S1-A N-Cyclic Performance Report - 2019-04
Cycles 173 to 176 (17-Jun-2019 to 04-Aug-2019)

Reference: MPC-0100
Nomenclature: DI-MPC-NPR
Issue: 2019-04. 1
Date: 2019, Aug. 21

Project funded under the European Union’s Copernicus Program.
Copernicus, previously known as GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation.
The views expressed on this document are those of the authors and do not necessarily represent those of the European Commission.
### Chronology Issues:

<table>
<thead>
<tr>
<th>Issue:</th>
<th>Date:</th>
<th>Reason for change:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019-04.1</td>
<td>21.08.19</td>
<td>First Issue: reporting period 17-Jun-2019 to 04-Aug-2019</td>
</tr>
</tbody>
</table>

### People involved in this issue:

<table>
<thead>
<tr>
<th>Written by (*):</th>
<th>Peter Meadows</th>
<th>Date + Initials: (visa or ref)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checked by (*):</td>
<td>K. Cordier</td>
<td>Date + Initial: (visa ou ref)</td>
</tr>
<tr>
<td>Approved by (*):</td>
<td>G. Hajduch</td>
<td>Date + Initial: (visa ou ref)</td>
</tr>
<tr>
<td>Application authorized by (*):</td>
<td></td>
<td>Date + Initial: (visa ou ref)</td>
</tr>
</tbody>
</table>

*In the opposite box: Last and First name of the person + company if different from CLS*

### Index Sheet:

<table>
<thead>
<tr>
<th>Context:</th>
<th>Sentinel-1 Mission Performance Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keywords:</td>
<td>Sentinel-1, Mission Performance Centre, N-Cyclic Report</td>
</tr>
<tr>
<td>Hyperlink:</td>
<td></td>
</tr>
</tbody>
</table>

### Distribution:

<table>
<thead>
<tr>
<th>Company</th>
<th>Means of distribution</th>
<th>Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESA</td>
<td>Notification</td>
<td>N. Miranda</td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
Applicable documents

<table>
<thead>
<tr>
<th>Nomenclature</th>
<th>Title</th>
<th>Edition Number</th>
<th>Revision Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>[S1-AD-14]</td>
<td>S1 RS-MDA-52-7441</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Sentinel-1 Product Specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[S1-AD-15]</td>
<td>S1-RS-MDA-57-7440</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Sentinel-1 Product Definition</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reference documents

# List of Contents

1. Introduction .................................................................................................................. 1  
   1.1. Purpose of the document ....................................................................................... 1  
   1.2. Structure of the document .................................................................................... 1  
2. Executive Summary ....................................................................................................... 2  
3. Instrument Status .......................................................................................................... 3  
   3.1. Antenna Status ...................................................................................................... 3  
   3.2. Instrument Unavailability ...................................................................................... 3  
4. IPF and Auxiliary Date File Status .............................................................................. 4  
   4.1. Level 1 Processor Issues ....................................................................................... 4  
   4.2. Auxiliary Data File Updates .................................................................................. 4  
5. Manoeuvres ................................................................................................................... 6  
6. Products Status ............................................................................................................ 7  
   6.1. Level 0 Products .................................................................................................... 7  
   6.2. Level 1 Products .................................................................................................... 9  
      6.2.1. Image Quality ................................................................................................. 9  
      6.2.2. Radiometric Calibration ............................................................................... 10  
      6.2.3. Geometric Calibration .................................................................................. 12  
      6.2.4. Polarimetric Calibration .............................................................................. 13  
      6.2.5. Elevation Antenna Patterns ......................................................................... 13  
      6.2.6. Azimuth Antenna Patterns .......................................................................... 13  
      6.2.7. Noise Equivalent Radar Cross-section .......................................................... 13  
      6.2.8. Antenna Pointing .......................................................................................... 13  
      6.2.9. Summary of Anomalies .................................................................................. 17  
      6.2.10. Quality Disclaimers ..................................................................................... 17  
Appendix A - List of Acronyms .......................................................................................... 18  
Appendix B - S1-A Transmit Receive Module Failures ...................................................... 19  
Appendix C - S1-A Instrument Unavailability .................................................................... 21  
Appendix D - S1-A Auxiliary Data Files .......................................................................... 25  
Appendix E - S-1A Quality Disclaimers .......................................................................... 28
1. Introduction

1.1. Purpose of the document

The purpose of this document is to provide a status on the S1-A sensor and product performance for orbit repeat cycle 173 from 17th June to 29th June 2019, cycle 174 from 29th June to 11th July 2019, cycle 175 from 11th July to 23rd July 2019 and cycle 176 from 23rd July to 4th August 2019.

1.2. Structure of the document

- Chapter 1: This introduction
- Chapter 2: Executive Summary
- Chapter 3: Instrument Status
- Chapter 4: IPF and Auxiliary Date File Status
- Chapter 5: Manoeuvres
- Chapter 6: Products Status

The following appendices are also provided:

- Appendix A: List of Acronyms
- Appendix B: S1-A Transmit Receive Module Failures
- Appendix C: S1-A Instrument Unavailability
- Appendix D: S1-A Auxiliary Data Files

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
2. Executive Summary

During the reporting period there was an update to the Instrument Processing Facility. IPF v3.1.0 was deployed on 26th June 2019 as described in Section 4.1.

A summary of the instrument and product status is provided in following sections of the document.

The list of Quality Disclaimers on the Sentinel-1A products performances and the list of the IPF Auxiliary Data Files can be accessed on the QC Web Server at following address:

https://qc.sentinel1.eo.esa.int/
### 3. Instrument Status

Here the status of the S1-A instrument during the reporting period is provided.

#### 3.1. Antenna Status

There were no new S1-A antenna transmit/receive module failures during the reporting period.

<table>
<thead>
<tr>
<th>TRM</th>
<th>Description</th>
<th>Date of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 S1-A Antenna Transmit/Receive Module Failures

A full list of all TRM failures since S1-A launch is given in Appendix B.

#### 3.2. Instrument Unavailability

Table 2 gives when the S1-A instrument was unavailable during the reporting period:

<table>
<thead>
<tr>
<th>Start Date/Time</th>
<th>End Date/Time</th>
<th>MPC Reference</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 S1-A Instrument Unavailabilities

A full list of all instrument unavailabilities since the S1-A launch is given in Appendix C.
4. IPF and Auxiliary Date File Status

4.1. Level 1 Processor Issues

There was an update to the Instrument Processing Facility during the reporting period. IPF v3.1.0 was deployed on 26th June 2019 with the following updates:

- NESZ annotation normalization: consistent NESZ annotation for all the L1 products (SLC, GRDM, GRDH, GR2).
- Internal processing normalisation: alignment of processing gains between internal (GR2/SL2) and external L1 products
- WV mode processing parallelization

4.2. Auxiliary Data File Updates

The following updates to S1-A Auxiliary Data Files (ADFs) were made during the reporting period (all related to IPF v3.1.0).

**Instrument ADF (AUX_INS)**

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3 AUX_INS Updates**

**Calibration ADF (AUX_CAL)**

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1A_AUX_CAL_V20140616T133300_G20190626T100036.SAFE</td>
<td>Circulation of S1A_AUX_CAL to be compliant with IPF3.10. Modification of the noiseCalibrationFactor for SM, IW, EW and WV modes to accommodate for the software changes introduced in IPF 3.1.0 and related to noise normalization. In addition, the WV NESZ annotations have been re-calibrated. Related to RDB#1.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20140908T000000_G20190626T100201.SAFE</td>
<td>As above but related to RDB#2.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20150519T120000_G20190626T100229.SAFE</td>
<td>As above but related to RDB#3.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20150722T120000_G20190626T100253.SAFE</td>
<td>As above but related to RDB#4.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20160627T000000_G20190626T100501.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20170117T080000_G20190626T100540.SAFE</td>
<td>As above but related to RDB#6.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20190228T092500_G20190626T100819.SAFE</td>
<td>As above but related to RDB#7.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20170117T080000_G20190731T120030.SAFE</td>
<td>Revised S1-A EW VV/VH Elevation Antenna Patterns. Related to RDB#6.</td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
Table 4 AUX_CAL Updates

L1 Processor Parameters ADF (AUX_PP1)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1A_AUX_PP1_V20140406T133000_G20190626T095552.SAFE</td>
<td>S1A_AUX_PP1 circulation to be compliant with IPF 3.10. The L2 processing gains for SM, IW and EW modes are now equal to the respective L1 gains. This reflects the software changes introduced in IPF 3.1.0: since that version, the delta gains between L1 and L2 processing are applied by the IPF and not in the configuration files. Related to RDB#1.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20140616T133500_G20190626T095622.SAFE</td>
<td>As above but related to RDB#2.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20140908T000000_G20190626T095649.SAFE</td>
<td>As above but related to RDB#3.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20150519T120000_G20190626T095713.SAFE</td>
<td>As above but related to RDB#4.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20150722T120000_G20190626T095736.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20171017T080000_G20190626T095800.SAFE</td>
<td>As above but related to RDB#6.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20190228T092500_G20190626T095822.SAFE</td>
<td>As above but related to RDB#7.</td>
</tr>
</tbody>
</table>

Table 5 AUX_PP1 Updates

L2 Processor Parameters ADF (AUX_PP2)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 AUX_PP2 Updates

Simulated Cross Spectra ADF (AUX_SCS)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7 AUX_SCS Updates
5. Manoeuvres

Table 8 gives a list of the S1-A orbit manoeuvres that occurred during the reporting period:

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Start Time</th>
<th>Stop Date</th>
<th>Stop Time</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/06/2019</td>
<td>22:39:49.185</td>
<td>19/06/2019</td>
<td>22:40:06.935</td>
<td></td>
</tr>
<tr>
<td>19/06/2019</td>
<td>23:29:59.943</td>
<td>19/06/2019</td>
<td>23:30:17.068</td>
<td></td>
</tr>
<tr>
<td>01/08/2019</td>
<td>00:23:25.108</td>
<td>01/08/2019</td>
<td>00:23:31.983</td>
<td></td>
</tr>
</tbody>
</table>

Table 8 S1-A Orbit Manoeuvres

---

1 This table is extracted from the DBL file of the SAFE product containing the list of thruster event by applying: awk 'NR>1 {if ($3=1) start=$1 ; getline; print start";"$1}'

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
6. Products Status

6.1. Level 0 Products

Figure 1 show missing lines, data gaps, and timeline failures derived from L1 annotation products (purple for IW, blue for EW and green for WV):

![Graphs showing missing lines, data gaps, and timeline failures](image)

Figure 1 Missing Lines, Data Gaps and Timeline Failures.

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
The above plots indicate no problems with missing lines and data gaps plus a small number of timeline failures.

Figure 2 and Figure 3 show I and Q trends and imbalance for IW and WV modes:

Figure 2 I&Q Channels

The jumps that may be noticed on the above time-series are related to instrument switch on/off, and correspond to a normal behaviour, that is compensated at processing level. It therefore has no impact on data quality.

Figure 3 I&Q imbalance

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
Figure 3 WV I&Q Channel Imbalance

The I & Q imbalance plots in the figure above (left: IW mode, right: WV mode) indicate that the Rx I and Q channels are perfectly balanced.

6.2. Level 1 Products

6.2.1. Image Quality

Figure 4 and Table 9 give the azimuth and range spatial resolution using the Australian corner reflector array, the BAE corner reflector and the DLR transponders & corner reflectors derived from IW imagery acquired during the reporting period. The spatial resolution has been derived from SLC data. Table 10 gives the impulse response function (IRF) sidelobe ratios. These indicate a nominal IRF performance.

<table>
<thead>
<tr>
<th>Mode/Swath</th>
<th>Azimuth Spatial Resolution (m)</th>
<th>Slant Range Spatial Resolution (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IW1</td>
<td>21.81±0.19</td>
<td>2.65±0.03</td>
</tr>
<tr>
<td>IW2</td>
<td>21.96±0.19</td>
<td>3.09±0.02</td>
</tr>
<tr>
<td>IW3</td>
<td>21.79±0.08</td>
<td>3.51±0.01</td>
</tr>
</tbody>
</table>

Table 9 IW Azimuth and Slant Range Spatial Resolutions
<table>
<thead>
<tr>
<th>Mode/Swath</th>
<th>Integrated Sidelobe Ratio (dB)</th>
<th>Peak Sidelobe Ratio (dB)</th>
<th>Spurious Sidelobe Ratio (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IW</td>
<td>-11.89±3.10</td>
<td>-19.74±1.09</td>
<td>-22.72±3.56</td>
</tr>
</tbody>
</table>

Table 10 IW Sidelobe Ratios

No Equivalent Number of Looks/Radiometric Resolution and Ambiguity measurements were made during the reporting period.

6.2.2. Radiometric Calibration

Figure 5 and Figure 6 give the relative radar cross-section using the DLR transponders & corner reflectors, Australian corner reflector array and the BAE corner reflector derived from IW imagery acquired during the reporting period. The relative radar cross-section has been derived from SLC data. These indicate a nominal radiometric calibration performance (where there is sufficient number of measurements per sub-swath).

![Figure 5 IW Relative Radar Cross-Section](image)

<table>
<thead>
<tr>
<th>Mode/Swath</th>
<th>Relative Radar Cross-Section (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>IW1</td>
<td>0.21±0.21</td>
</tr>
<tr>
<td>IW2</td>
<td>0.24±0.23</td>
</tr>
<tr>
<td>IW3</td>
<td>0.04±0.22</td>
</tr>
</tbody>
</table>

Table 11 IW Relative Radar Cross-Section

Figure 6 shows the IW long-term relative radar cross-section of the DLR transponders since March 2017 (the green triangles are the average radar cross-section per product) - the relative radar cross-section is 0.02±0.21 dB. Also shown in the IW long-term relative radar cross-section of the BAE corner reflector since the start of the Sentinel-1A routine phase (October 2014) where the mean relative radar cross-section is -0.18±0.21 dB (the majority of the measurements are for VV polarisation).

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
Figure 6 IW Long-Term Relative Radar Cross-Section

Figure 7 shows a recent IW VV Permanent Scatter Calibration series over Paris. The series covers almost 2 years from January 2016 to November 2017. The PSCAL results are consistent with the time series from the BAE corner reflector (Figure 6). In particular it can be noticed a small radiometric jump around March 2017 which could be related to the IPF 2.8.2 release.

Figure 7 Permanent Scatter Calibration time series for TopSAR IW V/V over Paris.
6.2.3. Geometric Calibration

Figure 8 shows the absolute location error (ALE) based on eight S-1A SLC products from the IW acquisition mode acquired during the current reporting period (all acquired on separate dates). Two subswaths are represented: the track 9 products contain targets in subswath IW3, while products from track 111 contain imaged targets in subswaths IW1 and IW2.

The points have been colour-coded according to the subswath the targets were visible in. The products were analysed using both precise and near-real-time restituted orbit files, depending on their availability at the time of reporting. Corrections described in previous reports were made, including the atmospheric path delay (PD), the “intra-burst-dependent” range correction, “bulk bistatic” and “bistatic residual” corrections, an instrument timing correction, and a topography-dependent Doppler centroid correction (the azimuth corrections are briefly described e.g. in [Piantanida et al., 2018]). Note that PD correction depends on the off-nadir angle, which is considered here for the individual corner reflectors spanning the over-100km wide array.

Figure 8 shows the ALE scatter after the effects listed above were corrected during post-processing. The range and azimuth ALE mean and standard deviations are annotated in the upper left corners of the figures. A possible residual separation of the ALE scatter “clouds” for the IW sub-swaths is apparent. The separation may represent an as-of-yet unidentified timing bias, or possibly a bias inherent in the measurement process. In any case, a physical explanation for such a separation has yet to be identified.

The IW mode ALE plots indicate a localisation performance well within the requirements. The ALE is within the specified 1-sigma for IW mode products (3.33m, i.e. 10m at 3 sigma; see section 5.5.2.2 of the “GMES Sentinel-1 System Requirements Document,” Ref. S1-RS-ESA-SY-0001, Iss. 3, Rev. 3).

![Figure 8 S1-A absolute localisation error based on S-1A IW SLC products acquired over the test site during the current reporting period.](image-url)
6.2.4. Polarimetric Calibration

Table 12 gives the co-registration between the two polarisations of dual-polarisation products acquired during the reporting period (based in DLR transponder measurements). No channel distortion measurements were made during the reporting period.

<table>
<thead>
<tr>
<th>Mode/Swath</th>
<th>Range Co-registration Accuracy (m)</th>
<th>Azimuth Co-registration Accuracy (m)</th>
<th>Channel Distortion (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IW</td>
<td>0.02±0.08</td>
<td>0.06±0.33</td>
<td></td>
</tr>
</tbody>
</table>

Table 12 Polarimetric Calibration Measurements

6.2.5. Elevation Antenna Patterns

No S1-A Elevation Antenna Patterns (EAPs) were updated during the reporting period.

6.2.6. Azimuth Antenna Patterns

No Azimuth Antenna Patterns (AAPs) were updated during the reporting period.

6.2.7. Noise Equivalent Radar Cross-section

No NESZ measurements were made during the reporting period.

6.2.8. Antenna Pointing

Figure 9 shows yaw, pitch and roll errors calculated for the reporting period against ascending node crossing time (ANX). The red horizontal lines show the nominal ±0.01° bounds for these attitude errors - points outside these bounds are normally due to orbit manoeuvres.
Figure 9 S1-A Yaw, Pitch and Roll Errors

Figure 10 shows the Doppler Centroid frequency as a function of date and ANX. The data has been derived from IW & WV data and from geometry. Note that it is expected that the Doppler estimation from WV mode data will have a higher standard deviation than from IW mode due to the Doppler estimation over the ocean will be noisier than over land. Table 13 gives the statistics based on Doppler Centroid derived from IW and WV data. A more detailed plot of Doppler Centroid frequency derived over land from SM, IW and EW products is shown in Figure 11. A small DC jump can be observed on the 4th July due to a change of the on-board SST configuration.
Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
6.2.9. Summary of Anomalies

There were no anomalies during the reporting period.

6.2.10. Quality Disclaimers

One new quality disclaimer was updated during the reporting period: QD-22 on Invalid annotation of SSPPDU in the manifest files of S-1A (see Appendix E for a list of issued and prepared quality disclaimers). A full list of issued quality disclaimers can also be found on the QC Web site.
## Appendix A - List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAP</td>
<td>Azimuth Antenna Pattern</td>
</tr>
<tr>
<td>AD</td>
<td>Applicable Document</td>
</tr>
<tr>
<td>ADF</td>
<td>Auxiliary Data File</td>
</tr>
<tr>
<td>ALE</td>
<td>Absolute Localisation Accuracy Error</td>
</tr>
<tr>
<td>ANX</td>
<td>Ascending Node Crossing Time</td>
</tr>
<tr>
<td>EAP</td>
<td>Elevation Antenna Pattern</td>
</tr>
<tr>
<td>EW</td>
<td>Extra Wide Swath</td>
</tr>
<tr>
<td>IPF</td>
<td>Instrument Processing Facility</td>
</tr>
<tr>
<td>IRF</td>
<td>Impulse Response Function</td>
</tr>
<tr>
<td>IW</td>
<td>Interferometric Wide Swath</td>
</tr>
<tr>
<td>NESZ</td>
<td>Noise Equivalent Sigma0 Zero</td>
</tr>
<tr>
<td>PD</td>
<td>Path Delay</td>
</tr>
<tr>
<td>PSCAL</td>
<td>Permanent Scatter Calibration</td>
</tr>
<tr>
<td>RD</td>
<td>Reference Document</td>
</tr>
<tr>
<td>RDB</td>
<td>Radar Data Base</td>
</tr>
<tr>
<td>Rx</td>
<td>Receive</td>
</tr>
<tr>
<td>SM</td>
<td>Stripmap</td>
</tr>
<tr>
<td>TBC</td>
<td>To be confirmed</td>
</tr>
<tr>
<td>TBD</td>
<td>To be defined</td>
</tr>
<tr>
<td>TRM</td>
<td>Transmit Receive Module</td>
</tr>
<tr>
<td>Tx</td>
<td>Transmit</td>
</tr>
<tr>
<td>WV</td>
<td>Wave Mode</td>
</tr>
</tbody>
</table>
Appendix B - S1-A Transmit Receive Module Failures

The following S1-A antenna TRM have failed since the S1-A launch:

<table>
<thead>
<tr>
<th>TRM</th>
<th>Description</th>
<th>Date of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tile 4, Row 11</td>
<td>Tx, H &amp; V</td>
<td>05-May-2014</td>
</tr>
<tr>
<td>Tile 4, Row 12</td>
<td>Tx, H &amp; V</td>
<td>05-May-2014</td>
</tr>
<tr>
<td>Tile 4, Row 11</td>
<td>Rx, V</td>
<td>05-May-2014</td>
</tr>
<tr>
<td>Tile 4, Row 12</td>
<td>Rx, V</td>
<td>05-May-2014</td>
</tr>
<tr>
<td>Tile 4, Row 12</td>
<td>Rx, H</td>
<td>09-June-2014</td>
</tr>
<tr>
<td>Tile 5, all TRM failures (intermittent)</td>
<td>Rx, H &amp; V</td>
<td>Between 18-Mar-2015, 04:09:00 UT and 20-Mar-2015, 11:46:30 UT</td>
</tr>
<tr>
<td>Tile 5, all TRM failures (intermittent)</td>
<td>Rx, H &amp; V</td>
<td>Between 26-Mar-2015, 16:20:00 UT and 28-Mar-2015, 02:50:30 UT</td>
</tr>
<tr>
<td>Tile 12, Row 16 (intermittent)</td>
<td>Tx V &amp; Rx V</td>
<td>Between 16-Apr-2015 and 18-Apr-2015</td>
</tr>
<tr>
<td>Tile 12, Row 16 (intermittent)</td>
<td>Tx V &amp; Rx V</td>
<td>Between 20-Apr-2015 and 28-Apr-2015</td>
</tr>
<tr>
<td>Tile 12, Row 16 (intermittent)</td>
<td>Tx V &amp; Rx V</td>
<td>18-May-2015, 22:33:36 UT</td>
</tr>
<tr>
<td>Tile 11, Rows 1 to 10</td>
<td>Tx H, Tx V</td>
<td>16 June -27 June 2016</td>
</tr>
<tr>
<td>Tile 11</td>
<td>See below</td>
<td></td>
</tr>
</tbody>
</table>

On the 16th October 2017 the S-1A antenna was reconfigured to optimize the electronic operation after the tile 11 issue on June 2016. The new antenna configuration, only related to the tile 11, was

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
captured in RDB#6. From the SAR data point of view, the new antenna status is not much different from the previous one and the only observed effects are a slight increase of the PG (less than 0.1 dB) and a modification of the EAP from the S-1 AM (lower than ±0.1 dB).
Appendix C - S1-A Instrument Unavailability

The S1-A instrument has been unavailable during the following periods since S-1A launch:

<table>
<thead>
<tr>
<th>Start Date/Time</th>
<th>End Date/Time</th>
<th>MPC Reference</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>26/04/2014 11:56</td>
<td>29/04/2014 12:13</td>
<td>SOB-23</td>
<td>Sentinel-1A Unavailability - Instrument Anomaly</td>
</tr>
<tr>
<td>29/05/2014 14:00</td>
<td>02/06/2014 17:00</td>
<td>SOB-27</td>
<td>Sentinel-1A Unavailability - Spacecraft Anomaly</td>
</tr>
<tr>
<td>06/07/2014 05:04</td>
<td>08/07/2014 15:22</td>
<td>SOB-39</td>
<td>Sentinel-1A Unavailability - Spacecraft Anomaly</td>
</tr>
<tr>
<td>21/07/2014 03:30</td>
<td>23/07/2014 08:35</td>
<td>SOB-40</td>
<td>Sentinel-1A Unavailability - Instrument Switch OFF for test</td>
</tr>
<tr>
<td>12/08/2014 09:37</td>
<td>12/08/2014 15:31</td>
<td>SOB-47</td>
<td>Sentinel-1A Unavailability - Onboard planned operation</td>
</tr>
<tr>
<td>21/08/2014 07:59</td>
<td>21/08/2014 15:29</td>
<td>SOB-49</td>
<td>Sentinel-1A Unavailability - Instrument Anomaly</td>
</tr>
<tr>
<td>25/08/2014 09:49</td>
<td>25/08/2014 17:50</td>
<td>SOB-50</td>
<td>Sentinel-1A Unavailability - SAR Instrument</td>
</tr>
<tr>
<td>03/09/2014 08:30</td>
<td>04/09/2014 15:11</td>
<td>SOB-53</td>
<td>Sentinel-1A Unavailability - SAR Instrument</td>
</tr>
<tr>
<td>23/09/2014 08:00</td>
<td>23/09/2014 20:00</td>
<td>SOB-60</td>
<td>S1PDGS - SAR &amp; X-Band downlink unavailability on Tuesday 23rd from 08:00 CET to 20:00 CET</td>
</tr>
<tr>
<td>06/10/2014 10:51</td>
<td>06/10/2014 14:05</td>
<td>SOB-70</td>
<td>Sentinel-1A Unavailability - SAR Anomaly</td>
</tr>
<tr>
<td>07/10/2014 06:30</td>
<td>07/10/2014 21:30</td>
<td>SOB-69</td>
<td>Sentinel-1A Unavailability - planned maintenance</td>
</tr>
<tr>
<td>10/10/2014 21:52</td>
<td>11/10/2014 11:03</td>
<td>SOB-73</td>
<td>Sentinel-1A Unavailability - SAR anomaly</td>
</tr>
<tr>
<td>13/10/2014 08:00</td>
<td>13/10/2014 12:48</td>
<td>SOB-71</td>
<td>Sentinel-1A Unavailability - Planned maintenance</td>
</tr>
<tr>
<td>19/11/2014 10:20</td>
<td>19/11/2014 14:50</td>
<td>SOB-91</td>
<td>Sentinel 1A unavailability</td>
</tr>
<tr>
<td>29/12/2014 20:45</td>
<td>30/12/2014 11:33</td>
<td>SOB-99</td>
<td>Sentinel-1A Unavailability</td>
</tr>
<tr>
<td>20/01/2015 07:30</td>
<td>20/01/2015 18:00</td>
<td>SOB-112</td>
<td>Sentinel-1A Unavailability - Planned maintenance</td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
<table>
<thead>
<tr>
<th>Start Date/Time</th>
<th>End Date/Time</th>
<th>MPC Reference</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/02/2015 07:50</td>
<td>02/02/2015 16:26</td>
<td>SOB-116</td>
<td>Sentinel-1A unavailability from 01/02/2015 7h50 to 02/02/2015 16h27</td>
</tr>
<tr>
<td>17/02/2015 19:56</td>
<td>18/02/2015 16:02</td>
<td>SOB-118</td>
<td>Sentinel-1A Unavailability - since 17/02/15 evening to 18/02/15 afternoon</td>
</tr>
<tr>
<td>19/02/2015 13:29</td>
<td>20/02/201510:15</td>
<td>SOB-121</td>
<td>Sentinel-1A unavailability from 19/02/2015 13h29 to 20/02/2015 10h15</td>
</tr>
<tr>
<td>14/04/2015 08:30</td>
<td>14/04/2015 17:00</td>
<td>SOB-147</td>
<td>Sentinel-1A unavailability planned on 14/04/2015 for maintenance</td>
</tr>
<tr>
<td>09/05/2015 23:19</td>
<td>10/05/2015 15:39</td>
<td>SOB-159</td>
<td>Sentinel-1A unavailability on 10/05/2015</td>
</tr>
<tr>
<td>19/05/2015 05:00</td>
<td>19/05/2015 12:00</td>
<td>SOB-168</td>
<td>Sentinel-1A planned unavailability on 19/05/2015 (RDB#4 uplink onboard)</td>
</tr>
<tr>
<td>28/05/2015 04:00</td>
<td>28/05/2015 14:30</td>
<td>SOB-170</td>
<td>Planned Sentinel-1A unavailability on 28/05/2015 for maintenance purpose</td>
</tr>
<tr>
<td>20/06/2015 15:30</td>
<td>21/06/2015 13:00</td>
<td>SOB-176</td>
<td>Sentinel-1A unavailability on 20 and 21/06/2015</td>
</tr>
<tr>
<td>22/07/2015 06:35</td>
<td>22/07/2015 08:21</td>
<td>SOB-206</td>
<td>Sentinel-1A Planned Unavailability (RDB#5)</td>
</tr>
<tr>
<td>03/08/2015 02:37</td>
<td>03/08/2015 18:33</td>
<td>SOB-207</td>
<td>Sentinel-1A Unavailability from orbit 7093 to 7101</td>
</tr>
<tr>
<td>04/08/2015 04:52</td>
<td>04/08/2015 13:47</td>
<td>SOB-208</td>
<td>Sentinel-1A Unavailability from orbit 7103 to 7114</td>
</tr>
<tr>
<td>04/08/2015 23:44</td>
<td>05/08/2015 11:20</td>
<td>SOB-209</td>
<td>Sentinel-1A Unavailability from orbit 7120 to 7128</td>
</tr>
<tr>
<td>09/08/2015 21:22</td>
<td>10/08/2015 16:14</td>
<td>SOB-210</td>
<td>Sentinel-1A Unavailability from orbit 7192 to 7204</td>
</tr>
<tr>
<td>04/09/2015 16:54</td>
<td>05/09/2015 11:08</td>
<td>SOB-214</td>
<td>Sentinel-1A Unavailability from 04/09 to 05/09/2015</td>
</tr>
<tr>
<td>23/09/2015 07:20</td>
<td>23/09/2015 11:56</td>
<td>SOB-222</td>
<td>Sentinel-1A Unavailability from orbit 7840 to 7842</td>
</tr>
<tr>
<td>19/10/2015 16:28</td>
<td>20/10/2015 07:27</td>
<td>SOB-226</td>
<td>Sentinel-1A Unavailability from 19/10 to 20/10/2015</td>
</tr>
<tr>
<td>21/10/2015 14:54</td>
<td>22/10/2015 07:12</td>
<td>SOB-227</td>
<td>Sentinel-1A Unavailability from 21/10 to 22/10/2015</td>
</tr>
<tr>
<td>05/11/2015 16:50</td>
<td>06/11/2015 12:20</td>
<td>SOB-229</td>
<td>Sentinel-1A Unavailability from 05/11 to 06/11/2015</td>
</tr>
<tr>
<td>07/11/2015 17:53</td>
<td>08/11/2015 12:10</td>
<td>SOB-230</td>
<td>Sentinel-1A Unavailability from 07/11 to 08/11/2015</td>
</tr>
<tr>
<td>10/12/2015 07:30</td>
<td>10/12/2015 13:00</td>
<td>SOB-252</td>
<td>Sentinel-1A Planned unavailability on 10/12/2015</td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
<table>
<thead>
<tr>
<th>Start Date/Time</th>
<th>End Date/Time</th>
<th>MPC Reference</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/12/2015 02:30</td>
<td>11/12/2015 16:00</td>
<td>SOB-253</td>
<td>Sentinel-1A Unavailability on 11/12/2015</td>
</tr>
<tr>
<td>02/01/2016 04:45</td>
<td>02/01/2016 15:14</td>
<td>SOB-255</td>
<td>Sentinel-1A Unavailability on 02/01/2016</td>
</tr>
<tr>
<td>16/01/2016 14:59</td>
<td>16/01/2016 19:57</td>
<td>SOB-257</td>
<td>Sentinel-1A Unavailability on 16/01/2016</td>
</tr>
<tr>
<td>21/02/2016 18:17</td>
<td>22/02/2016 10:51</td>
<td>SOB-310</td>
<td>Sentinel-1A Unavailability from 21/02/2016 to 22/02/2016</td>
</tr>
<tr>
<td>13/03/2016 08:23</td>
<td>13/03/2016 16:14</td>
<td>SOB-332</td>
<td>Sentinel-1A Unavailability on 13/03/2016</td>
</tr>
<tr>
<td>15/03/2016 07:46</td>
<td>15/03/2016 09:36</td>
<td>SOB-340</td>
<td>Sentinel-1A Planned Maintenance on 15/03/2016</td>
</tr>
<tr>
<td>06/05/2016 21:17</td>
<td>07/05/2016 14:27</td>
<td>SOB-389</td>
<td>Sentinel-1A Unavailability from 06/05/2016 to 07/05/2016</td>
</tr>
<tr>
<td>22/05/2016 14:51</td>
<td>22/05/2016 18:11</td>
<td>SOB-411</td>
<td>Sentinel-1A Unavailability on 22/05/2016</td>
</tr>
<tr>
<td>16/06/2016 05:59</td>
<td>16/06/2016 13:57</td>
<td>SOB-447</td>
<td>Sentinel-1A Unavailability on 16/06/2016</td>
</tr>
<tr>
<td>16/06/2016 16:45</td>
<td>17/06/2016 11:26</td>
<td>SOB-448</td>
<td>Sentinel-1A Unavailability between 16/06/2016 and 17/06/2016</td>
</tr>
<tr>
<td>17/06/2016 11:45</td>
<td>27/06/2016 16:32</td>
<td>SOB-467</td>
<td>Sentinel-1A Unavailability between 17/06/2016 and 27/06/2016</td>
</tr>
<tr>
<td>02/07/2016 04:52</td>
<td>02/07/2016 13:23</td>
<td>SOB-476</td>
<td>Sentinel-1A Unavailability on 02/07/2016</td>
</tr>
<tr>
<td>10/07/2016 06:39</td>
<td>10/07/2016 17:51</td>
<td>SOB-483</td>
<td>Sentinel-1A Unavailability on 10/07/2016</td>
</tr>
<tr>
<td>27/07/2016 07:49</td>
<td>27/07/2016 15:42</td>
<td>SOB-508</td>
<td>Sentinel-1A Unavailability on 27/07/2016</td>
</tr>
<tr>
<td>04/12/2016 06:52</td>
<td>04/12/2016 11:07</td>
<td>SOB-624</td>
<td>Sentinel-1A Unavailability on 04/12/2016</td>
</tr>
<tr>
<td>16/06/2017 09:09</td>
<td>16/06/2017 12:31</td>
<td>SOB-751</td>
<td>Sentinel-1A Unavailability on 16/06/2017</td>
</tr>
<tr>
<td>17/06/2017 11:43</td>
<td>17/06/2017 14:43</td>
<td>SOB-752</td>
<td>Sentinel-1A Unavailability on 17/06/2017</td>
</tr>
<tr>
<td>21/06/2017 14:09</td>
<td>21/06/2017 17:35</td>
<td>SOB-753</td>
<td>Sentinel-1A Unavailability on 21/06/2017</td>
</tr>
<tr>
<td>Start Date/Time</td>
<td>End Date/Time</td>
<td>MPC Reference</td>
<td>Summary</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>07/07/2017 02:20</td>
<td>07/07/2017 10:29</td>
<td>SOB-758</td>
<td>Sentinel-1A Unavailability on 07/07/2017</td>
</tr>
<tr>
<td>03/08/2017 13:30</td>
<td>03/08/2017 14:07</td>
<td>SOB-776</td>
<td>Sentinel-1A Unavailability on 03/08/2017</td>
</tr>
<tr>
<td>01/10/2017 12:06</td>
<td>01/10/2017 20:01</td>
<td>SOB-796</td>
<td>Sentinel-1A Unavailability on 01/10/2017</td>
</tr>
<tr>
<td>25/10/2017 08:25</td>
<td>25/10/2017 10:15</td>
<td>SOB-817</td>
<td>Sentinel-1A planned Unavailability on 25/10/2017</td>
</tr>
<tr>
<td>02/02/2018 14:27</td>
<td>02/02/2018 16:13</td>
<td>SOB-854</td>
<td>Sentinel-1A Unavailability on 02/02/2018</td>
</tr>
<tr>
<td>15/03/2018 20:06</td>
<td>16/03/2018 10:25</td>
<td>SOB-888</td>
<td>Sentinel-1A Unavailability between 15/03/2018 and 16/03/2018</td>
</tr>
<tr>
<td>16/05/2018 07:51</td>
<td>16/05/2018 09:34</td>
<td>SOB-892</td>
<td>Sentinel-1A Unavailability on 16/05/2018</td>
</tr>
<tr>
<td>22/05/2018 16:52</td>
<td>22/05/2018 19:00</td>
<td>SOB-895</td>
<td>Sentinel-1A Unavailability on 22/05/2018</td>
</tr>
<tr>
<td>31/05/2018 06:37</td>
<td>31/05/2018 09:54</td>
<td>SOB-897</td>
<td>Sentinel-1A Unavailability on 31/05/2018</td>
</tr>
<tr>
<td>02/06/2018 01:23</td>
<td>02/06/2018 09:42</td>
<td>SOB-898</td>
<td>Sentinel-1A Unavailability on 02/06/2018</td>
</tr>
<tr>
<td>29/06/2018 16:27</td>
<td>29/06/2018 18:16</td>
<td>SOB-911</td>
<td>Sentinel-1A Unavailability on 29/06/2018</td>
</tr>
<tr>
<td>06/07/2018 11:30</td>
<td>06/07/2018 13:11</td>
<td>SOB-916</td>
<td>Sentinel-1A Unavailability on 06/07/2018</td>
</tr>
<tr>
<td>05/12/2018 23:45</td>
<td>06/12/2018 09:29</td>
<td>SOB-953</td>
<td>Sentinel-1A Unavailability between 05/12/2018 and 06/12/2018</td>
</tr>
<tr>
<td>09/12/2018 18:53</td>
<td>10/12/2018 08:57</td>
<td>SOB-954</td>
<td>Sentinel-1A Unavailability between 09/12/2018 and 10/12/2018</td>
</tr>
<tr>
<td>14/02/2019 19:54</td>
<td>15/02/2019 10:26</td>
<td>SOB-997</td>
<td>Sentinel-1A Unavailability between 14/02/2019 and 15/02/2019</td>
</tr>
<tr>
<td>28/02/2019 09:25</td>
<td>28/02/2019 09:38</td>
<td>SOB-998</td>
<td>Sentinel-1A Planned Unavailability on 28/02/2019</td>
</tr>
<tr>
<td>12/03/2019 09:25</td>
<td>12/03/2019 09:38</td>
<td>SOB-1010</td>
<td>Sentinel-1A Planned Unavailability on 12/03/2019</td>
</tr>
<tr>
<td>18/04/2019 00:45</td>
<td>18/04/2019 15:00</td>
<td>SOB-1030</td>
<td>Sentinel-1A Unavailability on 18/04/2019</td>
</tr>
<tr>
<td>24/05/2019 17:37</td>
<td>25/05/2019 12:34</td>
<td>SOB-1047</td>
<td>Sentinel-1A Unavailability on 24/05/2019 and 25/05/2019</td>
</tr>
</tbody>
</table>
### Appendix D - S1-A Auxiliary Data Files

The following is a full list of currently applicable ADF updates:

#### Instrument ADF (AUX_INS)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1A_AUX_INS_V20140406T133000_G20180313T095009.SAFE</td>
<td>Update for usage with IPF V290:</td>
</tr>
<tr>
<td></td>
<td>- schemaVersion updated to 3.3</td>
</tr>
<tr>
<td></td>
<td>- new fields (correctBistaticDelayMethod, estimateNoiseEquivalentPowerFlag)</td>
</tr>
<tr>
<td></td>
<td>added.</td>
</tr>
<tr>
<td></td>
<td>Related to RDB#1.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20140616T133500_G20180313T100039.SAFE</td>
<td>As above but related to RDB#2.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20140908T000000_G20180313T100906.SAFE</td>
<td>As above but related to RDB#3.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20150519T120000_G20180313T101559.SAFE</td>
<td>As above but related to RDB#4.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20150722T120000_G20180313T102353.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20160627T000000_G20180313T103836.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20171017T080000_G20180313T104658.SAFE</td>
<td>As above but related to RDB#6.</td>
</tr>
<tr>
<td>S1A_AUX_INS_V20190228T092500_G20190227T100643.SAFE</td>
<td>Compliant with the new instrument configuration RDB#7 (same content as previously). RDB#7 only affects WV mode (no impact on SM/IW/EW modes). Related to RDB#7.</td>
</tr>
</tbody>
</table>

#### Calibration ADF (AUX_CAL)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1A_AUX_CAL_V20140406T133000_G20190626T100036.SAFE</td>
<td>Circulation of S1A_AUX_CAL to be compliant with IPF3.10.</td>
</tr>
<tr>
<td></td>
<td>Modification of the noiseCalibrationFactor for SM, IW, EW and WV modes to accommodate for the software changes introduced in IPF 3.1.0 and related to noise normalization. In addition, the WV NESZ annotations have been re-calibrated. Related to RDB#1.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20140616T133500_G20190626T100133.SAFE</td>
<td>As above but related to RDB#2.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20140908T000000_G20190626T100201.SAFE</td>
<td>As above but related to RDB#3.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20150519T120000_G20190626T100229.SAFE</td>
<td>As above but related to RDB#4.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20150722T120000_G20190626T100253.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20160627T000000_G20190626T100501.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_CAL_V20171017T080000_G20190731T120030.SAFE</td>
<td>Revised S1-A EW VV/VH Elevation Antenna Patterns. Related to RDB#6.</td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
### L1 Processor Parameters ADF (AUX_PP1)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1A_AUX_PP1_V20140406T133000_G20190626T095552.SAFE</td>
<td>S1A_AUX_PP1 circulation to be compliant with IPF 3.10. The L2 processing gains for SM, IW and EW modes are now equal to the respective L1 gains. This reflects the software changes introduced in IPF 3.1.0: since that version, the delta gains between L1 and L2 processing are applied by the IPF and not in the configuration files. Related to RDB#7.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20140616T133500_G20190626T095622.SAFE</td>
<td>As above but related to RDB#1.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20140908T000000_G20190626T095649.SAFE</td>
<td>As above but related to RDB#2.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20150519T120000_G20190626T095713.SAFE</td>
<td>As above but related to RDB#3.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20150722T120000_G20190626T095736.SAFE</td>
<td>As above but related to RDB#4.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20171017T080000_G20190626T095800.SAFE</td>
<td>As above but related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_PP1_V20190228T092500_G20190626T095822.SAFE</td>
<td>As above but related to RDB#6.</td>
</tr>
</tbody>
</table>

### L2 Processor Parameters ADF (AUX_PP2)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1A_AUX_PP2_V20140406T133000_G20151124T084156.SAFE</td>
<td>Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#1.</td>
</tr>
<tr>
<td>S1A_AUX_PP2_V20140616T135500_G20151124T084238.SAFE</td>
<td>Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#2.</td>
</tr>
<tr>
<td>S1A_AUX_PP2_V20140915T100000_G20151124T084308.SAFE</td>
<td>Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#3.</td>
</tr>
<tr>
<td>S1A_AUX_PP2_V20150519T120000_G20151124T084337.SAFE</td>
<td>Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#4.</td>
</tr>
<tr>
<td>S1A_AUX_PP2_V20150722T120000_G20151124T084401.SAFE</td>
<td>Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#5.</td>
</tr>
<tr>
<td>S1A_AUX_PP2_V20171017T080000_G20171013T101254.SAFE</td>
<td>Update of ADF to be compliant with RDB#6.</td>
</tr>
</tbody>
</table>
Compliant with the new instrument configuration RDB#7. Three new fields (activateNoise Correction (on OWI), activateTotalHs (on OSW), activateGroupDir (on OSW)) have been introduced to prepare future evolution of the processor. All these fields are set to false (de-activated). Related to RDB#7.

### Simulated Cross Spectra ADF (AUX_SCS)

<table>
<thead>
<tr>
<th>ADF</th>
<th>Update Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1__AUX_SCS_V20140402T000000_G20160413T103855.SAFE</td>
<td>Introduction of AUX_SCS. Related to RDB#1.</td>
</tr>
<tr>
<td>S1__AUX_SCS_V20140616T133700_G20160413T104849.SAFE</td>
<td>Introduction of AUX_SCS. Related to RDB#2.</td>
</tr>
<tr>
<td>S1__AUX_SCS_V20140908T000000_G20160413T105124.SAFE</td>
<td>Introduction of AUX_SCS. Related to RDB#3.</td>
</tr>
<tr>
<td>S1__AUX_SCS_V20150519T120000_G20160413T105253.SAFE</td>
<td>Introduction of AUX_SCS. Related to RDB#4.</td>
</tr>
<tr>
<td>S1__AUX_SCS_V20150722T120000_G20160413T105410.SAFE</td>
<td>Introduction of AUX_SCS. Related to RDB#5.</td>
</tr>
<tr>
<td>S1__AUX_SCS_V20171017T080000_G20171016T150910.SAFE</td>
<td>Update of ADF to be compliant with RDB#6.</td>
</tr>
</tbody>
</table>
## Appendix E - S-1A Quality Disclaimers

The following Quality Disclaimers have been prepared since the S-1A launch:

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Start Validity Date</th>
<th>End Validity Date</th>
<th>Issue Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S1A_WV_SLC_1S products filled with zero (black products)</td>
<td>2014-09-30 15:17:26 UT</td>
<td>2014-10-03 03:34:01 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>2</td>
<td>Failure on tile amplifier #5 of the receiving antenna</td>
<td>2014-10-18 15:29:30 UT</td>
<td>2015-01-20 19:04:54 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>3</td>
<td>Level 1 products processed with incorrect gains</td>
<td>2014-09-30 15:17:26 UT</td>
<td>2014-10-03 04:07:54 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>4</td>
<td>Incorrect Cycle Number and Relative orbit number in products processed in PAC2/DPA</td>
<td>2014-12-09 11:45:25 UT</td>
<td>2015-01-21 03:53:00 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>5</td>
<td>Failure on Tile amplifier #5 of the receiving antenna from 18/03/2015 to 20/03/2015</td>
<td>2015-03-18 04:09:00 UT</td>
<td>2015-03-20 11:46:30 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>6</td>
<td>Failure on Tile amplifier #5 of the receiving antenna from 26/03/2015 to 28/03/2015</td>
<td>2015-03-26 16:20:00 UT</td>
<td>2015-03-28 02:50:30 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>7</td>
<td>Failure on Tile amplifier #5 of the receiving antenna from 18/04/2015 to 24/04/2015</td>
<td>2015-04-18 17:40:21 UT</td>
<td>2015-04-24 17:48:08 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>8</td>
<td>Failure on Tile amplifier #5 of the receiving antenna from 25/04/2015 to 30/04/2015</td>
<td>2015-04-25 17:37:37 UT</td>
<td>2015-04-30 23:01:11 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>9</td>
<td>Failure on Tile amplifier #5 of the receiving antenna from 05/05/2015 to 06/05/2015</td>
<td>2015-05-05 05:12:51 UT</td>
<td>2015-05-06 00:44:43 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>10</td>
<td>Denoising vectors not qualified</td>
<td>2014-10-03 00:00:00 UT</td>
<td>2015-07-03 06:33:15 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>11</td>
<td>S1 L2 OCN product preliminary qualified</td>
<td>2015-07-02 00:31:03 UT</td>
<td>2030-01-01 00:00:00 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>14</td>
<td>Invalid radiometric calibration of WV L1 and L2 products</td>
<td>2015-03-19 02:29:22 UT</td>
<td>2015-07-03 08:09:02 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>16</td>
<td>Invalid Orbit Number at UPA - before 2014-10-10</td>
<td>2014-10-03 00:00:00 UT</td>
<td>2014-10-10 06:28:50 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>17</td>
<td>Incorrect Cycle Number in S1-A Products acquired between 26/01/2016 and 04/02/2016.</td>
<td>2016-01-26 21:17:42 UT</td>
<td>2016-02-04 16:29:59 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>18</td>
<td>Invalid annotation of NSSDC identifier of Sentinel-1A between April 2014 and July 5th 2016</td>
<td>2014-09-30 15:17:26 UT</td>
<td>2016-07-05 10:16:00 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>21</td>
<td>Issue on geolocation of Sentinel-1A SM SLC products with IPF v2.71</td>
<td>2016-05-11 21:02:59 UT</td>
<td>2016-08-22 21:35:50 UT</td>
<td>Issued</td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.
<table>
<thead>
<tr>
<th>No.</th>
<th>Issue Description</th>
<th>Start Date Time</th>
<th>End Date Time</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Invalid annotation of SSPPDU in the manifest of S-1A products</td>
<td>2014-09-30 15:17:26 UT</td>
<td>2019-04-17 06:30:03 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>24</td>
<td>Incorrect Cycle Number in S1-A Products acquired between 12/01/2017 and 24/01/2017</td>
<td>2017-01-12 00:18:59 UT</td>
<td>2017-01-24 06:52:28 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>26</td>
<td>S-1A products processed with invalid Restituted Orbit Files (AUX_RESORB) between 2017-09-06 and 2017-09-07</td>
<td>2017-09-06 18:57:47 UT</td>
<td>2017-09-07 08:07:45 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>28</td>
<td>S-1A L2 OCN products provide reverse OSW wind direction respect to the specification</td>
<td>2015-11-24 12:03:51 UT</td>
<td>ongoing</td>
<td>Issued</td>
</tr>
<tr>
<td>30</td>
<td>Issue on the noise vector annotation of S-1A products generated from L0N with updated content</td>
<td>2018-03-13 01:00:42 UT</td>
<td>2018-03-15 14:01:26 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>32</td>
<td>S-1A mis synchronisation with impact on azimuth bandwidth synchronisation for InSAR applications</td>
<td>2015-05-17 00:03:40 UT</td>
<td>2015-05-18 23:14:45 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>37</td>
<td>S1A denoising vectors for Strip Map products were not properly calibrated after IPF 2.90 deployment</td>
<td>2018-03-13 11:54:53 UT</td>
<td>2018-06-21 18:53:32 UT</td>
<td>Issued</td>
</tr>
<tr>
<td>40</td>
<td>S-1A products processed without Restituted Orbit Files (AUX_RESORB) on 2018-09-20</td>
<td>2018-09-20 10:41:03</td>
<td>2018-09-20 16:15:34</td>
<td>Issued</td>
</tr>
<tr>
<td>42</td>
<td>Test of the new S-1A antenna configuration, aiming improvement of WV2 performances</td>
<td>2019-02-28 09:42:51</td>
<td>2019-03-12 00:00:00</td>
<td>Issued</td>
</tr>
<tr>
<td>43</td>
<td>S-1A Products generated without AUX_RESORB between 10 April 14:00 UTC to 11 April 07:00 UTC 2019</td>
<td>2019-04-18 15:20:30</td>
<td>2019-04-10 12:37:43</td>
<td>Issued</td>
</tr>
<tr>
<td></td>
<td>Phase artefacts for products acquired over region with strong variations of terrain height in range direction</td>
<td>In preparation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Proprietary information: no part of this document may be reproduced divulged or used in any form without prior permission from CLS.