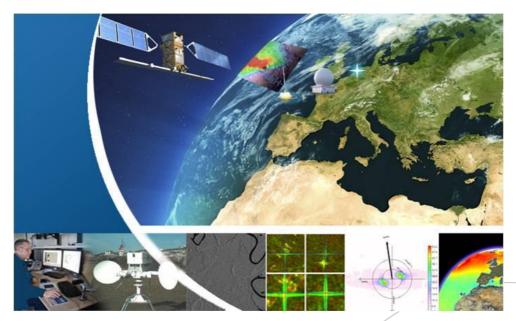
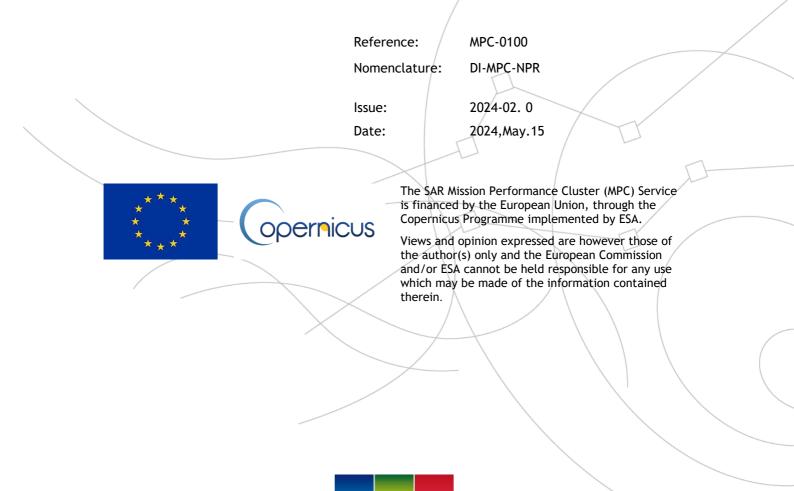




### SAR MPC



# S1-A N-Cyclic Performance Report - 2024-02 Cycles 317 to 320 (10th March 2024 to 27th April 2024)



MPC-0100

DI-MPC-NPR

V2024- 2024,May.15 02.0



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#### Applicable documents

None

#### **Reference documents**

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[5] S1 RS-MDA-52-7441, Sentinel-1 Product Specification, Edition 3, revision 13

[6] S1-RS-MDA-57-7440, Sentinel-1 Product Definition, Edition 2, revision 7

[7] Sentinel-1: Using the RFI annotations, SAR-MPC-0540, Edition 1, revision 1, 31/05/2023

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#### 1. Introduction

#### 1.1. Purpose of the document

The purpose of this document is to provide a status on the S-1A instrument and product performance for orbit repeat cycles:

- #317 from 10th March 2024 to 22th March 2024,
- #318 from 22th March 2024 to 03<sup>th</sup> April 2024,
- #319 from 03<sup>th</sup> April 2024 to 15<sup>th</sup> April 2024,
- and #320 from 15<sup>th</sup> April 2024 to 27<sup>th</sup> April 2024.

#### 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
- Appendix E: S1-A Quality Disclaimers
- Appendix F: IPF Updates and descriptions
- Appendix G: SETAP Updates and descriptions

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#### 2. Executive Summary

There was no particular issue on S1A for cycles 317 to 320.

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://sar-mpc.eu/

The Auxiliary Data Files can be downloaded using a queryable API documented at followed address:

https://sar-mpc.eu/doc/api/

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#### 3. Instrument Status

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This section provides 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.

TRM	Description	Date of Failure	

#### 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

S	Start Date/Time	End Date/Time	MPC Reference	Summary

#### Table 2 S1-A Instrument Unavailabilities

A full list of all instrument unavailabilities since the S1-A launch is given in Appendix C.

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#### 4. IPF and Auxiliary Date File Status

#### 4.1. Processor updates

A processor update was performed on the 19<sup>th</sup> of October 2023 (deployment of version IPF 003.71). The description of last applicable IPF and the full list of IPF description is provided on Sar-MPC website [link].

#### 4.2. Auxiliary Data File Updates

There were updates to S1-A Auxiliary Data Files (ADFs) during the reporting period.

Full list of applicable Auxiliary Data Files is provided on Appendix D

#### Instrument ADF (AUX\_INS)

ADF	Update Reason

#### Table 3 AUX\_INS Updates

#### Calibration ADF (AUX\_CAL)

ADF	Update Reason
<u>S1A_AUX_CAL_V20190228T092500_G20240327T102320</u>	This update only includes a change of the noiseCalibrationFactor for the TOPS modes (EW and IW). By design, the same values are considered for a beam based on its reception channel (for instance the values are the same for IW1/HH and IW1/VH) RDB#7
<u>S1A_AUX_CAL_V20171017T080000_G20240327T102202</u>	As above but related to RDB#6
S1A AUX CAL V20160627T000000 G20240327T102007	As above but related to RDB#5
S1A AUX CAL V20150722T120000 G20240327T101830	As above but related to RDB#5
S1A_AUX_CAL_V20150519T120000_G20240327T101700	As above but related to RDB#4
<u>S1A AUX CAL V20140908T000000 G20240327T101157</u>	As above but related to RDB#3

#### Table 4 AUX\_CAL Updates

#### L1 Processor Parameters ADF (AUX\_PP1)

ADF	Update Reason
<u>S1A_AUX_PP1_V20190228T092500_G20240423T075109</u>	Introduce in AUX_PP1 the parameters of RFI mitigation to be considered by the processor.

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	The RFI mitigation parameters stored in AUX_PP1 are not taken into account by the IPF 003.71. The values of RFI mitigation parameters stored in this file will be considered starting with IPF 003.80.
S1A_AUX_PP1_V20171017T080000_G20240423T075030	As above but related to RDB#6
S1A AUX PP1 V20150722T120000 G20240423T074951	As above but related to RDB#5
S1A AUX PP1 V20150519T120000 G20240423T074918	As above but related to RDB#4
<u>S1A_AUX_PP1_V20140908T000000_G20240423T074841</u>	As above but related to RDB#3
S1A AUX PP1 V20140616T133500 G20240423T074806	As above but related to RDB#2
S1A AUX PP1 V20140406T133000 G20240423T074732	As above but related to RDB#1

#### Table 5 AUX\_PP1 Updates

#### L2 Processor Parameters ADF (AUX\_PP2)

ADF	Update Reason

#### Table 6 AUX\_PP2 Updates

#### Simulated Cross Spectra ADF (AUX\_SCS)

ADF	Update Reason

#### Table 7 AUX\_SCS Updates

#### L2 Machine Learning Models (AUX\_ML2)

ADF	Update Reason

Table 8 AUX\_ML2 Updates

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#### 5. Manoeuvres

Start Date	Start Time	Stop Date	Stop Time	Comment
2024/03/12	23:42:58	2024/03/12	23:43:06	
2024/03/15	22:13:44	2024/03/15	22:14:00	
2024/03/15	23:02:22	2024/03/15	23:02:27	
2024/03/19	22:54:34	2024/03/19	22:54:41	
2024/03/19	23:43:03	2024/03/19	23:43:12	
2024/03/22	23:28:57	2024/03/22	23:29:10	
2024/03/23	00:17:25	2024/03/23	00:17:44	
2024/03/26	21:15:04	2024/03/26	21:15:49	
2024/03/26	22:16:21	2024/03/26	22:17:06	
2024/03/26	23:05:03	2024/03/26	23:05:21	
2024/03/29	22:08:19	2024/03/29	22:08:41	
2024/03/30	00:14:45	2024/03/30	00:15:12	
2024/04/03	01:34:52	2024/04/03	01:34:57	
2024/04/05	23:01:51	2024/04/05	23:02:07	
2024/04/06	00:08:17	2024/04/06	00:08:26	
2024/04/09	07:24:01	2024/04/09	07:24:44	
2024/04/09	09:02:45	2024/04/09	09:03:28	
2024/04/09	10:41:30	2024/04/09	10:42:13	
2024/04/09	12:20:14	2024/04/09	12:20:58	
2024/04/09	13:58:59	2024/04/09	13:59:42	
2024/04/09	17:16:27	2024/04/09	17:17:12	
2024/04/09	18:55:12	2024/04/09	18:55:57	
2024/04/09	20:33:56	2024/04/09	20:34:41	
2024/04/09	22:12:41	2024/04/09	22:13:26	
2024/04/09	23:51:25	2024/04/09	23:52:10	
2024/04/10	01:30:10	2024/04/10	01:30:55	
2024/04/12	22:52:14	2024/04/12	22:52:57	
2024/04/13	01:31:59	2024/04/13	01:32:43	

Table 9 gives a list of the S1-A orbit manoeuvres that occurred during the reporting period:

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2024/04/16	22:18:45	2024/04/16	22:18:50	
2024/04/16	23:07:14	2024/04/16	23:07:20	
2024/04/19	22:31:31	2024/04/19	22:32:03	
2024/04/23	21:38:16	2024/04/23	21:38:54	
2024/04/23	23:59:48	2024/04/24	00:00:30	
2024/04/27	01:44:45	2024/04/27	01:44:55	

Table 9 S1-A Orbit Manoeuvres

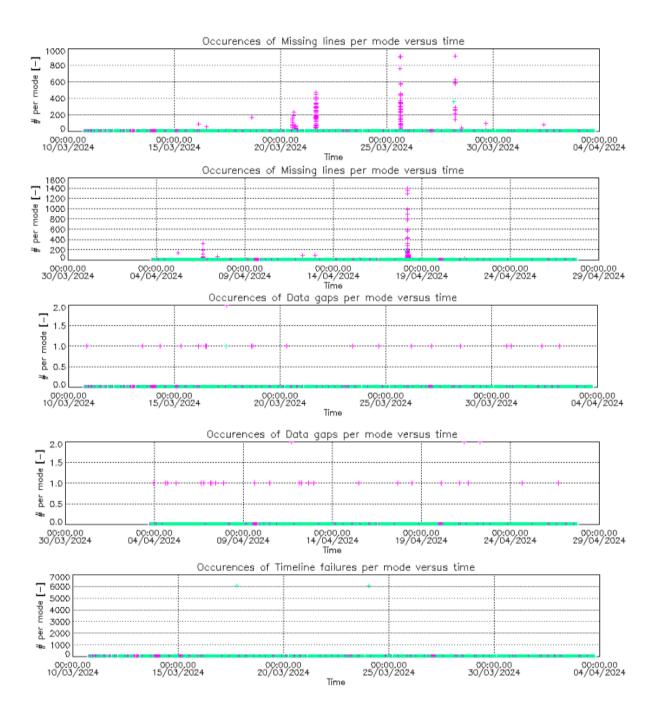
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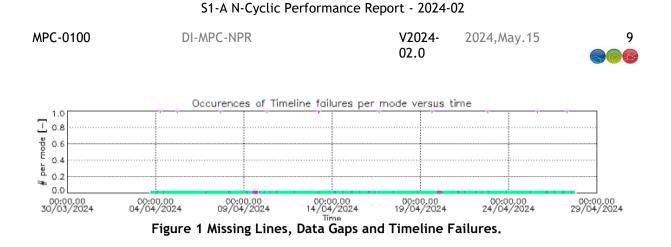
#### 6. Products Status

#### 6.1. Level 0 Products

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

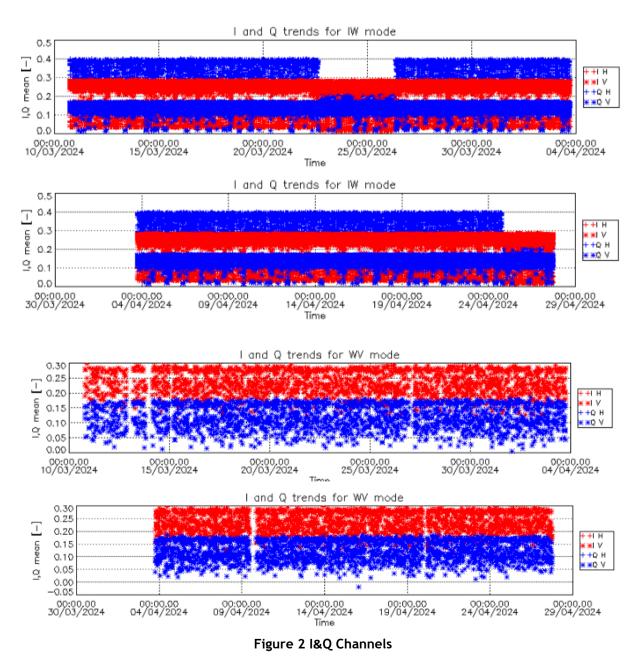


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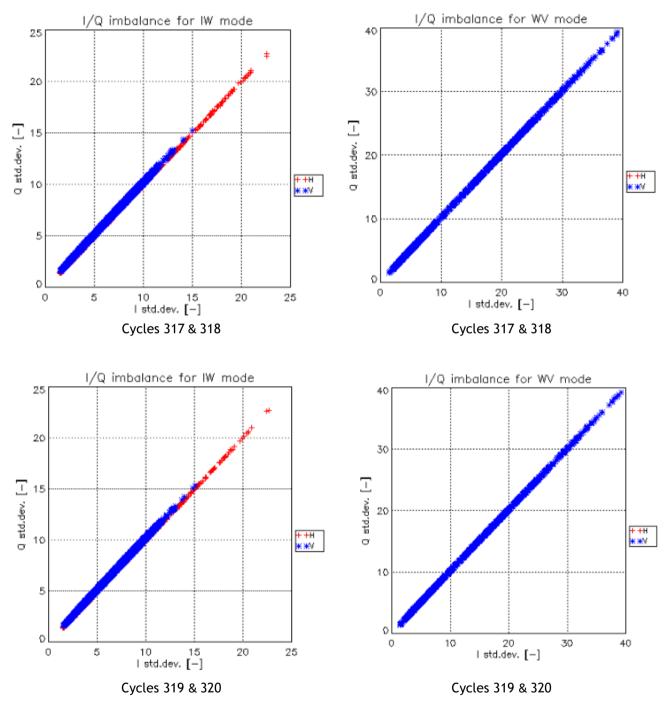
The above plots indicate that few products suffer of missing lines, no significant problems with data or timeline failures.

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



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It can be noticed very stable distribution of I&Q for the time period. Jumps on the above time-series usually related to instrument switch on/off correspond to a normal behaviour, that is compensated at processing level. It therefore has no impact on data quality.



#### 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.

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#### 6.2. Level 1 Products

#### 6.2.1. Image Quality

Figure 4 and Table 10 give the azimuth and range spatial resolution derived from IW imagery acquired during the reporting period, using the DLR transponders and corner reflectors. The spatial resolution has been derived from SLC data. Table 11 gives the impulse response function (IRF) sidelobe ratios derived from transponder results. These indicate a nominal IRF performance.

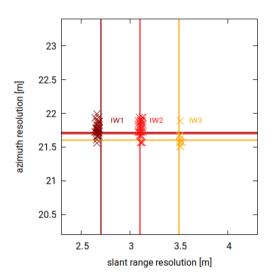


Figure 4 IW Azimuth and Slant Range Spatial Resolutions

Mode/Swath	Azimuth Spatial Resolution (m)	Slant Range Spatial Resolution (m)
IW1	21.77 ± 0.10	2.66 ± 0.01
IW2	21.78 ± 0.11	3.11 ± 0.01
IW3	21.62 ± 0.11	3.51 ± 0.01

#### Table 10 IW Azimuth and Slant Range Spatial Resolutions

Mode/Swath	ISLR azimuth (dB)	ISLR range (dB)	PSLR azimuth (dB)	PSLR range (dB)
IW1	-17.38 ± 0.10	-15.79 ± 0.17	-23.45 ± 0.35	-20.54 ± 0.51
IW2	-16.05 ± 0.11	-15.51 ± 0.15	-20.92 ± 0.28	-19.94 ± 0.28
IW3	-15.95 ± 0.06	-15.65 ± 0.11	-20.77 ± 0.21	-20.45 ± 0.36

#### Table 11 IW Sidelobe Ratios derived from transponders' IRF

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

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#### 6.2.2. Radiometric Calibration

Figure 5 depicts the absolute calibration factor derived from IW SLC data acquired during the reporting period using reference targets from the DLR calibration site (transponders and corner reflectors). The absolute calibration factor deviation is estimated as the difference between the measured radar cross section of each target response (transponder or corner reflector) with their own reference value. Table 12 summarizes mean value and standard deviation for the absolute calibration factor including separations between polarization channels VV and VH. The results indicate a nominal and stable radiometric performance for S1A with sufficient measurements for the reporting period.

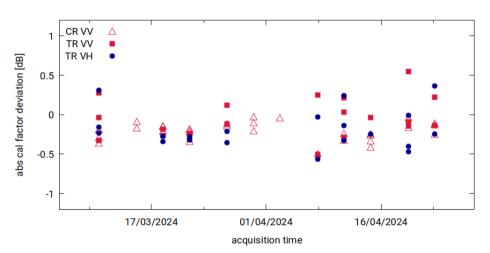


Figure 5 S1A calibration factor deviation as a function of time for IW acquisitions derived from DLR calibration site (TRs and CRs) for VV (red) and VH (blue) polarization.

polarization	Absolute calibration factor deviation (dB) mean value ± standard deviation (measurement points)			
VV	-0.15 ± 0.19 (51)			
VH	-0.18 ± 0.24 (20)			
all	-0.16 ± 0.21 (71)			

Table 12 S1A calibration factor deviation for IW acquisitions derived from DLR calibration site.

#### 6.2.3. Geometric Calibration

Figure 6 shows the absolute location error (ALE) based on 14 S-1A SLC slice products from the IW acquisition mode acquired during the current reporting period (6 products acquired in DV polarization, 4 in SV, 4 in SH, in total 7 separate dates).

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All the three TopSAR IW sub-swaths are represented. The points have been colour-coded according to the subswath the targets were visible in. The products were analysed using the same orbit files used for processing, i.e., the restituted orbit solution.

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, and a topography-dependent Doppler centroid correction (the azimuth corrections are briefly described e.g. in [1]). 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. Instrument range and azimuth calibration constants are applied in post-processing as described in [2]. The calibration numbers were determined in the 2023 re-calibration campaign using multiple corner reflector targets and 5.5 years of data [4]. Converted to units of meters, the values applied to S-1A read 0.1111m (Rg) and 0.0432m (Az).

Figure 6 shows the ALE scatter after the effects listed above were corrected during post-processing. The range and azimuth ALE mean, and corresponding standard deviations are annotated next to the figure. A possible residual separation of the ALE scatter "cloud" for the IW1 sub-swath is apparent in azimuth, see Table 12. The separation may represent an as-of-yet unidentified timing bias, or possibly a bias introduced by the antenna tile event of June 2016. In any case, a physical explanation for such a separation has yet to be identified. The observed range offset has been reduced by about 6cm due to the update of the instrument calibration constants. The small remaining range offsets may be due to the restituted orbit solution (the precise orbit solution was used when determining the instrument calibration) and unknown seasonal biases in the atmospheric path delay corrections. Compared to previous cycles, the range offsets maintained a stable range bias of a few centimetres which is attributed to seasonal ionospheric effects driven by the currently increased solar activity.

In summary, the IW mode ALE plots indicate a localisation performance well within the sensor 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 [3].

Mode/Swath	ALE [m]				
	Range	Azimuth			
IW1	+0.052 ± 0.060	-0.270 ± 0.319			
IW2	+0.037 ± 0.065	-0.038 ± 0.214			
IW3	+0.081 ± 0.064	-0.139 ± 0.328			

Table 13 S1-A absolute localisation error based on S-1A IW SLC products acquired over the testsite during the current reporting period

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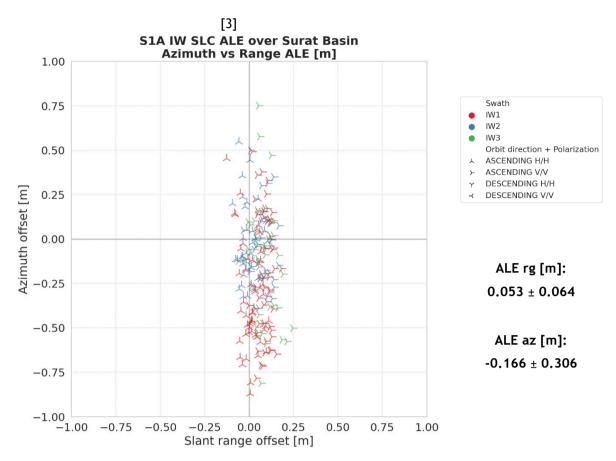


Figure 6 S1-A absolute localisation error based on S-1A IW SLC products acquired over the Surat Basin test site during the current reporting period (Mar 10, 2024, to Apr 27, 2024).

#### 6.2.4. Polarimetric Calibration

Table 14 gives the co-registration between the two polarisations of dual-polarisation products acquired during the reporting period (based on DLR transponder measurements).

Mode/Swath	Range Co-registration Accuracy (m)	Azimuth Co-registration Accuracy (m)	Channel Imbalance (dB)
IW DV	-0.01 ± 0.03	0.00 ± 0.01	0.13 ± 0.19

Table 14 Polarimetric	Calibration	Measurements
-----------------------	-------------	--------------

#### 6.2.5. Elevation Antenna Patterns

No 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.

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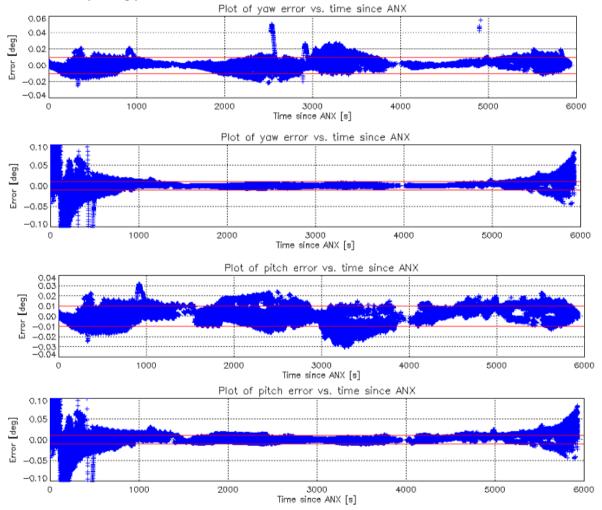
## 6.2.7. Noise Equivalent Radar Cross-section

No NESZ measurements were made during the reporting period.

## 6.2.8. Antenna Pointing

Figure 7 shows yaw, pitch and roll errors calculated for the reporting period against ascending node crossing time (ANX). The red horizontal lines show the nominal  $\pm 0.01^{\circ}$  bounds for these attitude errors - points outside these bounds are normally due to orbit manoeuvres.

Please note that in February, April, August and October, it is seasonally recorded, an increase of the amplitude of yaw and pitch (around ANX ~3000s or either ANX 0/6000s, respectively descending and ascending equator node), which does not impact the Doppler Centroid estimate and is observable on the current reporting period.



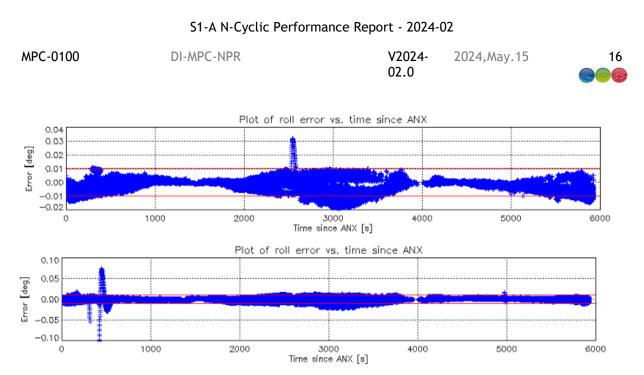
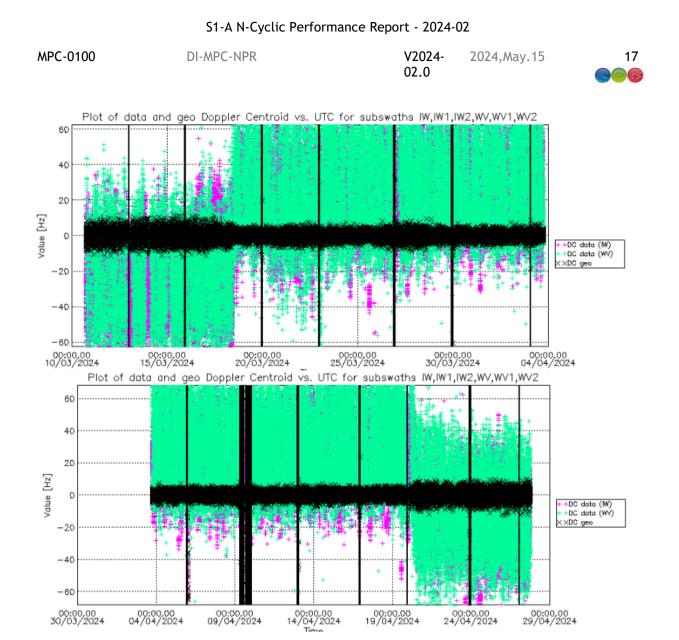


Figure 7 S1-A Yaw, Pitch and Roll Errors (top and bottom respectively cycle 317-318 and cycles 319-320) as function of ANX time

Figure 8 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 being noisier than over land.

Table 15 gives the statistics based on Doppler Centroid derived from IW and WV data. A more detailed plot of Doppler Centroid frequency distribution in time, derived over land from IW products, is shown in Figure 9.





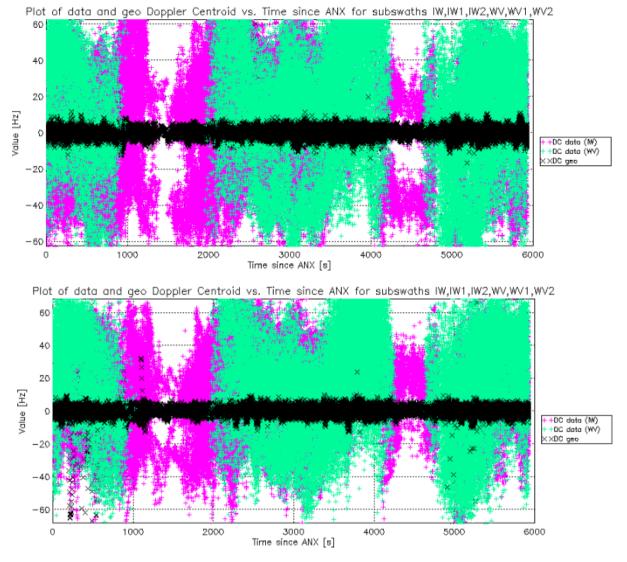


Figure 8 S1-A Doppler Centroid as respect to 1) time (vertical black lines representing the date of manoeuvres) and 2) ANX time (top and bottom respectively cycle 317-318 and cycles 319-320)



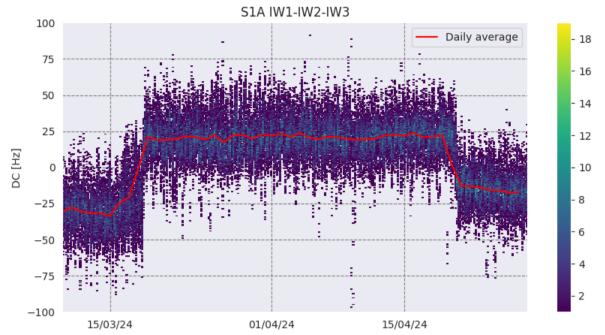


Figure 9 Sentinel1-A Doppler Centroid two-dimensional histogram. Red line shows daily average. Colour bar shows number of observations for each date-DC bin.

	Min (Hz)	Mean (Hz)	Max (Hz)
Cycles 317 & 318	-273.28	8.7981±27.991	179.00
Cycles 319 & 320	-1735.7	13.190 ±25.568	773.74

Table 15: Doppler Centroid Statistics

#### 6.2.9. Interferometric performance

#### 6.2.9.1. Burst synchronisation

The burst synchronization between repeat pass interferometric acquisitions is relevant for the TOPSAR modes (IW and EW), to provide an indication of the quality of the interferometric phase that can be expected. The SAR acquisition start time is planned over a discrete set of points round orbit with precision down to milliseconds. The burst synchronization is systematically monitored by the MPC comparing the times of TopSAR acquisitions derived from current LOA products. The burst synchronization is always monitored by a relative comparison between two acquisitions. Here two approaches are followed. In the first one, the burst synchronization error of each acquisition is evaluated with respect to the corresponding acquisition performed in a fixed reference cycle from the past (monitoring with respect to reference cycle), namely cycle number 182 (03 October - 15 October 2019) for S-1A. The result of this monitoring for the cycles under exams are shown in Figure 10 in the form of a histogram. This method of monitoring benefits from having a fixed cycle of comparison but suffers from seasonal variations and discrepancies between acquisitions far in time. To complement this approach, Figure 11 monitors the burst synchronization error of each acquisition with respect to the corresponding acquisition in the previous cycle (monitoring with respect to previous cycle).

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A synchronization timing error between two bursts causes a mismatch in the Doppler bands under which targets are observed, which in turn causes a loss of coherence. It can be shown that the loss of coherence is approximately linearly proportional to the timing error: for S-1 a synchronization error of 5 ms - corresponding to a Doppler spectrum overlap reduction of about 10 Hz in the SLC products - causes a coherence loss of about 3% for IW mode (that has a processed bandwidth around 300 Hz). This estimate is obtained considering only the Doppler mis-match due to the burst desynchronization; an additional error in pointing may either increase or decrease the Doppler error depending on the sign, thus increasing or decreasing the coherence loss.

The synchronization compliance is computed as the percentage of measurements for which the burst synchronization error falls within  $\pm 5\sqrt{2}$  ms (3 sigma interval), with respect to 0 ms. The interval length is obtained by multiplying the 5 ms timing requirement for single acquisitions by 2, as all the values in the image are obtained by combining the timing error of two independent acquisitions.

In the cycles under exam, the compliance has significantly reduced due to a series of avoidance orbital manoeuvres which happened in the first half of April.

The measured compliance percentages are show in Table 16.

Method	Compliance
Wrt reference cycle	81.6%
Wrt previous cycle	76.8%

Table 16 Burst synchronization error compliance percentages for the two monitoring strategies.

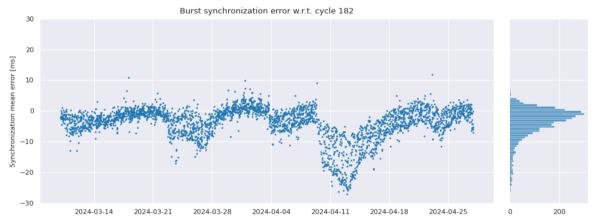
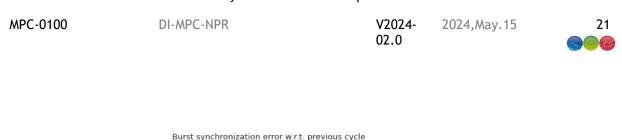


Figure 10:Burst synchronization error for current reporting period, monitoring with respect to reference cycle.



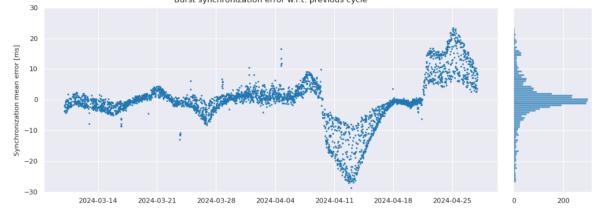


Figure 11 Burst synchronization error for current reporting period, monitoring with respect to previous cycle.

#### 6.2.9.2. Orbit Interferometric Baseline

Repeat pass interferometry requires that acquisitions at different times are performed with a similar orbit to ensure high coherence interferograms. The "distance" between the orbits of a pair of interferometric acquisition is monitored in terms of the interferometric baseline. The interferometric baseline is always monitored by a relative comparison between two acquisitions. Here two approaches are followed. In the first one, one computes the interferometric baseline of each acquisition with respect to the corresponding acquisition performed in a fixed reference cycle from the past (monitoring with respect to reference cycle), namely cycle number 182 (03 October - 15 October 2019) for S-1A. The result of this monitoring for cycles under exam are shown in Figure 12, showing the three components of the baseline. To complement this approach, Figure 13 monitors the interferometric baseline of each acquisition in the previous cycle (monitoring with respect to previous cycle). The plots show the evolution during the current reporting period of the three interferometric baseline components (Normal on top, Parallel in the middle and Along-Track at the bottom). For each orbit the plots report the minimum to maximum range as a blue-shaded area, and the average baseline value as an orange line.

The most significant baseline component for the interferometric coherence is the normal one, which must be significantly lower than the critical baseline. For S-1A the swath-dependent critical baseline is about 5 km. During the first half of April, avoidance orbital manoeuvres have caused the normal baseline component to increase beyond 500 m (10% of the critical baseline), but it has returned to less than 250 m values in the second half.

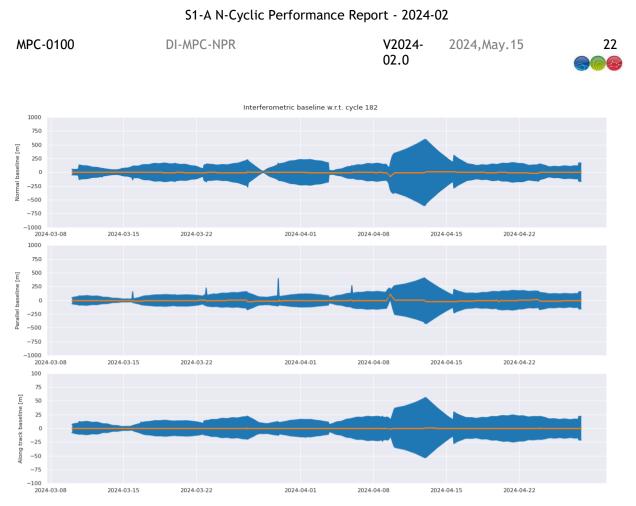


Figure 12: Interferometric baselines for reporting period, monitoring with respect to reference cycle

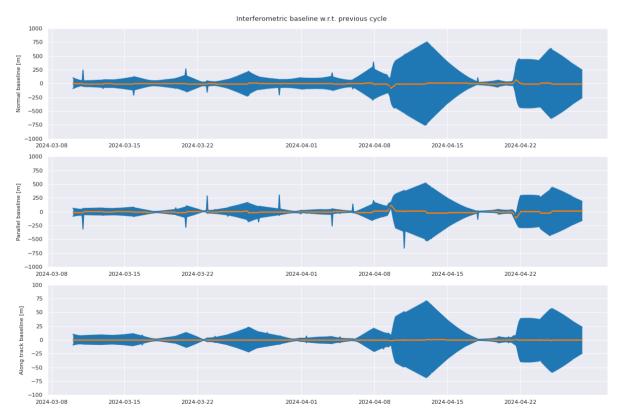


Figure 13 Interferometric baselines for reporting period, monitoring with respect to previous cycle

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#### 6.2.10. RFI monitoring

The S1 IPF is performing a pre-screening and a detection/mitigation of Radio Frequency Interferences and is annotating in in the level 1 products meta data as described in the technical note on the RFI annotations [7].

The number of RFI detected by the processor is monitored at burst level and at product level. The following tables provide the percentage of RFI detected during the cycles of the period. The percentage of RFI detected by the processor is stable.

	Products			Bursts		
Cycles	% of EW and IW products with RFI (*)	% of EW products with RFI (*)	% of IW products with RFI (*)	% of EW and IW burst with RFI (*)	% of EW bursts with RFI (*)	% of IW bursts with RFI (*)
317	21.98	2.84	24.71	14.52	2.26	19.53
318	21.65	2.62	24.53	14.05	2.02	19.24
319	23.38	2.9	26.59	15.16	2.04	21
320	21.58	1.76	24.55	14.14	1.41	19.55
(*) As d	etected by the	S1-IPF. The re	esidual RFI (de	tected or not b	y the S1-IPF)	are reported

separately.

#### Table 17: % of RFI mitigation during the reporting period

#### 6.2.11. Summary of Anomalies

There were no anomalies during the reporting period.

#### 6.2.12. Quality Disclaimers

The following quality disclaimers were issued or updated during the reporting period (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.

ID	Title	Start	Stop	Status
<u>#198</u>	Invalid burst ID annotations (S1A IW SLC in cycle 315)	2024-02-16 23:37:51	2024-02-27 16:22:13	Issue
<u>#199</u>	Products processed using degraded orbit files due to solar activity (20 December 2023 to 23 January 2024 included)	2024-01-21 08:04:05	2024-01-23 07:51:03	Issue
<u>#200</u>	Products processed using degraded orbit files due to solar activity (23 January 2024 to 25 February 2024 included)	2024-01-25 16:54:51	2024-02-25 20:16:06	Issue

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<u>#201</u>	Invalid burst ID annotations (S1A IW SLC in cycle 316)	2024-02-28 23:37:51	2024-03-10 16:22:13	lssue
<u>#202</u>	Products with residual RFI degradation acquired in February 2024	2024-02-01 00:00:00	2024-03-01 00:00:00	Issue
<u>#203</u>	Invalid burst ID annotations (S1A IW SLC in cycle 317)	2024-03-11 23:37:51	2024-03-18 23:29:44	Issue
<u>#204</u>	S-1A products with missing lines with degradation of product performance	2024-02-01 02:26:50	2024-02-29 16:04:33	Issue
<u>#205</u>	S-1A products with missing lines with degradation of product performance	2024-03-01 15:15:52	2024-03-30 21:56:48	Issue
<u>#206</u>	Products with residual RFI degradation acquired in March 2024	2024-03-01 00:22:18	2024-03-31 19:50:34	Issue
<u>#207</u>	Invalid burst ID annotations (S1A IW SLC in cycle 318)	2024-03-23 23:37:51	2024-04-03 16:22:14	lssue
<u>#208</u>	Invalid burst ID annotations (S1A IW SLC in cycle 319)	2024-04-04 23:37:52	2024-04-15 16:22:13	Issue

Table 18: Quality Disclaimers issued or updated during the reporting period

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#### Quality disclaimers on recurring issues

Since March 2022 (IPF 3.51 deployment), the processor performs mitigation of Radio Frequency Interference (RFI). The purpose of this mitigation is to reduce the number of observable RFI. A non-exhaustive list of products affected by residuals of RFI are published by month starting with QD-154 for the month of May 2023.

Since November 2021 (IPF 3.40 deployment), the EW and IW SLC products contain an annotation of burst ID (relative and absolute burst ID). For some products, the burst ID annotation (absolute and relative burst ID) is shifted by 1 compared to the expected value [QD-77]. Those products are reported for a first period from November 2021 to April 2022 [QD-115] and then at the end of each cycle. The number of invalid burst ID annotation is planned to decrease thanks to the planned deployment of a new processor version (IPF 3.71).

Due to increased solar activity, the performances of AUX\_PREORB and AUX\_RESORB can be degraded<sup>1</sup>1, exceeding the 100cm (AUX\_PREORB) and 10cm (AUX\_RESORB) performance requirements. Monthly quality disclaimers are provided containing the list of Level 1 products processed with such degraded orbit files.

<sup>&</sup>lt;sup>1</sup> https://sentinel.esa.int/en/web/sentinel/-/impact-of-high-solar-activity-on-sentinel-1a-aux-preorb-pod-files

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# Appendix A: List of Acronyms

AAP	Azimuth Antenna Pattern	
AD	Applicable Document	
ADF	Auxiliary Data File	
ALE	Absolute Localisation Accuracy Error	
ANX	Ascending Node Crossing Time	
CR	Corner Reflector	
EAP	Elevation Antenna Pattern	
EW	Extra Wide Swath	
IPF	Instrument Processing Facility	
IRF	Impulse Response Function	
IW	Interferometric Wide Swath	
NESZ	Noise Equivalent Sigma0 Zero	
PD	Path Delay	
PSCAL	Permanent Scatter Calibration	
RD	Reference Document	
RDB	Radar Data Base	
RFI	Radar Frequency Interference	
Rx	Receive	
SM	Stripmap	
твс	To be confirmed	
TBD	To be defined	
TRM	Transmit Receive Module	
Tx	Transmit	
wv	Wave Mode	

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#### Appendix B: S1-A Transmit Receive Module Failures

TRM	Description	Date of Failure
Tile 4, Row 11	Tx, H & V	05-May-2014
Tile 4, Row 12	Tx, H & V	05-May-2014
Tile 4, Row 11	Rx, V	05-May-2014
Tile 4, Row 12	Rx, V	05-May-2014
Tile 4, Row 12	Rx, H	09-June-2014
Tile 5, all TRM failures (intermittent)	Rx, H & V	Between 18-Oct-2014, 15:29:30 UT and 20-Jan-2015, 19:04:54 UT
Tile 5, all TRM failures (intermittent)	Rx, H & V	Between 18-Mar-2015, 04:09:00 UT and 20-Mar-2015, 11:46:30 UT
Tile 5, all TRM failures (intermittent)	Rx, H & V	Between 26-Mar-2015, 16:20:00 UT and 28-Mar-2015, 02:50:30 UT
Tile 12, Row 16 (intermittent)	Tx V & Rx V	Between 16-Apr-2015 and 18-Apr- 2015
Tile 5, all TRM failures (intermittent)	Rx, H & V	Between 18-Apr-2015, 17:40:21 UT and 24-Apr-2015, 17:48:08 UT
Tile 12, Row 16 (intermittent)	Tx V & Rx V	Between 20-Apr-2015 and 28-Apr- 2015
Tile 5, all TRM failures (intermittent)	Rx, H & V	Between 25-Apr-2015 17:37:37 UT and 30-Apr-2015, 23:01:11 UT
Tile 4, Row 11	Rx H	29-Apr-2015, 21:57:30 UT
Tile 12, Row 16 (intermittent)	Tx V & Rx V	Between 01-May-2015 and 04-May- 2015
Tile 5, all TRM failures (intermittent)	Rx, H & V	Between 05-May-2015, 05:12:51 UT and 06-May-2015, 00:44:43 UT
Tile 12, Row 16	Tx V & Rx V	18-May-2015, 22:33:36 UT
Tile 5, all TRM failures	Rx, H & V	Between 26-May-2015, 19:06:00 UT and 27-May-2015, 06:07:00 UT
Tile 5, all TRM failures	Rx, H & V	Between 06-Jun-2015, 06:35:00 UT and 14-July-2015, 10:43:00 UT
Tile 5, all TRM failures	Rx, H & V	Between 17-July-2015, 19:07:00 UT and 21-July-2015, 11:58:00 UT
Tile 11, Rows 1 to 10	Tx H, Tx V	16 June -27 June 2016
Tile 11	See below	

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

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On the 16<sup>th</sup> 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 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 then  $\pm 0.1$  dB).

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#### Appendix C: S1-A Instrument Unavailability

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

Start Date/Time	End Date/Time	MPC Reference	Summary
26/04/2014 11:56	29/04/2014 12:13	SOB-23	Sentinel-1A Unavailability - Instrument Anomaly
29/05/2014 14:00	02/06/2014 17:00	SOB-27	Sentinel-1A Unavailability - Spacecraft Anomaly
06/07/2014 05:04	08/07/2014 15:22	SOB-39	Sentinel-1A Unavailability - Spacecraft Anomaly
21/07/2014 03:30	23/07/2014 08:35	SOB-40	Sentinel-1A Unavailability - Instrument Switch OFF for test
12/08/2014 09:37	12/08/2014 15:31	SOB-47	Sentinel-1A Unavailability - Onboard planned operation
21/08/2014 07:59	21/08/2014 15:29	SOB-49	Sentinel-1A Unavailability - Instrument Anomaly
25/08/2014 09:49	25/08/2014 17:50	SOB-50	Sentinel-1A Unavailability - SAR Instrument
03/09/2014 08:30	04/09/2014 15:11	SOB-53	Sentinel-1A Unavailability - SAR Instrument
20/09/2014 22:30	21/09/2014 12:06	SOB-62	SAR anomaly from 20/09 at 22:30 UTC to 21/09 12:06 UTC
23/09/2014 08:00	23/09/2014 20:00	SOB-60	S1PDGS - SAR & X-Band downlink unavailability on Tuesday 23rd from 08:00 CET to 20:00 CET
26/09/2014 21:40	27/09/2014 09:42	SOB-63	SAR instrument unavailable between 26/09/2014 21.40.48 UTC and 27/09/2014 09.42.38 UTC
29/09/2014 14:56	30/09/2014 15:17	SOB-64	SAR instrument unavailability from 29/09/2014 16.54 UTC to 30/09/2014 at 15.17 UTC.
06/10/2014 10:51	06/10/2014 14:05	SOB-70	Sentinel-1A Unavailability - SAR Anomaly
07/10/2014 06:30	07/10/2014 21:30	SOB-69	Sentinel-1A Unavailability - planned maintenance
10/10/2014 21:52	11/10/2014 11:03	SOB-73	Sentinel-1A Unavailability - SAR anomaly
13/10/2014 08:00	13/10/2014 12:48	SOB-71	Sentinel-1A Unavailability - Planned maintenance
19/11/2014 10:20	19/11/2014 14:50	SOB-91	Sentinel 1A unavailability
29/12/2014 20:45	30/12/2014 11:33	SOB-99	Sentinel-1A Unavailability
20/01/2015 07:30	20/01/2015 18:00	SOB-112	Sentinel-1A Unavailability - Planned maintenance

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Start Date/Time	End Date/Time	MPC Reference	Summary
01/02/2015 07:50	02/02/2015 16:26	SOB-116	Sentinel-1A unavailability from 01/02/2015 7h50 to 02/02/2015 16h27
17/02/2015 19:56	18/02/2015 16:02	SOB-118	Sentinel-1A Unavailability - since 17/02/15 evening to 18/02/15 afternoon
19/02/2015 13:29	20/02/201510:15	SOB-121	Sentinel-1A unavailability from 19/02/2015 13h29 to 20/02/2015 10h15
14/04/2015 08:30	14/04/2015 17:00	SOB-147	Sentinel-1A unavailability planned on 14/04/2015 for maintenance
09/05/2015 23:19	10/05/2015 15:39	SOB-159	Sentinel-1A unavailability on 10/05/2015
19/05/2015 05:00	19/05/2015 12:00	SOB-168	Sentinel-1A planned unavailability on 19/05/2015 (RDB#4 uplink onboard)
28/05/2015 04:00	28/05/2015 14:30	SOB-170	Planned Sentinel-1A unavailability on 28/05/2015 for maintenance purpose
20/06/2015 15:30	21/06/2015 13:00	SOB-176	Sentinel-1A unavailability on 20 and 21/06/2015
22/07/2015 06:35	22/07/2015 08:21	SOB-206	Sentinel-1A Planned Unavailability (RDB#5)
03/08/2015 02:37	03/08/2015 18:33	SOB-207	Sentinel-1A Unavailability from orbit 7093 to 7101
04/08/2015 04:52	04/08/2015 13:47	SOB-208	Sentinel-1A Unavailability from orbit 7103 to 7114
04/08/2015 23:44	05/08/2015 11:20	SOB-209	Sentinel-1A Unavailability from orbit 7120 to 7128
09/08/2015 21:22	10/08/2015 16:14	SOB-210	Sentinel-1A Unavailability from orbit 7192 to 7204
04/09/2015 16:54	05/09/2015 11:08	SOB-214	Sentinel-1A Unavailability from 04/09 to 05/09/2015
23/09/2015 07:20	23/09/2015 11:56	SOB-222	Sentinel-1A Unavailability from orbit 7840 to 7842
19/10/2015 16:28	20/10/2015 07:27	SOB-226	Sentinel-1A Unavailability from 19/10 to 20/10/2015
21/10/2015 14:54	22/10/2015 07:12	SOB-227	Sentinel-1A Unavailability from 21/10 to 22/10/2015
05/11/2015 16:50	06/11/2015 12:20	SOB-229	Sentinel-1A Unavailability from 05/11 to 06/11/2015
07/11/2015 17:53	08/11/2015 12:10	SOB-230	Sentinel-1A Unavailability from 07/11 to 08/11/2015
18/11/2015 07:40	18/11/2015 12:28	SOB-233	Sentinel-1A Unavailability on 18/11/2015
29/11/2015 22:54	30/11/2015 11:10	SOB-251	Sentinel-1A Unavailability from 29/11 to 30/11/2015
10/12/2015 07:30	10/12/2015 13:00	SOB-252	Sentinel-1A Planned unavailability on 10/12/2015

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Start Date/Time	End Date/Time	MPC Reference	Summary
11/12/2015 02:30	11/12/2015 16:00	SOB-253	Sentinel-1A Unavailability on 11/12/2015
02/01/2016 04:45	02/01/2016 15:14	SOB-255	Sentinel-1A Unavailability on 02/01/2016
16/01/2016 14:59	16/01/2016 19:57	SOB-257	Sentinel-1A Unavailability on 16/01/2016
21/02/2016 18:17	22/02/2016 10:51	SOB-310	Sentinel-1A Unavailability from 21/02/2016 to 22/02/2016
13/03/2016 08:23	13/03/2016 16:14	SOB-332	Sentinel-1A Unavailability on 13/03/2016
15/03/2016 07:46	15/03/2016 09:36	SOB-340	Sentinel-1A Planned Maintenance on 15/03/2016
06/05/2016 21:17	07/05/2016 14:27	SOB-389	Sentinel-1A Unavailability from 06/05/2016 to 07/05/2016
22/05/2016 14:51	22/05/2016 18:11	SOB-411	Sentinel-1A Unavailability on 22/05/2016
16/06/2016 05:59	16/06/2016 13:57	SOB-447	Sentinel-1A Unavailability on 16/06/2016
16/06/2016 16:45	17/06/2016 11:26	SOB-448	Sentinel-1A Unavailability between 16/06/2016 and 17/06/2016
17/06/2016 11:45	27/06/2016 16:32	SOB-467	Sentinel-1A Unavailability between 17/06/2016 and 27/06/2016
02/07/2016 04:52	02/07/2016 13:23	SOB-476	Sentinel-1A Unavailability on 02/07/2016
10/07/2016 06:39	10/07/2016 17:51	SOB-483	Sentinel-1A Unavailability on 10/07/2016
11/07/2016 21:32	12/07/2016 12:05	SOB-507	Sentinel-1A Unavailability on 11/07/2016
27/07/2016 07:49	27/07/2016 15:42	SOB-508	Sentinel-1A Unavailability on 27/07/2016
27/08/2016 23:58	28/08/2016 09:45	SOB-533	Sentinel-1A Unavailability from 27/08/2016 to 28/08/2016
24/11/2016 20:38	25/11/2016 11:34	SOB-614	Sentinel-1A Unavailability from 24/11/2016 to 25/11/2016
04/12/2016 06:52	04/12/2016 11:07	SOB-624	Sentinel-1A Unavailability on 04/12/2016
16/06/2017 09:09	16/06/2017 12:31	SOB-751	Sentinel-1A Unavailability on 16/06/2017
17/06/2017 11:43	17/06/2017 14:43	SOB-752	Sentinel-1A Unavailability on 17/06/2017
21/06/2017 14:09	21/06/2017 17:35	SOB-753	Sentinel-1A Unavailability on 21/06/2017

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Start Date/Time	End Date/Time	MPC Reference	Summary
07/07/2017 02:20	07/07/2017 10:29	SOB-758	Sentinel-1A Unavailability on 07/07/2017
03/08/2017 13:30	03/08/2017 14:07	SOB-776	Sentinel-1A Unavailability on 03/08/2017
01/10/2017 12:06	01/10/2017 20:01	SOB-796	Sentinel-1A Unavailability on 01/10/2017
25/10/2017 08:25	25/10/2017 10:15	SOB-817	Sentinel-1A planned Unavailability on 25/10/2017
02/02/2018 14:27	02/02/2018 16:13	SOB-854	Sentinel-1A Unavailability on 02/02/2018
15/03/2018 20:06	16/03/2018 10:25	SOB-888	Sentinel-1A Unavailability between 15/03/2018 and 16/03/2018
16/05/2018 07:51	16/05/2018 09:34	SOB-892	Sentinel-1A Unavailability on 16/05/2018
22/05/2018 16:52	22/05/2018 19:00	SOB-895	Sentinel-1A Unavailability on 22/05/2018
31/05/2018 06:37	31/05/2018 09:54	SOB-897	Sentinel-1A Unavailability on 31/05/2018
02/06/2018 01:23	02/06/2018 09:42	SOB-898	Sentinel-1A Unavailability on 02/06/2018
29/06/2018 16:27	29/06/2018 18:16	SOB-911	Sentinel-1A Unavailability on 29/06/2018
06/07/2018 11:30	06/07/2018 13:11	SOB-916	Sentinel-1A Unavailability on 06/07/2018
13/08/2018 07:59	13/08/2018 11:21	SOB-917	Sentinel-1A Unavailability on 13/08/2018
05/12/2018 23:45	06/12/2018 09:29	SOB-953	Sentinel-1A Unavailability between 05/12/2018 and 06/12/2018
09/12/2018 18:53	10/12/2018 08:57	SOB-954	Sentinel-1A Unavailability between 09/12/2018 and 10/12/2018
14/02/2019 19:54	15/02/2019 10:26	SOB-997	Sentinel-1A Unavailability between 14/02/2019 and 15/02/2019
28/02/2019 09:25	28/02/2019 09:38	SOB-998	Sentinel-1A Planned Unavailability on 28/02/2019
12/03/2019 09:25	12/03/2019 09:38	SOB-1010	Sentinel-1A Planned Unavailability on 12/03/2019
18/04/2019 00:45	18/04/2019 15:00	SOB-1030	Sentinel-1A Unavailability on 18/04/2019
24/05/2019 17:37	25/05/2019 12:34	SOB-1047	Sentinel-1A Unavailability on 24/05/2019 and 25/05/2019
11/11/2019 15:34	11/11/2019 18:46	SOB-1216	Sentinel-1A Unavailability on 11/11/2019

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Start Date/Time	End Date/Time	MPC Reference	Summary
03/12/2019 08:35	03/12/2019 09:17	SOB-1252	Sentinel-1A Unavailability on 03/12/2019
03/12/2019 15:42	03/12/2019 15:46	SOB-1255	Sentinel-1A Unavailability on 03/12/2019
06/01/2020 15:17	06/01/2020 15:42	SOB-1305	Sentinel-1A Unavailability on 06/01/2020
29/02/2020 14:43	29/02/2020 17:45	SOB-1396	Sentinel-1A Unavailability on 29/02/2020
09/09/2020 08:50	09/09/2020 11:05	SOB-1688	Sentinel-1A Unavailability on 09/09/2020
26/11/2020 10:06	26/11/2020 13:32	SOB-1839	Sentinel-1A Unavailability on 26/11/2020
19/01/2021 21:42	20/01/2021 10:02	SOB-1948	Sentinel-1A Unavailability on 19/01/2021 and 20/01/2021
02/03/2021 05:34	02/03/2021 11:52	SOB-2014	Sentinel-1A Unavailability on 02/03/2021
22/06/2021 11:10	22/06/2021 11:20	SOB-3357	Sentinel-1A Planned Unavailability on 22/06/2021
29/06/2021 09:24	29/06/2021 11:09	SOB-3358	Sentinel-1A Planned Unavailability on 29/06/2021
09/08/2021 06:23	09/08/2021 09:37	SOB-3418	Sentinel-1A Unavailability on 09/08/2021
11/08/2021 01:23	11/08/2021 09:23	SOB-3422	Sentinel-1A Unavailability on 11/08/2021
15/09/2021 08:40	15/09/2021 12:02	SOB-3496	Sentinel-1A Planned Unavailability on 15/09/2021
16/11/2021 05:11	16/11/2021 11:41	SOB-3559	Sentinel-1A Unavailability on 16/11/2021
16/11/2021 12:23	16/11/2021 16:38	SOB-3560	Sentinel-1A Unavailability on 16/11/2021 #2
19/11/2021 06:30	19/11/2021 08:54	SOB-3561	Sentinel-1A Unavailability on 19/11/2021
24/12/2021 19:32	25/12/2021 08:51	SOB-3611	Sentinel-1A Unavailability on 24/12/2021 and 25/12/2021
10/02/2022 11:25	10/02/2022 14:38	SOB-3691	Sentinel-1A Unavailability on 10/02/2022
22/02/2022 04:54	22/02/2022 14:37	SOB-3726	Sentinel-1A Unavailability on 22/02/2022
01/03/2022 19:07	02/03/2022 12:01	SOB-3727	Sentinel-1A Unavailability on 01/03/20022 and 02/03/2022
13/04/2022 20:52	14/04/2022 08:34	SOB-3809	Sentinel-1A Unavailability on 13/04/2022 and 14/04/2022

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Start Date/Time	End Date/Time	MPC Reference	Summary
25/04/2022 06:17	25/04/2022 09:35	SOB-3810	Sentinel-1A Unavailability on 25/04/2022
12/05/2022 14:26	12/05/2022 21:12	SOB-3950	Sentinel-1A Unavailability on 12/05/2022
23/05/2022 16:21	24/05/2022 08:02	SOB-3951	Sentinel-1A Unavailability on 23/05/2022 and 24/05/2022
09/07/2022 18:26	10/07/2022 12:15	SOB-3952	Sentinel-1A Unavailability on 09/07/2022 and 10/07/2022
23/08/2022 23:20	24/08/2022 08:33	SOB-4005	Sentinel-1A Unavailability on 23/08/2022 and 24/08/2022
08/09/2022 23:01	09/09/2022 08:02	SOB-4015	Sentinel-1A Unavailability on 08/09/2022 and 09/09/2022
26/12/2022 11:24	26/12/2022 14:31	SOB-3183	Sentinel-1A Unavailability on 26/12/2022
02/02/2023 03:00	02/02/2023 12:41	SOB-4336	Sentinel-1A Unavailability on 02/02/2023
29/03/2023 09:09	29/03/2023 15:47	SOB-4337	Sentinel-1A Unavailability on 29/03/2023
26/10/2023 12:23	26/10/2023 18:13	SOB-4553	Sentinel-1A Unavailability on 26/10/2023
28/10/2023 16:46	29/10/2023 14:27	SOB-4554	Sentinel-1A Unavailability on 28/10/2023 and 29/10/2023
14/02/2024 00:30	14/02/2024 09:31	SOB-4666	Sentinel-1A Unavailability on 14/02/2024

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#### Appendix D: S1-A Auxiliary Data Files

This appendix provides the list of <u>currently applicable</u> ("active") ADF updates. They are the ADF corresponding to the most up to date characterisation of the instrument and SAR processor.

The full list of Auxiliary Data Files is available on the SAR MPC Web site at following address:

https://sar-mpc.eu/

while the list below corresponds to the "active" ones.

The Auxiliary Data Files can be downloaded using a queryable API documented at followed address: https://sar-mpc.eu/doc/api/

#### Instrument ADF (AUX\_INS)

ADF	Update Reason
<u>S1A_AUX_INS_V20190228T092500_G20211103T111906.SAFE</u>	Circulation of S1A_AUX_INS to be compliant with IPF3.40 with the introduction of two fields: - onBoardDecimationFilterParamsList for modes IW/EW to support RFI mitigation processing, - deltaTXLatch parameter used to perfom instrument timing correction.
	Related to RDB#7.
<u>S1A_AUX_INS_V20171017T080000_G20211028T133136.SAFE</u>	As above but related to RDB#6.
<u>S1A_AUX_INS_V20160627T000000_G20211028T133055.SAFE</u>	As above but related to RDB#5 (after tile #11 failure).
<u>S1A_AUX_INS_V20150722T120000_G20211028T132901.SAFE</u>	As above but related to RDB#5 (before tile #11 failure).
<u>S1A_AUX_INS_V20150519T120000_G20211028T132821.SAFE</u>	As above but related to RDB#4.
<u>S1A_AUX_INS_V20140908T000000_G20211028T132730.SAFE</u>	As above but related to RDB#3.
<u>S1A_AUX_INS_V20140616T133500_G20211028T132453.SAFE</u>	As above but related to RDB#2.
<u>S1A_AUX_INS_V20140406T133000_G20211028T132414.SAFE</u>	As above but related to RDB#1.

#### Calibration ADF (AUX\_CAL)

ADF	Update Reason
<u>S1A_AUX_CAL_V20190228T092500_G20240327T102320</u>	This update only includes a change of the noiseCalibrationFactor for the TOPS modes (EW and IW). By design, the same values are considered for a beam based on its reception channel (for instance the values are the same for IW1/HH and IW1/VH) RDB#7

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<u>S1A_AUX_CAL_V20171017T080000_G20240327T102202</u>	As above but related to RDB#6
S1A_AUX_CAL_V20160627T000000_G20240327T102007	As above but related to RDB#5
S1A_AUX_CAL_V20150722T120000_G20240327T101830	As above but related to RDB#5
S1A_AUX_CAL_V20150519T120000_G20240327T101700	As above but related to RDB#4
<u>S1A_AUX_CAL_V20140908T000000_G20240327T101157</u>	As above but related to RDB#3

# L1 Processor Parameters ADF (AUX\_PP1)

ADF	Update Reason
<u>S1A_AUX_PP1_V20190228T092500_G20240423T075109</u>	Introduce in AUX_PP1 the parameters of RFI mitigation to be considered by the processor.
	The RFI mitigation parameters stored in AUX_PP1 are not taken into account by the IPF 003.71. The values of RFI mitigation parameters stored in this file will be considered starting with IPF 003.80.
	RDB#7
S1A_AUX_PP1_V20171017T080000_G20240423T075030	As above but related to RDB#6
S1A_AUX_PP1_V20150722T120000_G20240423T074951	As above but related to RDB#5
S1A_AUX_PP1_V20150519T120000_G20240423T074918	As above but related to RDB#4
S1A_AUX_PP1_V20140908T000000_G20240423T074841	As above but related to RDB#3
S1A_AUX_PP1_V20140616T133500_G20240423T074806	As above but related to RDB#2
S1A_AUX_PP1_V20140406T133000_G20240423T074732	As above but related to RDB#1

# L2 Processor Parameters ADF (AUX\_PP2)

ADF	Update Reason
<u>S1A_AUX_PP2_V20190228T092500_G20220607T093912.SAFE</u>	Circulation of S1A_AUX_PP2 allowing the activation of TotalHs estimation
	- Flag activateTotalHs triggering the activation of TotalHs estimation based on machine learning method is set to true for WV mode, for both subswath WV1 and WV2. Consequently, oswTotalHs and oswTotalHsStdev will be populated for WV OCN products.
	The change affects only WV mode.
	Relative to RDB#7

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S1A_AUX_PP2_V20171017T080000_G20220607T093818.SAFE	As above and compliant with RDB#6
<u>S1A_AUX_PP2_V20150722T120000_G20220607T093737.SAFE</u>	As above and compliant with RDB#5
<u>S1A_AUX_PP2_V20150519T120000_G20220607T093644.SAFE</u>	As above and compliant with RDB#4
<u>S1A_AUX_PP2_V20140908T000000_G20220607T093557.SAFE</u>	As above and compliant with RDB#3
<u>S1A_AUX_PP2_V20140616T133500_G20220607T093510.SAFE</u>	As above and compliant with RDB#2
<u>S1A_AUX_PP2_V20140406T133000_G20220607T093358.SAFE</u>	As above and compliant with RDB#1

#### L2 Processor Parameters ADF (AUX\_SCS)

ADF	Update Reason

#### L2 Processor Parameters ADF (AUX\_ML2)

ADF	Update Reason

## SETAP Configuration File (AUX\_SCF)

ADF	Update Reason
<u>S1_AUX_SCF_V20140406T133000_G20221003T130002</u>	First version of the AUX SCF prepared by SAR-MPC for the SETAP-IPF. It provides the default configuration for the computation of correction layers of nominal S-1 ETAD products. This version of AUX SCF is applicable to SETAP-IPF version 2.0, see specification in ETAD-DLR- DD-0009 Processor Configuration Description-Document Issue 1.5. References: RDBADF: RDBADF-129

#### Instrument Timing Calibration (AUX\_ITC)

ADF	Update Reason
S1A_AUX_ITC_V20160627T000000_G20221003T125859.SAFE	First version of the S-1A AUX ITC prepared by SAR-MPC for the SETAP-IPF. This calibration product

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	provides Sentinel-1A specific azimuth and range timing correction values for the generation of S-1 ETAD products. According to the timing offset calibration status as of August 2022 the correction values are uniform over beams and polarizations. According to the validity date this AUX ITC product is applicable for S-1A data acquired after the S-1A antenna tile #11 event on 2016-06-27. The AUX ITC is specified in ETAD- DLR-DD-0004 Input/Output Description Document Issue 2.2. References: RDBADF: RDBADF-130
\$1A_AUX_ITC_V20160627T000000_G20230330T093840.SAFE	First version of the operational S-1A AUX ITC prepared by SAR-MPC for SETAP-IPF. This calibration product provides Sentinel-1A specific azimuth and range reference timing correction values and the beam and polarization dependent time offset values for the generation of S-1 ETAD products. According to the timing offset calibration status as of August 2022 the offset values are set to zero. The AUX ITC is specified in ETAD- DLR-DD-0009 Processor Configuration Description Document, Issue 1.6.
S1A_AUX_ITC_V20160627T000000_G20230406T084701.SAFE	Operational S-1A AUX ITC prepared by SAR-MPC for SETAP-IPF. This calibration product provides updated Sentinel-1A specific range and azimuth reference timing correction values for the generation of S-1 ETAD products. The value in / was changed from 1.1281e-09 to 7.4103e-10 seconds. The value in / was changed from 1.2873e-05 to 6.3522e-06 seconds.

## Simulated Cross Spectra ADF (AUX\_SCS)

ADF	Update Reason



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S1AUX_SCS_V20140402T000000_G20160413T103855.SAFE	Introduction of AUX_SCS. Related to RDB#1.
S1AUX_SCS_V20140616T133700_G20160413T104849.SAFE	Introduction of AUX_SCS. Related to RDB#2.
S1AUX_SCS_V20140908T000000_G20160413T105124.SAFE	Introduction of AUX_SCS. Related to RDB#3.
S1AUX_SCS_V20150519T120000_G20160413T105253.SAFE	Introduction of AUX_SCS. Related to RDB#4.
S1AUX_SCS_V20150722T120000_G20160413T105410.SAFE	Introduction of AUX_SCS. Related to RDB#5.
S1AUX_SCS_V20171017T080000_G20171016T150910.SAFE	Update of ADF to be compliant with RDB#6.
S1AUX_SCS_V20140406T133000_G20200623T142050.SAFE	This new AUX_SCS files was specifically developed to accompany a modification of the MTF (Modulation Transfer Function) estimated in the Level-2 Ocean Processor (LOP) in the ocean swell processing on IPF 3.30. This modification was performed to remove the several ad-hoc tunings applied to the initial MTF and to also propose a better compensation of the ocean wave spectral energy with respect to the ocean surface wind speed.
<u>S1AUX_SCS_V20210622T130000_G20210621T100158.SAFE</u>	This version of the AUX_SCS embeds a new tunned version of the Real Aperture Radar Modulation Transfer Function (RAR MTF), specific to the optimised WV2 antenna configuration. This AUX_SCS impacts only WV2, and support the upgrade of RDB configuration (S1A RDB#7, S1B RDB#2).

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## Appendix E: S-1A Quality Disclaimers

Number	Description	Start Validity Date	End Validity Date	Issue Status
1	S1A_WV_SLC_1S products filled with	2014-09-30	2014-10-03	Issued
	zero (black products)	15:17:26 UT	03:34:01 UT	
2	Failure on tile amplifier #5 of the	2014-10-18	2015-01-20	Issued
	receiving antenna	15:29:30 UT	19:04:54 UT	
3	Level 1 products processed with	2014-09-30	2014-10-03	Issued
	incorrect gains	15:17:26 UT	04:07:54 UT	
4	Incorrect Cycle Number and	2014-12-09	2015-01-21	Issued
	Relative orbit number in products processed in PAC2/DPA	11:45:25 UT	03:53:00 UT	
5	Failure on Tile amplifier #5 of the	2015-03-18	2015-03-20	Issued
	receiving antenna from 18/03/2015 and 20/03/2015	04:09:00 UT	11:46:30 UT	
6	Failure on Tile amplifier #5 of the	2015-03-26	2015-03-28	Issued
	receiving antenna from 26/03/2015 to 28/03/2015	16:20:00 UT	02:50:30 UT	
7	Failure on Tile amplifier #5 of the	2015-04-18	2015-04-24	Issued
	receiving antenna from 18/04/2015 to 24/04/2015	17:40:21 UT	17:48:08 UT	
8	Failure on Tile amplifier #5 of the	2015-04-25	2015-04-30	Issued
	receiving antenna from 25/04/2015 to 30/04/2015	17:37:37 UT	23:01:11 UT	
9	Failure on Tile amplifier #5 of the	2015-05-05	2015-05-06	Issued
	receiving antenna from 05/05/2015 to 06/05/2015	05:12:51 UT	00:44:43 UT	
10	Denoising vectors not qualified	2014-10-03	2015-07-03	Issued
		00:00:00 UT	06:33:15 UT	
11	S-1 L2 OCN product preliminary	2015-07-02	2030-01-01	Issued
	qualified	00:31:03 UT	00:00:00 UT	
12	Failure of TRM #5 between 2015-05-	2015-05-26	2015-05-27	Issued
	26 and 2015-05-27.	21:10:28 UT	05:53:00 UT	
13	Failure of TRM #5 between 2015-06-	2015-06-06	2015-07-14	Issued
	06 and 2015-07-14	06:44:28 UT	07:50:55 UT	
14	Invalid radiometric calibration of	2015-03-19	2015-07-03	Issued
45	WV L1 and L2 products	02:29:22 UT	08:09:02 UT	la su sa d
15	Failure of TRM #5 from 2015-07-17	2015-07-17	2015-07-21	Issued
47	to 2015-07-21	18:58:56 UT	12:04:57 UT	laava d
16	Invalid Orbit Number at UPA -	2014-10-03	2014-10-10	Issued
17	before 2014-10-10 Incorrect Cycle Number in S1-A	00:00:00 UT 2016-01-26	06:28:50 UT 2016-02-04	lowed
17	Products acquired between	2016-01-26 21:17:42 UT	16:29:59 UT	Issued
10	26/01/2016 and 04/02/2016.			
18	Invalid annotation of NSSDC identifier of Sentinel-1A between	2014-09-30 15:17:26 UT	2016-07-05 10:16:00 UT	Issued
21	April 2014 and July 5th 2016 Issue on geolocation of Sentinel-1A	2016-05-11	2016-08-22	Issued
۲۱	SM SLC products with IPF v2.71	2018-05-11 21:02:59 UT	21:35:50 UT	135000
22	Invalid annotation of SSPPDU in the manifest of S-1A products	2014-09-30 15:17:26 UT	2019-04-17 06:30:03 UT	Issued
24	Incorrect Cycle Number in S1-A	2017-01-12	2017-01-24	Issued
27	Products acquired between 12/01/2017 and 24/01/2017	00:18:59 UT	06:52:28 UT	135000

The following Quality Disclaimers have been prepared since the S1-A launch:

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26	S-1A products processed with invalid	2017-09-06	2017-09-07	Issued
	Restituted Orbit Files (AUX_RESORB)	18:57:47 UT	08:07:45 UT	
20	between 2017-09-06 and 2017-09-07	2045 44 24	2019 02 42	Janu - J
28	S-1A L2 OCN products provide	2015-11-24	2018-03-13	Issued
	reverse OSW wind direction respect to the specification	12:03:51 UT	02:30:17	
30	Issue on the noise vector annotation	2018-03-13	2018-03-15	Issued
	of S-1A products generated from	01:00:42 UT	14:01:26 UT	
	LON with updated content			
32	S-1A mis synchronisation with	2015-05-17	2015-05-18	Issued
	impact on azimuth bandwidth	00:03:40 UT	23:14:45 UT	
	synchronisation for InSAR			
	applications			
33	S-1A products processed without	2018-03-21	2018-03-22	Issued
	Restituted Orbit Files (AUX_RESORB)	21:42:52 UT	07:33:09 UT	
35	between 2018-03-21 and 2018-03-22 S-1A products processed without	2018-04-08	2018-04-11	Issued
55	Restituted Orbit Files (AUX_RESORB)	18:58:39 UT	16:20:49 UT	135000
	between 2018-04-08 and 2018-04-11	10.30.37 01	10.20.77 01	
37	S1A denoising vectors for Strip Map	2018-03-13	2018-06-21	Issued
	products were not properly	11:54:53 UT	18:53:32 UT	
	calibrated after IPF 2.90			
	deployment			
38	S-1A products processed without	2018-07-07	2018-07-09	Issued
	Restituted Orbit Files (AUX_RESORB)	11:49:47	03:34:48	
40	between 2018-07-07 and 2018-07-09 S-1A products processed without	2018-09-20	2018-09-20	logued
40	Restituted Orbit Files (AUX_RESORB)	10:41:03	16:15:34	Issued
	on 2018-09-20	10.41.05	10.13.34	
42	Test of the new S-1A antenna	2019-02-28	2019-03-12	Issued
	configuration, aiming improvement	09:42:51	00:00:00	
	of WV2 performances			
43	S-1A Products generated without	2019-04-18	2019-04-10	Issued
	AUX_RESORB between 10 April 14:00	15:20:30	12:37:43	
	UTC to 11 April 07:00 UTC 2019			
46	Products have been wrongly generated as S1B instead of S1A on	2019-08-20	2019-08-20	Issued
	20th August 2019	05:33:56	13:42:08	
47	S-1A Products generated without	2019-07-18	2019-07-18	Issued
	AUX_RESORB on 19th July 2019	22:52:54	23:55:52	
49	S-1A Products generated without	2019-09-12	2019-09-12	Issued
	AUX_RESORB on 12th September	05:47:48	05:54:28	
	2019	20/2 22 21		<u> </u>
50	S-1A Products generated without	2019-08-31	2019-08-31	Issued
51	AUX_RESORB on 31th August 2019 S-1A Products generated without	18:26:10 2019-11-13	23:16:23 2019-11-13	Issued
JI	AUX_RESORB on 13th November	07:04:23	12:54:52	issueu
	2019	07.07.23	12.J7.J2	
52	S-1A Products generated without	2020-01-06	2020-01-06	Issued
	AUX_RESORB on 06 January 2020	12:29:32	13:33:35	
53	S-1A OCN Products generated with	2020-03-10	2020-03-11	Issued
	missing wind information (OWI)	18:41:02	23:49:57	
	content on 11th March 2020	2022 22 22		<u> </u>
55	S-1A radiometric jumps on S1A IW	2020-03-08	2020-03-08	Issued
56	products on 08/03/2020 S-1A issue on the WV OCN: anomaly	17:35:11	17:36:01	laund
00	on swell spectrum energy with IPF	2020-06-22	2020-07-02	Issued
	3.3x	20:17:50	02:00:46	
58	Phase artefacts for products	2015-11-13	2016-04-13	Issued
	acquired over region with strong	23:40:21	10:04:58	
	variations of terrain height in range			
	direction	1		

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59	S-1A products on a same datatake processed with different processing	2015-03-23 17:14:52	2019-06-18 17:14:49	Issued
#60	configuration S-1A products containing data gaps	2021-01-18 16:46:17	2021-01-31 15:49:44	Issued
#62	Bias in OSW Wind Speed measurement for S-1A WV1 between 12th May 2020 and 23rd June 2020	2020-05-12 10:18:41	2020-06-23 01:38:51	Issued
#64	Bias in OSW Wind Speed measurement for S-1A WV2 starting from 12th May 2020 2020	2020-05-12 10:18:41	2030-01-01 00:00:00	Issued
#66	Bias in radiometric calibration of S1- A WV products acquired before 12th May 2020	2014-09-30 15:17:26	2020-05-12 10:18:41	Issued
#68	S-1A products generated without orbit file between 31/07/2021 and 02/08/2021	2021-07-29 23:11:10	2021-08-08 17:03:56	Issued
#70	S-1A products generated with inconsistent processing configuration following the IPF3.40 deployment	2021-11-03 03:43:32	2021-11-03 10:33:59	Issued
#72	For some IW products, a far range part of IW3 sub swath is missing	2014-10-14 09:10:48	2015-06-26 07:54:00	Issued
#73	S-1A Products processed without using orbit file	2021-03-25 00:00:00	2021-12-14 03:51:31	Issued
#75	S-1A Level 2 OCN products not containing the OWI (gridded wind field) and OSW (Swell) information	2021-12-12 23:57:58	2021-12-14 11:12:43	Issued
#77	Invalid Burst ID for some S-1A products	2021-11-02 23:07:50	2030-01-01 00:00:00	Issued
#79	Invalid annotation of acquisition anxTime for some S1-A RAW products	2014-09-30 15:17:26	2030-01-01 00:00:00	Issued
#81	S-1A OCN products with invalid xsd files	2022-03-23 07:50:46	2022-05-12 08:15:27	Issued
#82	S-1A Products generated without POD orbit file	2022-02-22 14:47:17	2022-02-25 13:16:37	Issued
#83	S-1A Products generated without POD orbit file	2022-03-02 12:11:35	2022-03-06 23:57:54	Issued
#84	S-1A products processed without using POD orbit file	2021-07-29 23:11:10	2021-08-08 17:03:56	Issued
#86	Sentinel-1A swell inversion (OCN/OSW processing) performed using invalid a priori wind speed and direction	2022-04-08 00:00:00	2022-05-12 08:25:01	Issued
#87	Auxiliary product information not properly projected on the SAR image, leading to major degradation of OCN measurements	2022-03-23 07:50:46	2022-05-12 08:25:01	lssued
#88	The Sentinel-1A StripMap OCN products are not operationally qualified	2014-10-04 02:43:30	2030-01-01 00:00:00	Issued

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# <b>9</b> 0	S-1A Range shifts of denoising vectors for GRDM, GRDH and OCN products	2014-09-30 15:17:26	2022-03-23 10:25:10	Issued
<b>#92</b>	S-1A: Invalid POD orbit files used during the processing	2022-05-11 21:46:04	2022-05-12 13:15:58	Issued
<b>#9</b> 3	S-1A: Invalid POD orbit files used during the processing	2022-05-16 14:18:30	2022-05-17 06:40:32	Issued
#94	Sentinel-1A OCN products crossing Greenwich meridian with no OWI information and issue on rvlNrcs	2022-04-08 04:56:57	2022-05-12 08:25:01	Issued
#95	S-1A products with invalid data due to downlink issue through EDRS-C	2022-01-19 21:59:30	2022-02-18 18:08:52	Issued
#96	Degraded geolocation accuracy due to degraded AUX_PREORB	2022-10-12 10:56:30	2022-10-16 07:10:09	Issued
<i>#</i> 97	Degraded geolocation accuracy due to degraded AUX_RESORB	2022-10-09 19:40:25	2022-10-15 22:05:46	Issued
#98	Product degradations due to acquisition during Orbit Control on 2022-10-18	2022-10-18 10:53:03	2022-10-18 20:54:23	Issued
#99	S-1A Products with RFI degradation acquired between 2014-09-15 and 2022-03-31	2014-09-15 00:00:00	2022-04-01 00:00:00	Issued
#101	Products with residual RFI degradation acquired in April 2022	2022-04-01 00:00:00	2022-05-01 00:00:00	Issued
#102	Products with residual RFI degradation acquired in May 2022	2022-05-01 00:00:00	2022-06-01 00:00:00	Issued
#103	Products with residual RFI degradation acquired in June 2022	2022-06-01 00:00:00	2022-07-01 00:00:00	Issued
#104	Products with residual RFI degradation acquired in July 2022	2022-07-01 00:00:00	2022-08-01 00:00:00	Issued
#105	Products with residual RFI degradation acquired in August 2022	2022-08-01 00:00:00	2022-09-01 00:00:00	Issued
#106	Products with residual RFI degradation acquired in September 2022	2022-09-01 00:00:00	2022-10-01 00:00:00	Issued
#107	Products with residual RFI degradation acquired in October 2022	2022-10-01 00:00:00	2022-11-01 00:00:00	Issued
#108	Products with residual RFI degradation acquired in November 2022	2022-11-01 00:00:00	2022-12-01 00:00:00	Issued
#109	Products with residual RFI degradation acquired in December 2022	2022-12-01 00:00:00	2023-01-01 00:00:00	Issued
#110	Products with residual RFI degradation acquired in January 2023	2023-01-01 00:00:00	2023-02-01 00:00:00	Issued
#111	S-1A products generated without POD orbit files	2023-02-01 05:25:50	2023-02-01 22:39:24	Issued
#112	Products with residual RFI degradation acquired in February 2023	2023-02-01 00:00:00	2023-03-01 00:00:00	Issued

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#113	Products with residual RFI degradation acquired in March 2023	2023-03-01 00:00:00	2023-04-01 00:00:00	Issued
#114	Products with residual RFI degradation acquired in April 2023	2023-04-01 00:00:00	2023-05-01 00:00:00	Issued
#115	Invalid burst ID annotations (S1A IW/EW SLC in cycles 245 to 258)	2021-11-05 17:10:59	2022-04-10 18:51:34	Issued
#117	S1A TOPS SLC Range Denoising Vector range annotation	2014-10-03 03:34:01	2030-01-01 00:00:00	Issued
#119	S-1A WV SLC annotated noise vectors were improperly calibrated with IPF 2.9x	2018-03-13 00:34:07	2019-06-25 22:58:06	Issued
#121	Invalid burst ID annotations (S1A IW/EW SLC in cycle 259)	2022-04-15 10:56:21	2022-04-27 06:20:22	Issued
#122	Invalid burst ID annotations (S1A IW/EW SLC in cycle 260)	2022-04-27 18:59:41	2022-05-08 07:05:09	Issued
#123	Invalid burst ID annotations (S1A IW/EW SLC in cycle 261)	2022-05-09 18:59:42	2022-05-20 14:29:26	Issued
#124	Invalid burst ID annotations (S1A IW/EW SLC in cycle 262)	2022-05-21 18:59:43	2022-05-29 06:32:40	Issued
#125	Invalid burst ID annotations (S1A IW/EW SLC in cycle 263)	2022-06-02 18:59:44	2022-06-09 18:51:37	Issued
#126	Invalid burst ID annotations (S1A IW/EW SLC in cycle 264)	2022-06-14 18:59:45	2022-06-25 12:00:01	Issued
#127	Invalid burst ID annotations (S1B IW SLC in cycles 175 to 179)	2021-11-04 09:50:37	2021-12-22 18:59:00	Issued
#128	Invalid burst ID annotations (S1A IW/EW SLC in cycle 265)	2022-06-26 18:59:46	2022-07-06 15:54:48	Issued
#129	Invalid burst ID annotations (S1A IW/EW SLC in cycle 266)	2022-07-08 18:59:46	2022-07-17 07:12:49	Issued
#130	Invalid burst ID annotations (S1A IW/EW SLC in cycle 267)	2022-07-20 18:59:47	2022-07-30 11:16:51	Issued
#131	Invalid burst ID annotations (S1A IW/EW SLC in cycle 268)	2022-08-01 18:59:48	2022-08-08 18:51:41	Issued
#132	Invalid burst ID annotations (S1A IW/EW SLC in cycle 269)	2022-08-13 10:56:29	2022-08-20 18:51:42	Issued
#133	Invalid burst ID annotations (S1A IW/EW SLC in cycle 270)	2022-08-25 18:59:49	2022-09-04 19:08:22	Issued
#134	Invalid burst ID annotations (S1A IW/EW SLC in cycle 271)	2022-09-10 10:25:51	2022-09-11 07:45:35	Issued
#135	Invalid burst ID annotations (S1A IW/EW SLC in cycle 272)	2022-09-18 10:56:30	2022-09-25 07:42:53	Issued
#136	Invalid burst ID annotations (S1A IW/EW SLC in cycle 273)	2022-10-07 10:48:19	2022-10-09 07:12:53	Issued
#137	Invalid burst ID annotations (S1A IW/EW SLC in cycle 274)	2022-10-14 10:41:14	2022-10-23 14:30:24	Issued

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#IJ7	degraded orbit files due to solar activity	02:30:48	07:42:56	133000
#158 #159	Invalid burst ID annotations (S1A IW/EW SLC in cycle 293) Products processed using	2023-05-27 19:48:20 2023-01-15	2023-06-04 07:29:17 2023-07-22	Issued
#157	Invalid burst ID annotations (S1A IW/EW SLC in cycle 292)	2023-05-20 05:25:51	2023-05-27 15:05:12	Issued
#156	Invalid burst ID annotations (S1A IW/EW SLC in cycle 291)	2023-05-04 12:33:54	2023-05-14 07:58:59	Issued
#155	Products with residual RFI degradation acquired in June 2023	2023-05-01 00:00:00	2023-06-01 00:00:00	Issued
#154	Products with residual RFI degradation acquired in May 2023	2023-05-01 00:00:00	2023-06-01 00:00:00	Issued
#153	Invalid burst ID annotations (S1A IW/EW SLC in cycle 290)	2023-04-21 19:48:18	2023-04-23 06:40:57	Issued
#152	Invalid burst ID annotations (S1A IW/EW SLC in cycle 289)	2023-04-14 07:04:38	2023-04-21 15:05:10	Issued
#151	Invalid burst ID annotations (S1A IW/EW SLC in cycle 288)	2023-03-30 11:35:13	2023-04-09 10:21:28	Issued
#150	Invalid burst ID annotations (S1A IW/EW SLC in cycle 287)	2023-03-16 19:48:17	2023-03-26 08:58:00	Issued
#149	Invalid burst ID annotations (S1A IW/EW SLC in cycle 286)	2023-03-04 19:48:18	2023-03-16 11:54:01	Issued
#148	Invalid burst ID annotations (S1A IW/EW SLC in cycle 285)	2023-02-23 10:41:09	2023-03-04 15:05:10	lssued
#147	Invalid burst ID annotations (S1A IW/EW SLC in cycle 284)	2023-02-09 22:18:18	2023-02-19 09:53:00	lssued
#146	Invalid burst ID annotations (S1A IW/EW SLC in cycle 283)	2023-01-28 01:36:49	2023-02-04 07:29:15	lssued
#145	Invalid burst ID annotations (S1A IW/EW SLC in cycle 282)	2023-01-20 03:55:12	2023-01-27 12:00:02	Issued
#144	Invalid burst ID annotations (S1A IW/EW SLC in cycle 281)	2023-01-06 10:41:11	2023-01-15 08:40:20	Issued
#143	Invalid burst ID annotations (S1A IW/EW SLC in cycle 280)	2022-12-23 10:56:28	2022-12-25 07:21:02	Issued
#142	Invalid burst ID annotations (S1A IW/EW SLC in cycle 279)	2022-12-16 07:45:33	2022-12-18 09:17:55	Issued
#141	Invalid burst ID annotations (S1A IW/EW SLC in cycle 278)	2022-12-02 06:23:27	2022-12-04 07:59:03	Issued
#140	Invalid burst ID annotations (S1A IW/EW SLC in cycle 277)	2022-11-18 06:39:57	2022-11-20 06:24:31	Issued
#139	Invalid burst ID annotations (S1A IW/EW SLC in cycle 276)	2022-11-04 19:48:21	2022-11-13 10:08:51	Issued
#138	Invalid burst ID annotations (S1A IW/EW SLC in cycle 275)	2022-10-24 01:36:52	2022-11-04 15:05:13	Issued

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#160	Invalid burst ID annotations (S1A IW/EW SLC in cycle 294)	2023-06-09 01:36:51	2023-06-18 07:12:52	Issued
#161	Products with residual RFI degradation acquired in July 2023	2023-07-01 00:00:00	2023-08-01 00:00:00	Issued
#162	Products with residual RFI degradation acquired in August 2023	2023-08-01 00:00:00	2023-09-01 00:00:00	Issued
#163	Invalid burst ID annotations (S1A IW/EW SLC in cycle 295)	2023-06-22 21:18:55	2023-07-02 08:40:23	Issued
#164	Invalid burst ID annotations (S1A IW/EW SLC in cycle 296)	2023-07-08 07:44:54	2023-07-14 14:29:32	Issued
#165	Invalid burst ID annotations (S1A IW/EW SLC in cycle 297)	2023-07-14 19:48:23	2023-07-23 10:08:53	Issued
#166	Invalid burst ID annotations (S1A IW/EW SLC in cycle 298)	2023-07-28 21:18:58	2023-08-07 05:18:45	Issued
#167	Products processed using degraded orbit files due to solar activity (26 July 2023 to 03 September 2023 included)	2023-07-26 10:15:54	2023-09-03 13:12:46	lssued
#168	Invalid burst ID annotations (S1A IW/EW SLC in cycle 299)	2023-08-08 05:58:53	2023-08-19 14:30:24	Issued
#169	Invalid burst ID annotations (S1A IW/EW SLC in cycle 300)	2023-08-20 01:36:56	2023-08-27 07:29:22	Issued
#170	Invalid burst ID annotations (S1A IW/EW SLC in cycle 301)	2023-09-01 10:56:35	2023-09-10 08:58:08	Issued
#171	Invalid burst ID annotations (S1A IW/EW SLC in cycle 302)	2023-09-14 21:19:00	2023-09-24 08:40:28	Issued
#172	Products with residual RFI degradation acquired in September 2023	2023-09-01 00:00:00	2023-10-01 00:00:00	Issued
#173	Degraded radiometric calibration due to acquisition close to a manoeuvre	2023-09-20 22:00:48	2023-09-20 22:01:18	Issued
#174	S-1A Products generated without POD orbit files	2023-10-04 04:46:41	2023-10-04 07:29:28	Issued
#175	Invalid burst ID annotations (S1A IW/EW SLC in cycle 303)	2023-09-29 05:25:16	2023-10-06 15:05:19	Issued
#176	Products processed using degraded orbit files due to solar activity (12 September 2023 to 09 October 2023 included)	2023-09-12 05:17:43	2023-10-09 18:46:09	lssued
#177	Invalid burst ID annotations (S1A IW/EW SLC in cycle 304)	2023-10-06 19:48:27	2023-10-15 06:32:51	Issued
#177	Invalid burst ID annotations (S1A IW/EW SLC in cycle 304)	2023-10-06 19:48:27	2023-10-15 06:32:51	Issue
#179	Products with residual RFI degradation acquired in October 2023	2023-10-01 00:00:00	2023-11-01 00:00:00	Issue
#180	Invalid burst ID annotations (S1A IW SLC in cycle 305)	2023-10-19 23:37:55	2023-10-30 16:22:17	Issue

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#199	Products processed using degraded orbit files due to solar	2024-01-21 08:04:05	2024-01-23 07:51:03	Issue
#198	Invalid burst ID annotations (S1A IW SLC in cycle 315)	2024-02-16 23:37:51	2024-02-27 16:22:13	Issue
#197	Products processed using degraded orbit files due to solar activity (08 November 2023 to 20 December 2023 included)	2023-11-11 05:17:43	2023-12-18 02:44:26	Issue
#196	Products processed using degraded orbit files due to solar activity (11 October 2023 to 08 November 2023 included)	2023-10-11 05:25:15	2023-11-07 18:53:37	Issue
#195	S-1A products with missing lines with degradation of product performance	2024-01-02 05:08:04	2024-01-31 22:03:55	lssue
#194	Invalid annotation of Stokes drift information in S1A OCN products	2024-02-21 11:04:43	2024-02-22 05:10:29	Issue
#193	Invalid burst ID annotations (S1A IW SLC in cycle 314)	2024-02-04 23:37:51	2024-02-15 16:22:13	Issue
#192	Invalid burst ID annotations (S1A IW SLC in cycle 313)	2024-01-23 23:37:52	2024-02-03 16:22:13	Issue
#191	Products with residual RFI degradation acquired in January 2024	2024-01-01 00:00:00	2024-02-01 00:00:00	lssue
#190	Invalid burst ID annotations (S1A IW SLC in cycle 312)	2024-01-11 23:37:52	2024-01-22 16:22:12	Issue
#189	Invalid burst ID annotations (S1A IW SLC in cycle 311)	2023-12-30 23:37:53	2024-01-10 16:22:14	Issue
#188	Invalid burst ID annotations (S1A IW SLC in cycle 310)	2023-12-18 23:37:53	2023-12-29 16:22:14	Issue
#187	Products with residual RFI degradation acquired in December 2023	2023-12-01 00:00:00	2024-01-01 00:00:00	Issue
#186	Invalid burst ID annotations (S1A IW SLC in cycle 309)	2023-12-06 23:37:54	2023-12-17 16:22:15	Issue
#185	Invalid burst ID annotations (S1A IW SLC in cycle 308)	2023-11-24 23:37:54	2023-12-05 16:22:16	Issue
#184	Products with residual RFI degradation acquired in November 2023	2023-11-01 00:00:00	2023-12-01 00:00:00	lssue
#183	Invalid burst ID annotations (S1A IW SLC in cycle 307)	2023-11-12 23:37:55	2023-11-23 16:22:16	Issue
#182	Invalid denoising vector due to contamination by RFI	2023-01-31 15:55:17	2023-01-31 16:09:35	Issue
#181	Invalid burst ID annotations (S1A IW SLC in cycle 306)	2023-10-31 23:37:55	2023-11-11 16:22:16	Issue

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	activity (20 December 2023 to 23 January 2024 included)			
#200	Products processed using degraded orbit files due to solar activity (23 January 2024 to 25 February 2024 included)	2024-01-25 16:54:51	2024-02-25 20:16:06	Issue
#201	Invalid burst ID annotations (S1A IW SLC in cycle 316)	2024-02-28 23:37:51	2024-03-10 16:22:13	Issue
#202	Products with residual RFI degradation acquired in February 2024	2024-02-01 00:00:00	2024-03-01 00:00:00	Issue
#203	Invalid burst ID annotations (S1A IW SLC in cycle 317)	2024-03-11 23:37:51	2024-03-18 23:29:44	Issue
#204	S-1A products with missing lines with degradation of product performance	2024-02-01 02:26:50	2024-02-29 16:04:33	Issue
#205	S-1A products with missing lines with degradation of product performance	2024-03-01 15:15:52	2024-03-30 21:56:48	Issue
#206	Products with residual RFI degradation acquired in March 2024	2024-03-01 00:22:18	2024-03-31 19:50:34	Issue
#207	Invalid burst ID annotations (S1A IW SLC in cycle 318)	2024-03-23 23:37:51	2024-04-03 16:22:14	Issue
#208	Invalid burst ID annotations (S1A IW SLC in cycle 319)	2024-04-04 23:37:52	2024-04-15 16:22:13	Issue

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## Appendix F: IPF Updates and descriptions

The full list of S1 IPF / SAR Processor together with the description of changes is provided on the SAR MPC web site at following address:

https://sar-mpc.eu/processor/ipf

The table below provides the status of this list at the time of preparation of this report.

delivery	start usage	end usage
2023-10-10 00:00:00	2023-10-19 09:42:00	
2023-03-17 12:00:00	2023-03-30 10:19:46	2023-10-19 09:59:00
2022-05-12 00:00:00	2022-05-12 10:48:19	2023-03-30 09:29:57
2022-03-04 00:00:00	2022-03-23 16:25:31	2022-05-12 09:31:31
2021-10-08 00:00:00	2021-11-04 07:56:32	2022-03-23 12:25:17
2020-06-19 12:00:00	2020-06-30 12:00:00	2021-11-03 11:08:26
2020-03-09 12:00:00	2020-06-23 08:00:00	2020-06-30 12:00:00
2019-12-16 12:00:00	2020-01-29 10:00:00	2020-06-23 08:00:00
2019-06-04 15:00:00	2019-06-26 10:00:00	2020-01-29 10:00:00
2018-05-29 00:00:00	2018-06-26 08:30:00	2019-06-26 10:00:00
2018-01-16 00:00:00	2018-03-13 12:00:00	2018-06-26 08:30:00
2017-07-12 00:00:00	2017-08-22 10:00:00	2018-03-13 12:00:00
2017-02-27 00:00:00	2017-03-28 06:00:00	2017-08-22 10:00:00
2016-07-29 00:00:00	2016-08-23 12:00:00	2017-03-28 12:00:00
2016-04-21 00:00:00	2016-05-11 12:00:00	2016-08-23 12:00:00
2016-03-31 00:00:00	2016-04-13 12:00:00	2016-05-11 12:00:00
2016-02-09 00:00:00	2016-03-14 17:51:00	2016-04-12 14:47
2015-10-09 00:00:00	2015-11-20 12:00:00	2016-04-13 12:00:00
2015-07-12 00:00:00	2015-07-18 17:48:00	2015-11-22 14:35:00
2015-06-30 00:00:00	2015-07-02 12:00:00	2015-11-24 12:00:00
2015-05-15 00:00:00	2015-06-17 14:35:00	2015-07-01 14:23:00
2015-03-09 00:00:00	2015-03-19 00:00:00	2015-07-02 12:00:00
2014-09-15 00:00:00	2014-10-01 13:18:00	2015-03-18 02:49:00
	2023-10-10 00:00:00           2023-03-17 12:00:00           2022-05-12 00:00:00           2022-03-04 00:00:00           2021-10-08 00:00:00           2020-06-19 12:00:00           2019-12-16 12:00:00           2019-06-04 15:00:00           2018-05-29 00:00:00           2017-07-12 00:00:00           2016-07-29 00:00:00           2016-03-31 00:00:00           2015-07-12 00:00:00           2015-07-12 00:00:00           2015-05-15 00:00:00	2023-10-10         2023-10-19         99:42:00           2023-03-17         12:00:00         2023-03-30         10:19:46           2022-05-12         00:00:00         2022-05-12         10:48:19           2022-03-04         00:00:00         2022-03-23         16:25:31           2021-10-08         00:00:00         2021-11-04         07:56:32           2020-06-19         12:00:00         2020-06-30         12:00:00           2019-12-16         12:00:00         2020-06-23         08:00:00           2019-06-04         15:00:00         2019-06-26         10:00:00           2018-05-29         00:00:00         2018-06-26         08:30:00           2017-07-12         00:00:00         2017-08-22         10:00:00           2017-07-12         00:00:00         2017-03-28         06:00:00           2016-07-29         00:00:00         2016-05-11         12:00:00           2016-07-29         00:00:00         2016-03-14         17:51:00           2016-03-31         00:00:00         2015-07-18         17:48:00           2015-07-12         00:00:00         2015-07-18         17:48:00           2015-06-30         00:00:00         2015-07-18         17:48:00           2015-05-15

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#### Appendix G: SETAP Updates and descriptions

The full list of SETAP Processor together with the description of changes is provided on the SAR MPC web site at following address:

https://sar-mpc.eu/processor/setap/

SETAP is used to generate the Extended Timing Annotation Dataset (ETAD) as described here: <a href="https://sentinels.copernicus.eu/ca/web/sentinel/missions/sentinel-1/data-products/etad-dataset">https://sentinels.copernicus.eu/ca/web/sentinel/missions/sentinel-1/data-products/etad-dataset</a>

The table below provides the status of this list at the time of preparation of this report.

version	delivery	start usage	end usage
002.10	2023-07-02 00:00:00	2023-07-21 00:00:00	
002.00	2022-07-14 00:00:00	Products not made available to users	Products not made available to users