DOMINO-X

Title: Domino-X Pivot Format Definition Document

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Document change log

ISSUE	DATE	MODIFICATION NB	CLASS	OBSERVATIONS
1	13/01/2023	-	-	Initial version
2	24/02/2023	1	§5.3	Product types alignment
		2	§7.1	Naming convention characters numbers corrections
		3	§7.3.2	Clarifications on the preview files content
		4	§4	Removal of the "pivot product" notion in favor of "primary product"
		5	§7.2	Correction of the feature detection output file name (figure)
		6	§7.2	Format correction for change detection output file name (figure)
		7	Figure 1 §5.5 Table 2	Addition of the Datacube products (DC)
3	27/04/2023	8	§5.5	Update of the DC products definition
		9	§7.3.3	Precisions on DC3 files naming convention
		10	§7.3.3/7.3.4	Separation of instrument and bands in naming convention + extension for COG images moved to .COG.TIF
		11	§7.4	Made icon file optional for DC
		12	§7.3.5	Updated the quality reports section with AI conficence indicators
		13	§9.2	Removed duplicated eo STAC extension in CAT file example
		14	ANNEXES	Update of the CAT files examples with more representative content
		15	§7.3.4	Corrected the coordinates referential in Feature Detection products geojson files
		16	§7.3	Added note on STAC/GEOJSON coordinates specifications.
		17	ANNEXES	Attached the CAT files examples and schemas instead of inserting the full content (for easier download and usage)
4	13/10/2023	18	§7.2/§7.3.2	Datacube Preview format modification
		19	§5.5	Clarifications on the number of dimensions on a datacube
		20	§7.2/§7.3.4	Correction of the SEG maps names
		21	§7.4	Clarification on the applicability to external products harvested through the INTS domino
		22	§5.3	Introduction of the Multi-Detection Products

		23	ANNEXES	Added the "L0 " value to the "processing:level" enum on Lx CAT files schema and example Added the "dox:onBoardId" tag on L2 CAT file schema and example (mandatory) Added the "dox:userRequestId" tag on L2 CAT file schema and example (optional) Added the "dox:userRequestId" tag on FD/CD/DC CAT files schemas and examples (mandatory) Added the "dox:qualityTag" tag on all CAT files schemas and examples (optional) Added the "dox:productOrigin" tag on L2 CAT file schema and example (optional) Corrected the epsj type in all CAT file schemas and examples (from string to integer).
		24	ANNEXES	Renamed ANNEX1 with "Lx" instead of "L2"/"MUM"

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Table of Contents

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1 INTRODUCTION

1.1 Scope of the document

This document provides technical details on the naming convention, structure and content of the Domino-X pivot format.

1.2 Document Structure

The chapters are organized as follows:

- Section1 – provides the current introduction, describing the scope and the structure of the chapters;
- Section 2 – references the related applicable and reference documents;
- Section 3 – provides definitions needed to follow this subject;
- Section 4 – recalls the basis of the pivot concept;
- Section 5 – provides an overview of the different Domino-X product types
- Section 6 – provides details on the pivot format applicable norms and standards;
- Section 7 – details the format specificities;
- Section 8 – introduces the need for conversion from/to pivot format;

2 DOCUMENTATION

2.1 Applicable documents

AD1.	PROP-TMCSF-1000215005-2021	Domino-X Proposal

2.2 Reference documents

RD1.	DOMX-TN-ADST-1001286041	DOMINO-X Glossary
RD2.	DOMX-TN-ADST-1001281343	DOMINO-X System High Level Description and Conops

3 DEFINITIONS

Refer to RD1 for definitions of terms and abbreviations used throughout this document.

4 DOMINO-X PRIMARY PRODUCT AND PIVOT CONCEPTS

As part of the Domino-X project, the PRIMARY and PIVOT notions have emerged from several needs :

- The need for dominos to be able to exchange data formatted/transformed to a pre-defined standard (including interoperability) to ease integration and optimize system timeliness
- The need to optimize the storage and access of the data in a virtualized environment (up to cloud native)

These needs translate into the definition of:

- A **primary product**: product level hosting the necessary transformations (performed systematically on the primary processing chain) to cope with most of the constraints brought by the enhanced and advanced processing chains.
- A **pivot format** (also called Internal Exchange Product Format) : a set of structure/naming/extension conventions that each EO product archived inside the system must respect to factorize and optimize processes.

While the primary product refers to a particular step in the processing chain, the pivot format is to be applied to all steps of the data transformation, up to the most evolved product level.

4.1 Primary product

For DominoX, it has been agreed that this product will correspond to the definition of a L2 product (cf. RD1).

Indeed, while some enhanced algorithms are able to perform with the most basic transformations on raw telemetry, most of them require geometric resampling into a virtual perfect sensor grid, which matches the L2 definition.

As a result, it has been decided that the primary processing chain shall systematically process all input data up to this primary product level and that enhanced processors shall be developed/trained in accordance with this choice as much as possible.

4.2 Pivot format

As the various transformations applied to the data on the processing chain arise, they tend to:

- generate new files to be added to products
- remove files from products
- modify the data content (e.g add metadata)

As a result, the goal of this pivot format is not to impose a complete and restrictive definition of the products formats, but rather to define the general formatting guidelines and frame that can be commonly applied by all product processors as well as archiving and cataloguing services.

This pivot format is to be applied to all products internally stored in the system (except auxiliary data) for exchanges between Dominoes or processors. This includes in particular the Primary Level and all upper levels, but also other lower levels and external products imported from interoperated systems.

5 DOMINO-X PRODUCTS OVERVIEW

The Domino-X system is composed of several Dominoes involved in the generation/storage/dissemination of Earth Observation products, as shown in the figure below :

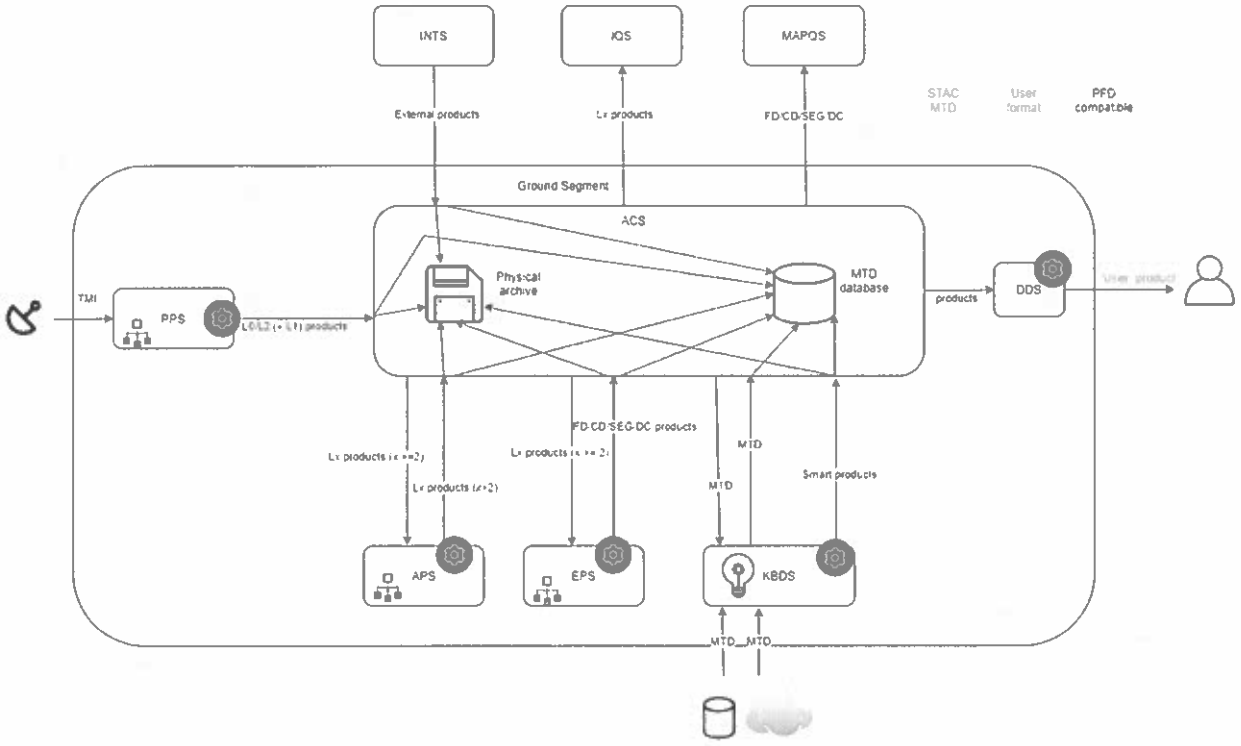


Figure 1: Domino-X product echanges overview

5.1 Basic products (up to primary)

Basic products are issued from the PPS and include all the product levels issued from raw telemetry up to the perfect sensor product (i.e primary product) applying radiometric/geometric corrections : L0P / L1P / L2P. See RD1 for a more detailed definition of the modifications applied to each level.

5.2 Advanced products

Advanced products are issued from the APS and include all the upper monomission or multimission product levels (ortho-rectification, DEM usage, mozaïc, stereo…) : L3P/L4P/L5P/L6P/L7P.

5.3 Enhanced products

Enhanced products are issued from the EPS and include all products generated by enhanced processors (i.e based on IA technologies) from the primary level(s) and/or adding value to the initial products. These products can be classified into 3 categories:

- Change detection products (CDP) : featuring change intensity masks or change signature files between several (typically 2) EO products

- Feature detection products (FDP) : adding additional files listing the objects found in the images

- Image Segmentation products (SGP) : pixel-wise classifying parts of the images into one or several object classes

It is to be noted that the three categories described here are the ones that represent an interest for the use cases currently listed for Domino-X. Would new cases arise, this list could be extended and the new products foreseen mapped to the pivot format described as much as possible.

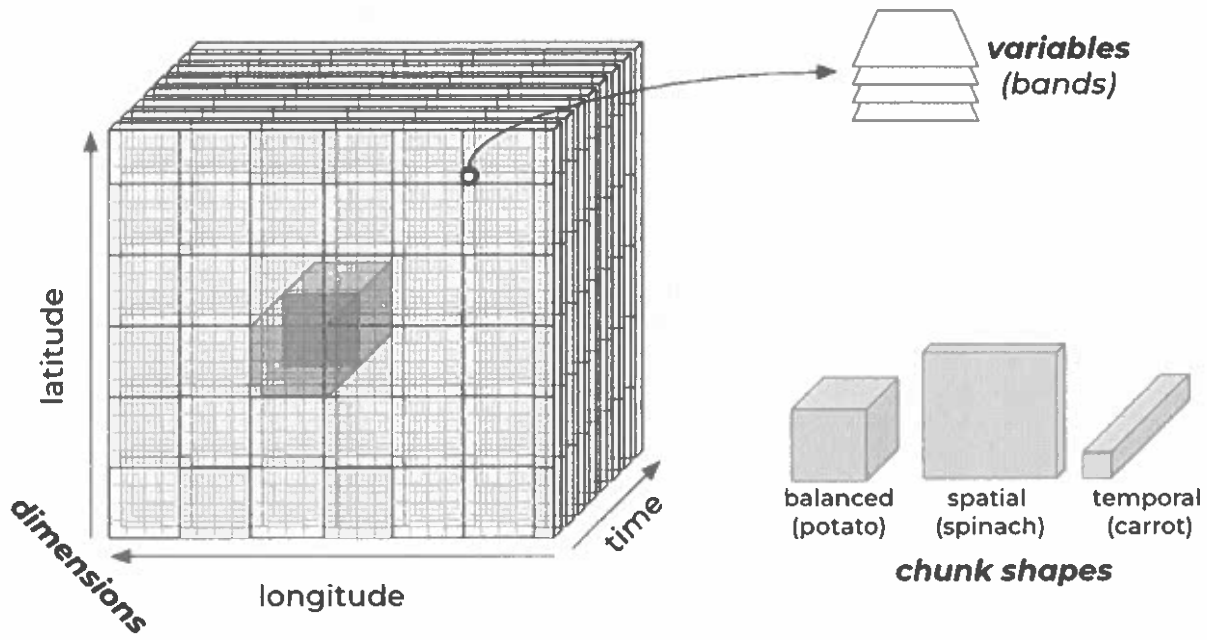
In particular, a new "Multi-detection products (MDP)" category could be foreseen for more complex scenarios where the EPS would expose services chaining several detections and delivering a combined prediction in a single product (e.g a prediction providing feature detections on the result of a change detection analysis).

5.4 Smart products

Smart products are issued from the KBDS and include all analytics generated from the various products of the system over a precise timeframe and location.
They are not usual earth observation products as they tipically do not contain any image data but are meant to include various types of charts/plots/maps...

5.5 Datacube products

Datacube products (DC) are issued from the EPS and contain multi-dimensional ("n-D") arrays.
Typical dimensions (spatio-temporal) would be:
- latitude coordinates
- longitude coordinates
- time
The arrays contain sensor measures or computed values (also called "variables") such as pixel values, temperatures, cloud coverages, NDVI...
Note : although it is called a "cube", the number of dimensions could be superior to 3.



5.6 Metadata enhancement

The Domino-X system can host some processors which goal is to improve the product description through the computation/retrieval of relevant metadata (labels, thematics…).
These metadata would not result in a new product, but would rather be indexed in a catalogue for further requests and concatenation to a product at dissemination.

6 PIVOT FORMAT APPLICABLE NORMS AND STANDARDS

The following table lists the norms and standards followed by the described pivot format and their applicable references.

Norm/Standard	Extended name	Applicable version/reference
TIF(F)	Taggued Image File Format	-
COG	Cloud Optimized GEOTIFF	-
ZARR	-	V2.12.0
GML	Geography Markup Language	V3.3
JSON	Javascript Object Notation	-
GEOJSON	Georeferenced JSON	-
JPG	Joint Photographic Experts Group	-
STAC	Spatio Temporal Asset Catalog	V1.0.0

Table 1: Applicable norms and standards

7 DOMINO-X PIVOT FORMAT DEFINITION

7.1 Naming convention

The product filename shall be unique : <UniqueID>.TAR (extention in uppercase).

The <UniqueID> is composed of 33 characters (uppercase letters: A..Z, numbers : 0..9, special : "_") and can be freely set with the constraint to be unique for the whole system lifetime.

It is nevertheless required for internally generated products to include the following informations:

- Mission / spacecraft (MMI in case of multi-mission products) : 3 characters
- Instrument (MULT in case of multi-instruments products) : 4 characters
- Product level/type (L[1..7]P/TDP/CDP/SGP/SMP) : 3 characters
    - L[1..7]P: Level [1..7] Product
    - FDP: Feature Detection Product
    - CDP: Change Detection Product
    - SGP: SeGmentation Product
    - SMP: Smart Product
    - DCP: Datacube Product
- Start time of the product applicability (defined for each product type):
    - L[1..7]P : sensing start of the product
    - FDP : sensing start of the Lx product on which the detection is performed
    - CDP : sensing start of the earlier product compared
    - SGP : sensing start of the Lx product on which the segmentation is performed
    - SMP : sensing start of the earlier product analysed
    - DCP : time of the oldest temporal layer of the datacube

And comply to the following naming convention:

<SPACECRAFT>_<INSTRUMENT>_<PRODUCT_TYPE>_<START_DATE>_<uid>.TAR

The uid shall be composed of 4 alphanumeric characters (lower case).

For paths lengh optimization purpose on some OS, the dates format must be YYYYMMDDTHHMMSS.

For field values which initial length is smaller that the requested one, the use of the character "_" is requested.

7.2 Product physical format

The product is defined by a set of data items, encapsulated in a TAR archive file:

- A catalogue file, **mandatory** for any product cataloguing
- A preview image file, **mandatory** for any product cataloguing
- An image folder, **optional**
- An expert folder, **optional**
- A quality folder, **optional**
- An auxiliary data folder, **optional**
- An analytics folder, **optional**
- An icon file, **optional**


<UniqueID>
CAT_<UniqueID> JSON
PREVIEW_<UniqueID> JPG/GIF
IMAGE_<UniqueID>
IMG_<INST/BAND_REF>_<UniqueID> ZARR/COG TIF
EXPERT_<UniqueID>
MASKS_<UniqueID>
MSK_<MSK_TYPE>_<INST_BAND_REF>_<UniqueID> GML
LABELS_<UniqueID>
PRED_FD_<OBJECT>_<UniqueID> GEOJSON
PRED_CD_<Input_ID_1>_<Input_ID_2>_<UniqueID> TIF
PRED_SEG_<Class>_<UniqueID> TIF
GT_SEG_<Class>_<UniqueID> TIF
QUALITY_<UniqueID>
IQR_<FORMAT/RADIOMETRY/GEOMETRY/...>_<UniqueID> JSON
CIR_PATCH_<UniqueID>.JSON
CIR_GLOBAL_<UniqueID>.JSON
AUXILLIARY_<UniqueID>
AUX_<AUX_TYPE>_<UniqueID> TAR
ANALYTICS_<UniqueID>
ANA_<TYPE>_<VARIABLES>_<SENSING_STOP>_<UniqueID> <TBD>
ICON_<UniqueID> JPG

7.3 Product content details

7.3.1 Catalogue file

The catalogue file filename shall be : CAT_<UniqueID>.JSON.
The file shall be unique for each product and reference at least the minimum metadata necessary for product indexing:

- Product id
- Mission / spacecraft
- Instrument
- Product level/type
- Generation time
- Time span covered
- The original IDs of the input products used for this product processing
- Localisation information

Additional mission specific parameters can be added in this file, as well as enhanced production metadata.

For specifications and examples, refer to:
- Appendix 1: Lx product CAT file spec and example~~Appendix 1: L2 product CAT file spec and example~~
- Appendix 2: Feature detection product CAT file spec and example~~Appendix 2: Feature detection product CAT file spec and example~~
- Appendix 3: Change detection product CAT file spec and example
- Appendix 4: Smart product CAT file spec and example~~Appendix 4: Smart product CAT File spec and example~~

This file is the entry point for catalogs to extract the relevant metadata for product indexing.
In order to optimize the ingestion of the products into STAC compliant catalogs, each CAT file is meant to represent one STAC item (GEOJSON feature) and the referencing of its properties shall comply with the STAC standard.

In case of inconsistency between the product name and the CAT file content, the CAT file content must prevail.

Note : as per GEOJSON specifications, the coordinates provided as part of STAC descriptions must include two or more elements. The first two elements are longitude and latitude, or easting and northing, precisely in that order.

7.3.2 Preview image

The preview image filename shall be PREVIEW_<UniqueID>. JPG for all products except datacube.
For datacube product, the preview image filename shall be PREVIEW_<UniqueID>.GIF.

It is a quicklook image of the product generated by subsampling the full resolution data.
It is preferably in true color when available in the product.

In case of basic and advanced products, it is generated from the main image file generated.
In case of enhanced products, it is generated from the visual prediction issued :
- subsampled heatmap for CDP products
- subsampled original image with objects bounding boxes visible for FDP products
- In case of datacube products, it is generated from temporal evolution of colored indicators over the area of the product.

In case of smart products, it is generated from the main chart issued.

Note : JPG is the standard currently widely used among existing cataloguing products.
Note 2 : the subsampling ratio should be configurable and adapted to the mission (32 is a typical value).

7.3.3 Image folder

In case the product contains image data (basic, advanced products and some enhanced products), the image folder contains the full resolution product(s) folder.
The folder can contain as many files as necessary to cover all aspects of the related mission instruments depending on the chosen granularity. A zarr file can contain one or several bands according to the mission needs.

All files of this folder must comply with the COG or ZARR format and respect the following naming convention :

IMG_<INST>_<BAND(S)>_REF>_<RESOLUTION>_<UniqueID>.<{COG.TIF}/ZARR>

Example : IMG_MSI_B01_10m_DO1_INST_L2P_20230516T120000_a3j8.COG.TIF

In the case of datacubes (DC products), the file format is restricted to ZARR.

Example : IMG_DC3_B01B02B12_10m_ DO1_INST_L2P_20230516T120000_a3j8.ZARR

7.3.4 Expert folder

The expert folder contains expertise data issued from:

- basic processors such as cloud masks (in subfolder MASKS)
- enhanced processors such as heatmap predictions (in subfolder LABELS)

MASKS subfolder:

Masks files (WGS84 projection) are GML files named according to the following convention :

MSK_<MASK_TYPE>_<INST>_<BAND_REF>_<UniqueID>.GML

LABELS subfolder:

Contains the labels either produced by the operational algorithm (predictions/PRED) or corrected post-production (ground truths/GT) :

- Feature detection predictions/ground truths are contained in geojson files matching the following convention:

[PRED/GT]_FD__<OBJECT>_<UniqueID>.GEOJSON

Feature detection files contain information for each predicted object : label, confidence score, bounding box coordinates (xmin, ymin, xmax, ymax) in long/lat.

The feature detection labels inside the geojson are described as shown in the example below :

```
{
  "type": "FeatureCollection",
  "crs": {
    "type": "name",
    "properties": {
      "name": "EPSG:4326"
    }
  },
  "metadata": {
    "model_name": "MyAwesomeModel",
```

```
    "model_version": "1.0.0",
    "production_date": "13/12/2022"
  },
  "features": [
    {
      "type": "Feature",
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [
            [
              10.208185675850826,
              36.860459191655245
            ],
            [
              10.208185675850826,
              36.86041882136638
            ],
            [
              10.208236138711912,
              36.86041882136638
            ],
            [
              10.208236138711912,
              36.860459191655245
            ],
            [
              10.208185675850826,
              36.860459191655245
            ]
          ]
        ]
      },
      "properties": {
        "class_id": 0,
        "class_name": "vehicle",
        "confidence": 0.9999957084655762
      }
    },
    {
      "type": "Feature",
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [
            [
              10.212619679244865,
              36.862548354104185
            ],
            [
              10.212619679244865,
              36.86251134800605
            ],
            [
              10.212660049533733,
              36.86251134800605
            ],
            [
```

```
                10.212660049533733,
                36.862548354104185
            ],
            [
                10.212619679244865,
                36.862548354104185
            ]
        ]
    ]
},
"properties": {
    "class_id": 0,
    "class_name": "vehicle",
    "confidence": 0.9999943971633911
}
},
{
"type": "Feature",
"geometry": {
    "type": "Polygon",
    "coordinates": [
        [
            [
                10.207845892586185,
                36.86031453145347
            ],
            [
                10.207845892586185,
                36.8602741611646
            ],
            [
                10.207899719638009,
                36.8602741611646
            ],
            [
                10.207899719638009,
                36.86031453145347
            ],
            [
                10.207845892586185,
                36.86031453145347
            ]
        ]
    ]
},
"properties": {
    "class_id": 0,
    "class_name": "vehicle",
    "confidence": 0.9999861717224121
}
},
{
"type": "Feature",
"geometry": {
    "type": "Polygon",
    "coordinates": [
        [
            [
```

```
                10.210029252375813,
                36.86174094832681
            ],
            [
                10.210029252375813,
                36.86170057803795
            ],
            [
                10.210066258473944,
                36.86170057803795
            ],
            [
                10.210066258473944,
                36.86174094832681
            ],
            [
                10.210029252375813,
                36.86174094832681
            ]
        ]
    ]
},
"properties": {
    "class_id": 0,
    "class_name": "vehicle",
    "confidence": 0.9999853372573853
}
},
{
"type": "Feature",
"geometry": {
    "type": "Polygon",
    "coordinates": [
        [
            [
                10.208471632063643,
                36.86070814176993
            ],
            [
                10.208471632063643,
                36.86067449986254
            ],
            [
                10.20852209492473,
                36.86067449986254
            ],
            [
                10.20852209492473,
                36.86070814176993
            ],
            [
                10.208471632063643,
                36.86070814176993
            ]
        ]
    ]
},
"properties": {
```

```
            "class_id": 0,
            "class_name": "vehicle",
            "confidence": 0.9999845027923584
        }
    }
  ]
}
```

- Change detections maps are TIF files matching the following convention:

[PRED/GT]_CD__<Input_ID_1>_<Input_ID_2>_<UniqueID>.TIF

Change detection maps are heatmaps with the same projection, coordinates and size than the input images, and whose pixel values range from 0 to 1 to represent the probability that a change has occurred between the acquisition date of both input images and are encoded on float32 if threshold is zero, uint8 otherwise.

- Segmentation maps are single channel TIF files matching the following convention:

[PRED/GT]_SEG__<UniqueID>_<Class>_<UniqueID>.TIF

Segmentation maps are heatmaps with the same projection, coordinates and size than the input image, and whose pixel values range from 0 to 1 represent the probability of being the object/class.

Optionnally, the segmentation algorithms could issue GML vectorial masks of the areas representing each object/class.

Note : TIF is the standard for applications using these files.

7.3.5 Quality folder

This folder contains potential reports issued from quality checks (PPS/APS) or confidence computations (EPS) over the product.

7.3.5.1 Image quality checks

The image quality reports are JSON files matching the following naming convention :

IQR_<FORMAT/RADIOMETRY/GEOMETRY/...>_< UniqueID>.JSON

These checks can either be on-line checks performed by the processing chain in real time or post-processing checks performed by operators.

7.3.5.2 AI confidence indicators

The confidence indicator reports are JSON files matching the following naming convention :

For a summary of all confidence indicators per algorithm and per patch (subset of the image on which the prediction has been issued) :

CIR _PATCH_<UniqueID>.JSON

```
{
    "patches": [{
                "patch_location": [< top > , < left > , < height > , < width >],
                "confidence_indicators": {
                        "<algo1>": 0.5,
                        "<algo2>": 0.7,
                        "<chain>": 0.6
```

```
                        }
                },
                {
                        "patch_location": [< top > , < left > , < height > , < width >],
                        "confidence_indicators": {
                                "<algo1>": 0.3,
                                "<algo2>": 0.5,
                                "<chain>": 0.4
                        }
                }
        ]
}
```

This file is optional and can be used by quality operators to analyse potential algorithms weaknesses.

For an overall confidence indicator over the image per algorithm :

CIR_GLOBAL_<UniqueID>.JSON

```
{
        "confidence_indicators": {
                "<algo1>": 0.5,
                "<algo2>": 0.7,
                "chain": 0.6
        }
}
```

7.3.6 Auxiliary data folder

This folder contains auxiliary data either used for the processing of the product or to be included in the product for post-processing by the user.

The auxiliary data must appear as single TAR archives (one tar per instance of auxiliary data, including auxiliary data subtypes, e.g GIP_RADIO/GIP_DECOMP…) and respect the naming convention as provided by the Auxiliary Data Gathering Service :

AUX_<AUX_TYPE>_<UniqueID>.TAR

7.3.7 Analytics folder

This folder is only expected in Smart Products and contains charts/plots from the collection of several products metadata.

The analytics can be present in their native format (CSV, or PDF).
One file is expected by item and each file must match the following naming convention :
ANA_<TYPE>_<VARIABLES>_<SENSING_STOP>_<UniqueID>.<TBD>

7.3.8 Icon file

To be completed.

7.4 Product types mandatory content matrix

The following matrix is meant to synthetise the items of the pivot format which should be expected for each type of product:

- X : mandatory,
- (X) : optional,
- empty : should not be present.

	L0	L1	L2	L3-7	FD	CD	SG	SM	DC
Catalogue file	X	X	X	X	X	X	X	X	X
Preview image	X	X	X	X	X	X	X	X	X
Image folder	X	X	X	X	-	-	-	-	X
Expert folder	(X)	(X)	(X)	(X)	X	X	X	-	-
Expert folder/MASKS	(X)	(X)	X	(X)	-	-	-	-	-
Expert folder/LABELS	-	-	-	-	X	X	X	-	-
Quality folder	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	-
Auxiliary Data folder	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	-
Analytics folder	-	-	-	-	-	-	-	X	-
Icon file	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)

Table 2: Products content applicability matrix

FD: Feature-Detection
CD: Change-Detection
SG: Image SEGmentation
SM: Smart
DC: DataCube

Note : the previous status are only applicable for the products generated within a Domino-X system.
For external products harvested through the INTS domino, only the « Catalogue file » and « Preview image » items are mandatory.

8 CONVERSION NEEDS

The application of this pivot format as input of many functions using EO products implies that some conversion from/to this format must be planned.

In particular, they would be used:

- For the archiving of products retrieved from the interoperability function : in this case, the converted product must comply with all the mandatory attributes as specified in §7.4.
- For the dissemination of products to a specific format chosen by the user (not stored in the system) or needed by PPS/MAPQS operators : in this case, the converted product must reference the initial one in pivot format for further potential investigation.
- In case of integration of "on-the-shelf" processors in the processing chains, conversion steps may be added to workflows to comply with the pivot format (input and output).

9 APPENDIX 1: LX2 PRODUCT CAT FILE SPEC AND EXAMPLE

9.1 Specification

Not yet defined.

9.2 Example


```
{
      "type": "Feature",
      "id": "BSG_OPT__L2P_20220525T043541_5pla",
      "bbox": [119.5444327,
      5.0749942,
      119.5502634,
      5.0811318],
      "geometry": {
            "type": "Polygon",
            "coordinates": [[[119.5444327,
            -5.0749942],
            [119.5444327,
            -5.0811318],
            [119.5502634,
            -5.0811318],
            [119.5502634,
            -5.0749942],
            [119.5444327,
            -5.0749942]]]
      },
      "properties": {
            "sat:platform": "BSG",
            "proj:epsg": 4326,
            "datetime": "2022-05-25T04:35:41Z",
            "dox:sensorFamily": "OPTIC",
            "dox:imageFileFormat": "COG",
            "processing:product_type": "IMAGE",
            "processing:level": "L2_",
            "dox:processingDate": "2022-05-25T04:35:41Z",
            "dox:onBoardId": "198263-2873",
            "dox:userRequestId": "xxx-4572-2873",
            "dox:qualityTag": "QUALITY_OK"
      }
}
```


Also see annex :
DOMX-SP-ADST-1101576904_V4_schemas/examples/CAT_BSG_OPT__L2P_20220525T043541_5pla.json

9.3 Validation schema

~~9.3~~ See annex: DOMX-SP-ADST-1101576904_V4_schemas/schemas/dox-lx-stac-schema.json

10 APPENDIX 2: FEATURE DETECTION PRODUCT CAT FILE SPEC AND EXAMPLE

10.1 Specification

Not yet defined.

10.2 Example


```
{
      "stac_version": "1.0.0",
      "stac_extensions": ["https://tas/stac-extensions/dox/v1.0.0/schema.json",
      "https://stac-extensions.github.io/projection/v1.0.0/schema.json",
      "https://tas/stac-extensions/dox/v1.0.0/schema.json"],
      "type": "Feature",
      "id": "BSG_OPT__FDP_20230223T230223_50ze",
      "bbox": [0.495928592903789,
      43.23826255332707,
      1.888683014192297,
      44.24783068396879],
      "geometry": {
            "type": "Polygon",
            "coordinates": [[[0.536772323136669,
            43.23826255332707],
            [1.888683014192297,
            43.25939191053712],
            [1.870237286761489,
            44.24783068396879],
            [0.495928592903789,
            44.22596415476343],
            [0.536772323136669,
            43.23826255332707]]]
      },
      "properties": {
            "processing:product_type": "DETECTION",
            "dox:metadataFormat": "STAC",
            "dox:productFileFormat": "PIVOT",
            "dox:productParentId": "BSG_OPT_L2P_20230223T230223_abcd",
            "proj:epsg": 4326,
            "datetime": "2023-02-23T23:33:21Z",
            "dox:productionMode": "TEST",
            "dox:processingBaseline": "02.02",
            "dox:processingDate": "2023-06-15T11:46:00Z",
            "dox:userRequestId": "xxx-4572-2873",
            "processing:facility": "GDC01",
            "dox:productConfidentialityLevel": "NOT_PROTECTED",
            "dox:qualityTag": "QUALITY_OK",
            "dox:detectionType": "feature",
            "dox:featureLabels": [{
                  "confidence": 0.9313355982303619,
                  "count": 2,
                  "name": "plane"
            }]
      }
}
```

Also see annex :
DOMX-SP-ADST-1101576904_V4_schemas/examples/CAT_BSG_OPT__FDP_20230223T230223_50ze.json

10.3 Validation schema

See annex : DOMX-SP-ADST-1101576904_V4_schemas/schemas/dox-fd-stac-schema.json
~~10.3~~

11 APPENDIX 3: CHANGE DETECTION PRODUCT CAT FILE SPEC AND EXAMPLE

11.1 Specification

Not yet defined.

11.2 Example


```
{
      "stac_version": "1.0.0",
      "stac_extensions": ["https://tas/stac-extensions/dox/v1.0.0/schema.json",
      "https://stac-extensions.github.io/projection/v1.0.0/schema.json",
      "https://tas/stac-extensions/dox/v1.0.0/schema.json"],
      "type": "Feature",
      "id": "S2B_MSI__CDP_20220803T113612_iblz",
      "bbox": [0.495928592903789,
      43.23826255332707,
      1.888683014192297,
      44.24783068396879],
      "geometry": {
            "type": "Polygon",
            "coordinates": [[[0.536772323136669,
            43.23826255332707],
            [1.888683014192297,
            43.25939191053712],
            [1.870237286761489,
            44.24783068396879],
            [0.495928592903789,
            44.22596415476343],
            [0.536772323136669,
            43.23826255332707]]]
      },
      "properties": {
            "processing:product_type": "DETECTION",
            "dox:metadataFormat": "STAC",
            "dox:productFileFormat": "PIVOT",
            "dox:productParentsIds": ["S2B_MSI__L1C_20220803T113612_00a1",
            "S2B_MSI__L1C_20220808T113612_2b00"],
            "proj:epsg": 4326,
            "datetime": "2022-08-03T14:33:21Z",
            "dox:changeStartDate": "2022-08-03T11:36:12Z",
            "dox:changeStopDate": "2022-08-08T11:36:12Z",
            "dox:productionMode": "TEST",
            "dox:qualityTag": "QUALITY_OK",
            "dox:processingBaseline": "02.02",
            "dox:processingDate": "2023-06-15T11:47:46Z",
            "dox:userRequestId": "xxx-4572-2873",
            "processing:facility": "GDC01",
            "dox:productConfidentialityLevel": "NOT_PROTECTED",
            "dox:detectionType": "change",
            "dox:changeLabels": ["change.addition",
            "change.removal"]
      }
}
```

Also see annex :
DOMX-SP-ADST-1101576904_V4_schemas/examples/CAT_S2B_MSI__CDP_20220803T113612_iblz.json

11.3 Validation schema

See annex : DOMX-SP-ADST-1101576904_V4_schemas/schemas/dox-cd-stac-schema.json

12 APPENDIX 4: SMART PRODUCT CAT FILE SPEC AND EXAMPLE

12.1 Specification

Not yet defined.

12.2 Example

Not yet defined.

12.3 Validation schema

Not yet defined.

13 APPENDIX 5: DATA CUBE CAT FILE SPEC AND EXAMPLE

13.1 Specification

Not yet defined.

13.2 Example


```
{
      "title": "Datacube example",
      "type": "Feature",
      "stac_version": "1.0.0",
      "stac_extensions": ["https://stac-
extensions.github.io/projection/v1.0.0/schema.json",
      "https://stac-extensions.github.io/raster/v1.1.0/schema.json",
      "https://stac-extensions.github.io/datacube/v2.2.0/schema.json",
      "https://stac-extensions.github.io/processing/v1.1.0/schema.json",
      "https://dox/stac-extensions/dox/v1.0.0/schema.json",
      "https://dox/stac-extensions/dox_dc3/v1.0.0/schema.json"],
      "id": "MMI_MULT_DCP_20230623T114539_abcd",
      "bbox": [-1.7856279024500623,
      42.302486350803214,
      0.8180190340270996,
      43.34608330846064],
      "geometry": {
            "type": "Polygon",
            "coordinates": [[[-1.7856279024500623,
            42.302486350803214],
            [0.8180190340270996,
            42.302486350803214],
            [0.8180190340270996,
            43.34608330846064],
            [-1.7856279024500623,
            43.34608330846064],
            [-1.7856279024500623,
            42.302486350803214]]]
      },
      "properties": {
            "processing:product_type": "DATACUBE",
            "dox:imageFileFormat": "ZARR",
            "dox:sensorFamily": "OPTIC",
            "proj:epsg": 4326,
            "datetime": "2023-06-23T11:45:39Z",
            "dox:start_datetime": "2017-09-01T02:00:00Z",
            "dox:end_datetime": "2017-09-01T02:00:00Z",
            "dox:userRequestId": "xxx-4572-2873",
            "dox:qualityTag": "QUALITY_OK",
            "dox_dc3:cubeDataThematics": ["snow.over.time"],
            "dox_dc3:time_compacity": 2.0,
            "dox_dc3:spatial_coverage": 0.9566878679426483,
            "dox_dc3:group_lightness": 0.9463374102734075,
            "dox_dc3:time_regularity": 1.0,
            "dox_dc3:number_of_chunks": 567,
            "dox_dc3:chunk_weight": 1277952,
            "dox_dc3:fill_ratio": 0.656017565101069,
            "cube:dimensions": {
                  "x": {
```

```
                        "axis": "x",
                        "description": "",
                        "type": "spatial",
                        "extent": [-1.7856279024500623,
                        0.8180190340270996],
                        "step": 0.00010668497998267412,
                        "reference_system": "EPSG:4326"
                  },
                  "y": {
                        "axis": "y",
                        "description": "",
                        "type": "spatial",
                        "extent": [42.302486350803214,
                        43.34608330846064],
                        "step": 0.00010668543836800382,
                        "reference_system": "EPSG:4326"
                  },
                  "t": {
                        "axis": "t",
                        "description": "",
                        "type": "temporal",
                        "extent": ["2017-09-01T02:00:00Z",
                        "2017-09-01T02:00:00Z"]
                  }
            },
            "cube:variables": {
                  "B02": {
                        "dimensions": ["x",
                        "y",
                        "t"],
                        "type": "data",
                        "extent": [1.0,
                        21959.0],
                        "expression": "Pivot.B02"
                  }
            },
            "dox_dc3:composition": [{
                  "rasters": ["PRODUCT_S2A_MSI__L1C_20180424T110609_3nek",
                  "PRODUCT_S2A_MSI__L1C_20180424T110609_s62i"],
                  "timestamp": 1504224000
            }],
            "dox_dc3:preview": {
                  "rainbow": "B02"
            },
            "raster:bands": [{
                  "data_type": "float32",
                  "nodata": "nan"
            }]
      }
}
```


Also see annex :
DOMX-SP-ADST-1101576904_V4_schemas/examples/CAT_MMI_MULT_DCP_20230623T114539_abcd

13.3 Validation schema

See annex : DOMX-SP-ADST-1101576904_V4_schemas/schemas/dox-dc-stac-schema.json

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