MEMORANDUM

From	:	IDEAS+ AATSR QC Team	**Document Ref**	:	IDEAS+-VEG-OQC-MEM-2089
To	:	(A)ATSR Users	**Date**	:	28 September 2016
			Issue	:	1.0
			File ID	:	(A)ATSR v3 0 Dataset Release Note v1-0.doc

SUBJECT : (A)ATSR Version 3.0 Dataset Release Note

This Release Note gives details on the official release of the (A)ATSR Version 3.0 dataset (v3.0), which is the fully assessed dataset from the third reprocessing of ATSR-1, ATSR-2 and AATSR data.

Note that a third reprocessing evaluation dataset was generated in 2013 as v2.1. There are *no algorithm changes* between v3.0 and v2.1; the only differences are in completeness and availability.

This Release Note explains:

- Which data products constitute v3.0 of the dataset and how to identify them
- The differences between v3.0 and v2.1
- A summary statement on the quality of v3.0 data, and details on where to find further information

Further information on all aspects of the data from the third reprocessing is given in the (A)ATSR Third Reprocessing Information Pack, available from the ESA EO SPPA web pages.

Version 3.0 Products and Identification

The v3.0 dataset comprises:

- ATSR-1, ATSR-2 and AATSR data in Envisat format
- ATSR-1, ATSR-2 and AATSR SST data in L2P and L3U data format (NetCDF)
- AATSR LST data in L2P-like format, referred to as UOL LST

The term “Envisat-format” refers to the Level 1B, Browse, Level 2 NR and AR, and Meteo products. These products have file extensions .E1, .E2 or .N1; the column headers of Table 1 show the start of their filenames.

Version 3.0 products may be identified using information in the product filenames and headers as explained in the following subsections.

Product Filename Indicators

For the **Envisat-format products**, there is a field within the filename called the *Processing Stage Flag*. In accordance with the Envisat filename convention, this is the 11th character of the filename. For data from the third reprocessing, this field was set to ‘U’. (Exceptions to this are the ATSR-1 and ATSR-2 Browse and Meteo products which have this field set to ‘S’.)

- An example v3.0 filename with the Processing Stage Flag highlighted:
  `ATS_TOA_1PUUPA20120308_005911_000065273112_00246_52415_4499.N1`

For the **SST L2P/L3U products**, there is a field in the filename called the GHRSST *product identifier*. In accordance with the GDS 2.0 filename convention, this is the 6th field (fields are separated by '-' or '_'). For data from the third reprocessing, this field contains the identifier 'ARC'.

- An example v3.0 filename with the GHRSST product identifier highlighted:
  `20120308005911-UPA-L2P_GHRSST-SSTskin-ARC-AATSR-v02.0-fv01.0.nc`

The **UOL LST products** (which were not available prior to the third reprocessing) have an Envisat-format style name but are in NetCDF format (the file extension is .nc). The key indicators are the 'U' Processing Stage Flag and the 'UOL' Processing Centre:

- An example UOL LST filename with the Processing Stage Flag and Processing Centre highlighted:
  `ATS_LST_2PUUOL20120308_005911_000065273112_00246_52415_6357.nc`

Further information on the filename conventions for all products can be found in the relevant Product Format Specifications and User Guides.

Product Header Indicators

Information in the product headers can be used to confirm the diagnosis of a v3.0 product. The clearest indicator is the version of *processing software* used to generate the data product.

- For **Envisat-format products**, this is given in the "SOFTWARE_VER" field of the Main Product Header (MPH). The values that should be contained in these fields are given in Table 1.
- For **SST L2P/L3U products**, this is given within the "history" NetCDF global attribute. The values that should be contained in these fields are given in Table 2.
- Note: the **UOL LST products** do not contain software version details.

Table 1 (A)ATSR v3.0 Processing Software Versions (Envisat format)

	L1b (AT*x*_TOA…)*	Browse (AT*x*_AST…)	L2 NR (AT*x*_NR…)	L2 AR (AT*x*_AR…)	Meteo (AT*x*_MET…)
AATSR	AATSR/6.05	AATSR/6.05	AATSR/6.05	AATSR/6.05	AATSR/6.05
ATSR-1-/2	Step/1.4	BPSGEN/1.00	Prt2-L/0.7	Prt2-L/0.7	ARTOMET/1.7

* The '*x*' in the filename is replaced with 1 for ATSR-1, 2 for ATSR-2 and S for AATSR.

Table 2 (A)ATSR v3.0 Processing Software Versions (SST L2P/L3U)

	SST L2P/L3U
AATSR*	Rev: 1735 / Rev: 1735M
ATSR-1/-2	Rev: 1735M

* AATSR products spanning any 29th February used revision 1735M; other products used revision 1735.

The bulk of the third reprocessing took place in 2013 and as there was no other operational processing after the end of the Envisat mission in April 2012, then the *product processing or creation date* can also be used to confirm that data products were generated from the third reprocessing.

- For **Envisat-format products**, the processing time is given in the "PROC_TIME" MPH field.
- For **SST L2P/L3U** and **UOL LST products**, the creation date is given in the "date_created" global attribute.

Product Format Specifications and User Guides

All the documents referenced below may be accessed via the ESA Library:

- The **AATSR Product Specification** is given in Volume 7 of the Envisat Product Specification. The changes implemented to the Envisat-format products were included in Issue 4/B; the changes to the SST L2P and introduction of the L3U products were subsequently included in Issue 4/C. For the Envisat-format products, the version of the Product Specification applicable to the products is given in the "REF_DOC" MPH field. (Note that there was no change in the specification of Envisat-format products from Issue 4/B to Issue 4/C.)
  - Because the Envisat-format filename convention and MPH structure are common to all Envisat products, not just AATSR, then the format specification and conventions used are given in Volume 5 of the Envisat Product Specification.
- The **AATSR Level 1B Detailed Processing Model** and Parameter Data List (PO-TN-RAL-GS-10004) document (version 1.10) updated the information for the gridded L1 product.
- The **AATSR Level 2 Detailed Processing Model** and Parameter Data List (PO-TN-RAL-GS-10005) document (version 1.8) updated the information for the L2 products.
- The **ATSR-1 and ATSR-2 data** in Envisat-format Technical Note (APP-TN-05) was updated (issue 3.0).
- Information on the ARC-based **SST L2P and L3U products** is contained in the ARC_L2P Product Guide (issue 1.3).
- Information on the **UOL LST products** is contained in the (A)ATSR Land Surface Temperature (LST) Product (UOL_LST_L2) Level 2 User Guide (v1.0).

Differences Between v3.0 and v2.1

With the issuing of this Release Note, the contents and structure of the (A)ATSR archive will now be frozen as v3.0. (In the event that any further additions, removals or other alterations are identified, these will be collected up and implemented as a new version.)

As indicated earlier, a previous release of data from the third reprocessing was done as v2.1. It is important to note that there are *no algorithm changes* between v3.0 and v2.1; the only difference is in completeness and availability. This heritage is important to note, as "v2.1" may still be evident in a few places (e.g. L2P/L3U header attributes including id, product version and source). These references to v2.1 may be disregarded, as the data product contents are unchanged between v3.0 and v2.1.

Users should bear in mind that v3.0 data is subject to segregation; a README file has been produced for each instrument, which gives the reasons for segregation of data from that instrument and provides a full list of affected orbits. These README files are

available from the access points to the (A)ATSR archive, and are also included in the (A)ATSR Third Reprocessing Information Pack.

The following sub-sections give details on the differences between v3.0 and v2.1. This is to enable users who have already downloaded the v2.1 dataset to achieve parity with v3.0.

Data Added with v3.0

UOL LST: University of Leicester have processed the entire AATSR L1B archive using an improved LST processing scheme. Data from this processing has been added to the AATSR archive (with appropriate segregation).

Data Removed with v3.0

1. Empty **L2P/L3U products** from outgassing periods were removed rather than segregated (as thermal channel data become unavailable during outgassings, it is not possible to generate dual-view SSTs).

2. A set of **ATSR-1 and ATSR-2 products** were removed from the archive for the reasons specified below. Full listings of the products removed are given in the relevant README files.

    a. ATSR-2 products generated at the start of the scan-mirror anomaly period (Dec. 1995);

    b. ATSR-2 and ATSR-1 products with a high degree of corruption;

    c. ATSR-2 and ATSR-1 products generated from “empty” UBTs;

    d. ATSR-1 products generated during outgassings. Unlike AATSR and ATSR-2, all channels were cooled and so no useful science data are available;

    e. ATSR-1 products generated during the start of a phased shut-down prior to hibernation (June 1996).

Data Amended with v3.0

A set of **ATSR-1 Envisat-format products** were generated with the wrong filename and headers for one orbit in v2.1. The filenames and headers have been corrected with v3.0. Note that the data contents of the products are unchanged. The details are given below:

Incorrect product filename (v2.1)	Corrected product filename (v3.0)
AT1_TOA_1PURAL19930614_081005_000000009999_99999_02105_0000.E1	AT1_TOA_1PURAL19930614_081005_000000004013_00335_09999_0000.E1
AT1_AST_BPSRAL19930614_081005_000000009999_99999_02105_0000.E1	AT1_AST_BPSRAL19930614_081005_000000004013_00335_09999_0000.E1
AT1_NR__2PURAL19930614_081005_000000009999_99999_02105_0000.E1	AT1_NR__2PURAL19930614_081005_000000004013_00335_09999_0000.E1
AT1_AR__2PURAL19930614_081005_000000009999_99999_02105_0000.E1	AT1_AR__2PURAL19930614_081005_000000004013_00335_09999_0000.E1
AT1_MET_2PSRAL19930614_081005_000000009999_99999_02105_0000.E1	AT1_MET_2PSRAL19930614_081005_000000004013_00335_09999_0000.E1

Additional Data Segregated in v3.0

1. Additional **AATSR products** have been segregated in v3.0 for the following reason:

    a. Products from the outgassing period of July 2010 were not segregated in the v2.1 release. These are AATSR product orbits from 43577 to 43597, inclusive. AATSR L2P and L3U products corresponding to the segregated L1 and L2 products were moved to the Segregated section, if they contained information. Some products were empty and these were removed from the archive.

2. Additional **ATSR-2 products** have been segregated in v3.0 for the following reasons:

    a. Products that were found to be corrupted in the last granule;

    b. Products generated after the loss of the ATSR-2 gyros but before suitable satellite attitude modes were implemented (January–July 2001).

3. Additional **ATSR-1 products** have been segregated in v3.0 for the following reasons:

    a. Products that were found to be corrupted in the last granule;

    b. Products that had a mismatch between the ADS record and the number of MDS granules (these were also corrupted in the last granule).

Full listings of the above additionally segregated products are given in the relevant README files.

Quality Statement for v3.0

This quality statement provides highlights of the status of the (A)ATSR third reprocessing dataset, which encompasses ATSR-1, ATSR-2 and AATSR data from 1991 to 2012.

Radiometry:

- Thermal channel radiometric uncertainty < 0.1 K
- VIS-SWIR channel radiometric uncertainty < 3%

  Note that these are type B estimates of the uncertainty due to systematic effects and not the random noise estimates

SST validation

- SST uncertainty < 0.15 K (*k*=1) for AATSR, ATSR-2
- SST uncertainty < 0.25 K (*k*=1) for ATSR-1

LST validation (AATSR only)

- LST bias is in the range 0.0−2.0 K (night) and 0.2−3.8 K (day)

Cloud identification

- Cloud identification has been improved over land and sea

Geolocation and view colocation

- Absolute nadir geolocation has been improved to within 1 km (AATSR)
- Nadir/forward view colocation has been improved
  - AATSR retains an along-track shift of 1 pixel
  - ATSR-2 and ATSR-1 best-fit empirical offsets are within 1 pixel

Quality of whole dataset

- The full archived dataset has undergone systematic QC to ensure the products are self-consistent and contain readable data

Users are encouraged to access the improved SST and LST data within the newly generated NetCDF products, rather than the Envisat-format Level 2 NR products.

To accompany the release of v3.0, the (A)ATSR Third Reprocessing Information Pack has been produced on behalf of ESA and the (A)ATSR Quality Working Group. The Information Pack contains full information on all the assessment activities carried out on the data from the third (A)ATSR reprocessing. A quick-reference User Summary has been produced, containing an overview of the key findings, and this is also contained within the information pack. These are available from the ESA EO SPPA web pages