the name of the referenced object with its relative path from the root of the package, where the path will begin with a "/", or from the directory where the referencing file is located.

Eg for the service 1701020002_S1A_IWS_20170102_045014_VDS_1.xml file, in the Metatdata folder, the clip image file name shall be defined as follows 1701020002_S1A_IWS_20170102_045014_VDS_1_CLIP.tif. The clip image file can be referenced via one of these two options:

- From the root of the package - /ImageData/1701020002_S1A_IWS_20170102_045014_VDS_1_CLIP.tif
- From the current directory – ../ImageData/1701020002_S1A_IWS_20170102_045014_VDS_1_CLIP.tif

Example for Wake Detection Service:

- Wake: 1610280913_RS2_XF_20161028_091324_WDS_1.xml
 - o Wake Clip image name: 1610280913_RS2_XF_20161028_091324_WDS_1_CLIP.tif
 - o Wake Clip image name with a vessel:
1610280913_RS2_XF_20161028_091324_WDS_1_VDS_1_CLIP.tif

The below table describes each package and its contents:

| Package Type | Package Content | File format | Description | Multiplicity | Mandatory (M)/ Optional (O) |
|-------------------------|------------------------------|---|---|--------------|-----------------------------|
| EO Product | Package info XML file | See section 2.3. | A file describing the content of the package and stating the type of package as "EO_PRODUCT" | 1 | M |
| | EO Native Image file (s) | L1b, Level 2 and Level 3 native formats | Level 1b EO product. It includes both SAR and Optical platforms. The file extension must match the original format extension. | N | M |
| | EO Product metadata GML file | See section 2.3. | The EOP application profile compliant metadata description of the EO product. | 1 | M |
| | EO browse image file | JPG | Browse image file | 1 | O |
| Quality Notification | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "QUALITY_NOTIFICATION" | 1 | M |
| | Image quality notification | See section 2.3 | Suitability of product (YES or NOT) and position accuracy/displacement vector, 1 per SAR image. | 1 | M |
| Oil Spill Notifications | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "OS_NOTIFICATION" | 1 | M |
| | Oil Spill feature GML file | See section 2.3 | <p>A file describing a detected OS. It contains full set of OS parameters. /eo:OilSpill/eo:origin element has fixed value of 'DETECTED'.</p> <p>The OSN package can hold 1 to N notifications however EMSA requests all Service Providers to create 1 OSN package which may contain N OSN GML files</p> <p>In the case of a 'CleanSea' where no oil spills are detected, no oil spill feature GML should be provided. The OSN Package should only</p> | N | O ¹ |

¹ Please note that Oil Spill feature GML file is not provided only in case of a Clean Sea report

| | | | | | |
|-------------------|--------------------------------|--|--|---|---|
| | | | <p>contain the Package Info XML file.</p> <p>NOTE: in order to avoid some physical limits of the Oracle ingestion functions, it is necessary that the number of vertexes for each oil spill polygon is < 450 points.</p> <p>The polygon describing the oil spill (meaning the first point has to be repeated at the end of the list) and drawing segments following the order of the points in the list shall not result in intersecting segments</p> | | |
| | Clip image file | Geotiff with a pixel depth not greater than 8bit. See 2.6. | A clip image file to be associated to a given OS. Please see section 2.6 for details about the expected zoom level and content of the clip image. | N | M |
| SAR Wind and Wave | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "SAR_DERIVED" | 1 | M |
| | SAR extracted wind file | NetCDF (CF convention v1.4). | Gridded file with SAR extracted wind field | 1 | O |
| | SAR wave/swell extracted file | NetCDF (CF convention v1.4). See 3.2.3.1 | Gridded file with SAR extracted wave field | 1 | O |
| Vessel Detection | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "VESSEL_DETECTION" | 1 | M |
| | Detected Ship feature GML file | XML as per schema in section 2.3 | A file describing a detected ship. | N | M |
| | | | | | |
| Quality Report | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "QUALITY_REPORT" | 1 | M |
| | Quality report file | See section 2.3 | A file describing the quality features of the image in terms of coverage compliance and usable area. | 1 | M |

| | | | | | |
|--------------------|-----------------------|--|--|---|---|
| Activity Detection | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "ACTIVITY_DETECTION" | 1 | M |
| | Activity Detection | See section 2.3 | A file describing the content of the activities found in the current image. | N | M |
| | Clip image files | Geotiff with a pixel depth not greater than 8bit. See 2.6. | A clip image file with elements pointed to by the activity detection XML file (see above). It may includes vessels, rubber boats or any other feature that is related to the activity being described. The file is pointed by a specific tag in the activity XML file both for vessels and for activity features. | N | O |
| Change Detection | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "CHANGE_DETECTION" | 1 | M |
| | Change Detection | See section 2.3 | A file describing the content of the changes found for an entity in the current image. A Change Detection package may contain several of these files. However, each file may only describe changes about one entity. An entity has can be of type: Vessel, Feature, Activity or Oilspill. In case contractors compare the same type but from different levels (e.g.Vessel Detection Service and Enriched Vessel Service) the attributes to be considered shall be the common to both levels. | N | M |
| | Clip image files | Geotiff with a pixel depth not greater than 8bit. See 2.6. | A clip image file with elements pointed to by the change detection XML file (see above). It may includes vessels, rubber boats or any other feature that is related to the activity being described. The file is pointed by a specific tag in the detection XML file both for vessels and for detected changes features. | N | O |
| Enriched Vessel | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as | 1 | M |

| | | | | | |
|----------------------------|--------------------------------|--|--|---|---|
| Detection | | | "ENRICHED_VESSEL_DETECTION" | | |
| | Enriched Ship feature GML file | XML as per schema in section 2.3 | A file describing enriched information about a detected vessel. | N | M |
| | Clip image file | Geotiff with a pixel depth not greater than 8bit. See 2.6. | A clip image file to be associated to a given vessel. Please see 2.6 for details about the expected zoom level and content of the clip image. | N | O |
| Feature Detection | Package info XML file | See section 2.3 | A file describing the content of the package and stating the type of package as "FEATURE_DETECTION" | 1 | M |
| | Feature feature GML file | XML as per schema in section 2.3 | A file describing the details of a single feature detected in the image. Each feature will require a separate Feature GML file. | N | M |
| | Clip image file | Geotiff with a pixel depth not greater than 8bit. See 2.6. | A clip image file to be associated to a given feature. Please see Annex N for details about the expected zoom level and content of the clip image. | N | O |
| Enriched Feature Detection | Package info XML file | XML as per schema in section 2.3 | A file describing the content of the package and stating the type of package as "ENRICHED_FEATURE_DETECTION" | 1 | M |
| | Feature feature GML file | XML as per schema in section 2.3 | A file describing enriched information about a single feature detected in the image. | N | M |
| | Clip image file | Geotiff with a pixel depth not greater than 8bit. See 2.6. | A clip image file to be associated to a given feature. Please see 2.6 for details about the expected zoom level and content of the clip image. | N | O |
| Wake Detection | Package info XML file | XML as per schema in section 2.3 | A file describing the content of the package and stating the type of package as "WAKE_DETECTION" | 1 | M |
| | Wake feature GML file | XML as per schema in section 2.3 | A file describing a single wake detected in the image. Each wake will require a different Wake GML file. | N | M |
| | Clip image file | Geotiff with a pixel depth not greater | A clip image file to be associated to a given wake. Please see 2.6 for details about the expected zoom | N | O |

| | | | | | |
|--|--|------------------------|---|--|--|
| | | than 8bit. See 2.6. | level and content of the clip image. | | |
|--|--|------------------------|---|--|--|

3.2.3 Miscellaneous features and examples

3.2.3.1 SAR wind and wave NetCDF format conventions and specifications

SAR wind and wave files produced by the service providers as part of the data analysis shall be provided in NetCDF format, following NetCDF (CF convention v1.4), in particular with reference to the conventions for naming and units of the various variables (e.g. longitude unit is degree_east, etc.).

In addition the following additional constraints shall be applied:

- the total size of the grid lat long shall not exceed 250,000 pixels (e.g. 500 x 500 pixels)
- standard names defined by the convention for the variables shall be used also for naming the variables inside the NetCDF. This in particular applies to:
 - Wind speed: wind_speed;
 - Wind direction: wind_from_direction;
 - Wave height: sea_surface_swell_wave_significant_height;
 - Wave direction: sea_surface_swell_wave_to_direction.

3.3 Naming conventions

3.3.1 Identifier conventions

A number of identifiers that are defined that uniquely refer to features that shall be handled by the EODC. These will also be used for building the file naming conventions.

| Identifier type | Rules and description |
|--------------------------------|---|
| Earth Observation Image | <p>The unique identifier for the image is build with the following rule: <code><image_id>=<service_id>_<satellite_name>_<sensor_mode>_<stop_acquisition_date></code></p> <p>Where:</p> <p><code><service_id></code> = is the unique identifier of the service assigned by EODC at the time of the ordering process <code><satellite_name></code>= satellite name <code><sensor_mode></code>= sensor mode of the image (for Optical the naming of sensor mode will be improved in the next releases of EICD). See section 4.1 and 4.2 for details. <code><stop_acquisition_date></code>= stop acquisitiondate in format <code>yyyymmdd_hhmmss</code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424</p> <p>Please note:</p> <ul style="list-style-type: none"> The image identifier is used in the naming convention of any package AND in the GML files itself It is up to the EO DC to build a valid OGC compliant URN based on the image unique identifier specified here. For the cases with DTO's and where the EO Service is not delivered but QUA needs to be delivered, the nomenclature of the <i>image_id</i> shall be the following: <ul style="list-style-type: none"> <code><service_id>_<satellite name scheduled for the last apptempt> _<sensor mode of the last attempt>_<stop acquisition date and time of the last attempt></code> |
| Oil spill | <p>The identifier of an Oil Spill shall match the following rule:</p> <p><code><os_id> = <image_id>_OSN_<os_num></code></p> <p>Where:</p> <p><code><os_num></code> is a progressive number from 1 to N being N the total number of Oil Spills detected in the same image <code><image_id></code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_OSN_2</p> <p>Please note:</p> <ul style="list-style-type: none"> The OS identifier is used in the GML files as identifier of the Oil Spill It is up to the EODC to build a valid OGC compliant URN based on the oil spill identifier specified here. |
| Vessel Detection | <p>The identifier of a Vessel Detection shall match the following rule:</p> <p><code><vds_id> = <image_id>_VDS_<vds_num></code></p> |

| | |
|--------------------------------|---|
| | <p>Where: <code><vds_num></code> is a progressive number from 1 to N being N the total number of vessels detected in image <code><image_id></code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_VDS_32</p> <p>Please note:</p> <ul style="list-style-type: none"> The Detected Vessel identifier is used in the GML files as identifier of a vessel; It is up to the EODC to build a valid OGC compliant URN based on the detected ship identifier specified here. |
| Enriched Vessel Service | <p>The identifier of an Enriched Vessel Service shall match the following rule:</p> <p><code><evs_id> = <image_id>_EVS_<evs_num></code></p> <p>Where: <code><evs_num></code> is a progressive number from 1 to N being N the total number of vessels detected in image <code><image_id></code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_EVS_32</p> <p>Please note:</p> <ul style="list-style-type: none"> The enriched vessel's identifier may be used in the GML files as identifier of a vessel; It is up to the EODC to build a valid OGC compliant URN based on the enriched vessel identifier specified here or, if this vessel was already identified in a previous Vessel Detection, to make sure it is equal to its identifier <code><vds_id></code>, |
| Activity detection | <p>The identifier of an Activity shall match the following rule:</p> <p><code><act_id> = <image_id>_ACT_<act_num></code></p> <p>Where: <code><act_num></code> is a progressive number from 1 to N being N the total number of detected activities in image <code><image_id></code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_ACT_5</p> <p>Please note:</p> <ul style="list-style-type: none"> The activity detection identifier is used in the GML files as identifier of an activity; It is up to the EODC to build a valid OGC compliant URN based on the activity detection identifier specified here. |
| Change detection | <p>The identifier of a Change Detection shall match the following rule:</p> <p><code><cds_id> = <image_id>_CDS_<cds_num></code></p> <p>Where: <code><cds_num></code> is a progressive number from 1 to N being N the total number of changes in image <code><image_id></code></p> <p>Example:</p> |

| | |
|---------------------------------|--|
| | <p>1706010001_RS2_SCN_20170601_053424_CDS_2</p> <p>Please note:</p> <ul style="list-style-type: none"> The change detection identifier is used in the GML files as identifier of an activity; It is up to the EODC to build a valid OGC compliant URN based on the change detection identifier specified here. |
| Feature Detection | <p>The identifier of a Change Detection shall match the following rule:</p> <p><code><fvds_id> = <image_id>_FDS_<fds_num></code></p> <p>Where:</p> <p><code><fds_num></code> is a progressive number from 1 to N being N the total number of changes in image <code><image_id></code></p> <p>Example:</p> <p>1706010001_RS2_SCN_20170601_053424_FDS_2</p> <p>Please note:</p> <ul style="list-style-type: none"> The Feature detection identifier is used in the GML files as identifier of an activity. It is up to the EODC to build a valid OGC compliant URN based on the feature detection identifier specified here. |
| Enriched Feature Service | <p>The identifier of an Enriched Feature Service shall match the following rule:</p> <p><code><evs_id> = <image_id>_EFS_<efs_num></code></p> <p>Where:</p> <p><code><efs_num></code> is a progressive number from 1 to N being N the total number of vessels detected in image <code><image_id></code></p> <p>Example:</p> <p>1706010001_RS2_SCN_20170601_053424_EFS_2</p> <p>Please note:</p> <ul style="list-style-type: none"> The detected vessel identifier is used in the GML files as identifier of a Detected Vessel; It is up to the EODC to build a valid OGC compliant URN based on the enriched feature identifier specified here or, if this feature was already identified in a previous Feature Detection, to make sure it is equal to its identifier <code><fds_id></code>, |
| Wake Detection | <p>The identifier of a wake Detection shall match the following rule:</p> <p><code><wds_id> = <image_id>_WDS_<wds_num></code></p> <p>Where:</p> <p><code><wds_num></code> is a progressive number from 1 to N being N the total number of changes in image <code><image_id></code></p> <p>Example:</p> <p>1706010001_RS2_SCN_20170601_053424_WDS_2</p> <p>Please note:</p> <ul style="list-style-type: none"> The wake detection identifier is used in the GML files as identifier of a wake.. |

| | |
|--|--|
| | <ul style="list-style-type: none"> It is up to the EODC to build a valid OGC compliant URN based on the wake detection identifier specified here. |
|--|--|

3.3.2 File naming conventions

This section reports the naming conventions both for the packages (i.e. zip) which is a unique piece of data transmitted to the system and for the files (e.g. XML, image file, etc.) that are to be included inside the packages.

3.3.2.1 Package file name

The package file name shall match the rules as followed in the table below.

| Rule | <code><image_id>_<package_type>.<extension></code> |
|---------------|--|
| Package types | <p><code><package_type></code> is a code for package type. Following codes are valid:</p> <ul style="list-style-type: none"> EOP for Image package. OSN for OS Notification package type DER for SAR derived package type, which includes SAR wind and wave information VDS for detected vessels package type QUA for Quality report package type QNO for Quality notification package type ACT for Activity Package type CDS for Change Detection Service Package type WDS for Wake detection service FDS for Feature detection service EFS for Enriched feature service EVS for Enriched vessel service <p>Where: <code><extension></code> is a valid file format extension for the package as defined in section 2.</p> |
| Examples | <p>1706010001_RS2_SCN_20170601_053424_EOP.zip 1706010001_RS2_SCN_20170601_053424_OSN.zip 1706010001_RS2_SCN_20170601_053424_ACT.zip 1706010001_RS2_SCN_20170601_053424_CDS.zip</p> |

Another packages used by the EODC that abides to different rules is the predicted oil spill package. The table below reflects the rules for these packages

| Predicted Oil Spill package file name | |
|---------------------------------------|--|
| Rule | <code><os_id>_<model_identifier>><run_id>_<package_type>.<extension></code> |
| Package types | <p>A predicted oil spill file name shall match the following rule:</p> <ul style="list-style-type: none"> <code><os_id></code> is the Id of the oil spill package as provided as input to the model run <code><model_identifier></code> is a code for the model, as specified by the Model Provider <code><run_id></code> identifier of the run, as specified in input elements <code><package_type></code> is a code for package type. OSP for Oil Spill Predicted <code><extension></code> the file extension, e.g. zip |
| Examples | 1306170001_RS2_SCW_20130617_061824_OS_1_OSERIT_102_OSP.zip |

3.3.2.2 GML / XML/Native file names

| Package type | Rules and description |
|------------------|--|
| Package info XML | <p>Package info XML file name in any single package shall match the following rule:</p> <p><code><image_id>_PCK.xml</code></p> |

| | |
|---------------------------------------|---|
| | <p>Example:</p> <p>1706010001_RS2_SCN_20170601_053424_PCK.xml</p> |
| EO Product GML | <p>An EO Product GML file name shall match the following rule:</p> <p><code><image_id>_EOP.xml</code></p> <p>Example:</p> <p>1706010001_RS2_SCN_20170601_053424_EOP.xml</p> |
| Oil spill GML | <p>An Oil Spill feature GML file name shall match the following rule:</p> <p><code><os_id>_osn.xml</code></p> <p>Example:</p> <p>1306170001_RS2_SCW_20130617_061824_OSN_1.xml</p> |
| Detected vessel GML | <p>A detected vessel GML file name shall match the following rule:</p> <p><code><vds_id>.xml</code></p> <p>Example:</p> <p>1306170001_RS2_SCW_20130617_061824_VDS_32.xml</p> |
| Enriched detected vessel GML | <p>An enriched detected vessel GML file name shall match the following rule:</p> <p><code><evs_id>.xml</code></p> <p>Example:</p> <p>1306170001_RS2_SCW_20130617_061824_EVS_4.xml</p> |
| Activity detection GML | <p>An activity report GML file name shall match the following rule:</p> <p><code><act_id>.xml</code></p> <p>Example:</p> <p>1306170001_RS2_SCW_20130617_061824_ACT_23.xml</p> |
| Feature detection GML | <p>A feature report GML file name shall match the following rule:</p> <p><code><fds_id>.xml</code></p> <p>Example:</p> <p>1306170001_RS2_SCW_20130617_061824_FDS_23.xml</p> |
| Enriched feature detection GML | <p>An enriched feature report GML file name shall match the following rule:</p> <p><code><efs_id>.xml</code></p> <p>Example:</p> <p>1306170001_RS2_SCW_20130617_061824_EFS_23.xml</p> |
| Change detection GML | <p>A Change Detection report GML file name shall match the following rule:</p> <p><code><cds_id>.xml</code></p> <p>Example:</p> <p>1706010001_RS2_SCN_20170601_053424_CDS_23.xml</p> |

| | |
|---|---|
| Wake detection GML | <p>A Wake Detection report GML file name shall match the following rule:</p> <p><code><wds_id>.xml</code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_WDS_23.xml</p> |
| Image quality notification XML | <p>An Image Quality notification file name shall match the following rule:</p> <p><code><image_id>_QNO.xml</code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_QNO.xml</p> <p>Please note: <code><image_id>_QNO</code> is also the unique identifier of the QNO to be reported into the QNO XML file.</p> |
| Image quality report XML | <p>An Image Quality report file name shall match the following rule:</p> <p><code><image_id>_QUA.xml</code></p> <p>Example: 1706010001_RS2_SCN_20170601_053424_QUA.xml</p> <p>For non-deliveries, the package filename shall be "service_id"_"satellite_name_scheduled_for_the_last_attempt"_"sensor_mode scheduled for the last attempt"_"date_of_the_last_attempt"_"time_of_the_last_attempt".QUA.zip</p> |
| EO Native image file | <p>The unique identifier for the image is build with the following rule: <code><image_id>=<service_id>_<satellite_name>_<sensor_mode>_<stop_acquisition_date>.<extension></code></p> <p>Where:</p> <p><code><service_id></code> = is the unique identifier of the service assigned by EODC at the time of the ordering process <code><satellite_name></code>= satellite name <code><sensor_mode></code>= sensor mode of the image <code><stop_acquisition_date></code>= stop acquisitiondate in format <code>yyyymmdd_hh:mm:ss</code> <code><extension></code>=extension of the product.</p> <p>Example: 1706010001_RS2_SCN_20170601_053424.tiff</p> |
| Clip Image File name, EO Browse image file name, and SAR derived NetCDF file name and model prediction NetCDF file names | <p>The following rules and conventions must be used:</p> <ul style="list-style-type: none"> clip images (e.g. oil spill clips, detected vessel clips, etc.) must have a naming which is unique inside the data package and is referenced by the XML file describing it. For example, the activity report XML allows to point to the filename with the clip image for vessels, features, etc. SAR derived wind file name has a fixed name: SAR_WIND.nc SAR derived wave file name has a fixed name: SAR_WAVE.nc NetCDF file containing the gridded concentration of particles file name: <code><os_id>_<direction>.nc</code> <p>where:</p> <ul style="list-style-type: none"> <code><os_id></code>: same used in the package file name |

| | |
|---|--|
| | <ul style="list-style-type: none"> • <direction>: <ul style="list-style-type: none"> ○ backtrack: for backtrack modelling ○ forecast: for forward modelling <p>Example: 1706010001_RS2_SCN_20170601_053424_OS_1_backtrack.nc</p> |
| Oil spill model process request file XML | <p>A predicted oil spill file name shall match the following rule: <image_id>_RQT.xml</p> <p>Example name: 1706010001_RS2_SCNA_20170601_053424_RQT.xml</p> |
| Oil spill Model output file XML | <p>A predicted oil spill file name shall match the following rule: <os_id>_<model_identifier>><run_id>_modeloutput.xml</p> <ul style="list-style-type: none"> - <os_id> is the Id of the oil spill package as provided as input to the model run - <model_identifier> is a code for the model, as specified by the Model Provider - <run_id> identifier of the run, as specified in input elements <p>Example name: 1706010001_RS2_SCN_20170601_053424_OS_1_OSERIT_210_modeloutput.xml</p> |
| Oil spill Model feature GML | <p>A predicted oil spill file name shall match the following rule: <os_id>_<dir>_contour_<counter>.xml</p> <ul style="list-style-type: none"> - <os_id> is the Id of the oil spill package as provided as input to the model run - <dir> is the simulation direction: f for forward, b for backward - <counter> is a 5 digit zero padded integer counter of the oil spill contour files <p>Example name: 1706010001_RS2_SCN_20170601_053424_OS_1_f_contour_00061.xml</p> |

3.3.2.3 Data Take Opportunity (DTO)

DTO refers to a unique ID of an opportunity of acquisition inside an EO Service. Although EO Services may have only one opportunity of acquisition, it always have a DTO ID number. This value is an integer higher than 0.

4 List of attributes

4.1 Filename: Sensor Modes (SAR)

Table 2- List of Sensor Modes

| Sensor Type | Satellite | Sensor Mode Description | Sensor Mode |
|-------------|---------------------------------|------------------------------------|-------------|
| SAR | RADARSAT-2 | ScanSARNarrow | SCN |
| | | ScanSARWide | SCW |
| | | UltraFine | UF |
| | | ExtraFine | XF |
| | | Wide | W |
| | | Ship Detection | DVWF |
| | | Ocean Surveillance | OSVN |
| | | Standard | S |
| | | WideUltraFine | UW |
| | | MultiLookFine | MF |
| | | WideFine | FW |
| | | Extended High | EH |
| | | Extended Low | EL |
| | | WideMultiLookFine | MFW |
| | | SpotLight | SL |
| | | Fine Quad Pol | FQ |
| | | WideFine Quad Pol | FQW |
| | | Standard Quad Pol | SQ |
| | | Wide standard Quad Pol | SQW |
| | | Fine | F |
| | SENTINEL-1A SENTINEL-1B | Interferometric Wide Swath | IWS |
| | | Extra-Wide Swath | EWS |
| | | StripMap | S |
| | | Wave | |
| | TERRASAR-X TanDEM-X PAZ-1 | StripMap | SM |
| | | StripMapRad | SMRaD |
| | | ScanSAR | SC |
| | | WideScanSAR | WS |
| | | Staring SpotLight | ST |
| | | Hig Resolution SpotLight (150 MHz) | HS |
| | | Hig Resolution SpotLight (300MHZ) | HS300 |
| | | SpotLight | SL |

4.2 Filename: Sensor Modes (Optical)

Table 3- List of Sensor Modes

| Sensor Type | Sensor Mode/Optical product | Spatial Resolution | Sensor Mode |
|-------------|-----------------------------|--------------------|-------------|
| OPTICAL | Pansharpened | VHR0 | PX30 |
| | Panchromatic | | PA30 |
| | Pansharpened | VHR1 VHR2 | PX |
| | Panchromatic | | PA |
| | Multispectral | | XS |

Abbreviations and acronyms

| Abbreviation | Definition |
|--------------|--|
| AIS | Automatic Identification System |
| APT | Acquisition Planning Tool |
| CRS | Coordinate Reference System |
| CSW | Catalog Service for the Web |
| DTO | Data Take Opportunity |
| EICD | External Interface Control Document |
| EMSA | European Maritime Safty Agency |
| EPSG | European Petroleum Survey Group |
| ESA | European Space Agency |
| EO | Earth Observation |
| EODC | Earth Observation Data Centre |
| EOP | Earth Observation Product |
| GML | Geographic Markup Language |
| GUI | Graphical User Interface |
| HMA | Heterogeneous Mission Accessibility |
| HTTP | Hyper Text Transfer Protocol |
| ICD | Interface Control Document |
| ISO | International Organization for Standardization |
| MSP | Model Service Provider |
| NetCDF | Network Common Data Form |
| OGC | Open Geospatial Consortium |
| SAR | Synthetic Aperture Radar |
| URL | Uniform Resource Locator |
| UTC | Coordinated Universal Time |
| UTF | Unicode Transformation Format |
| WFS | Web Feature Server |
| WMS | Web Map Server |
| XML | Extensible Mark-up Language |
| XSD | XML Schema Definition |