S-1 MPC

S1-A N-Cyclic Performance Report - 2016-06
Cycles 81 to 84 (08-Jun-2016 to 26-Jul-2016)

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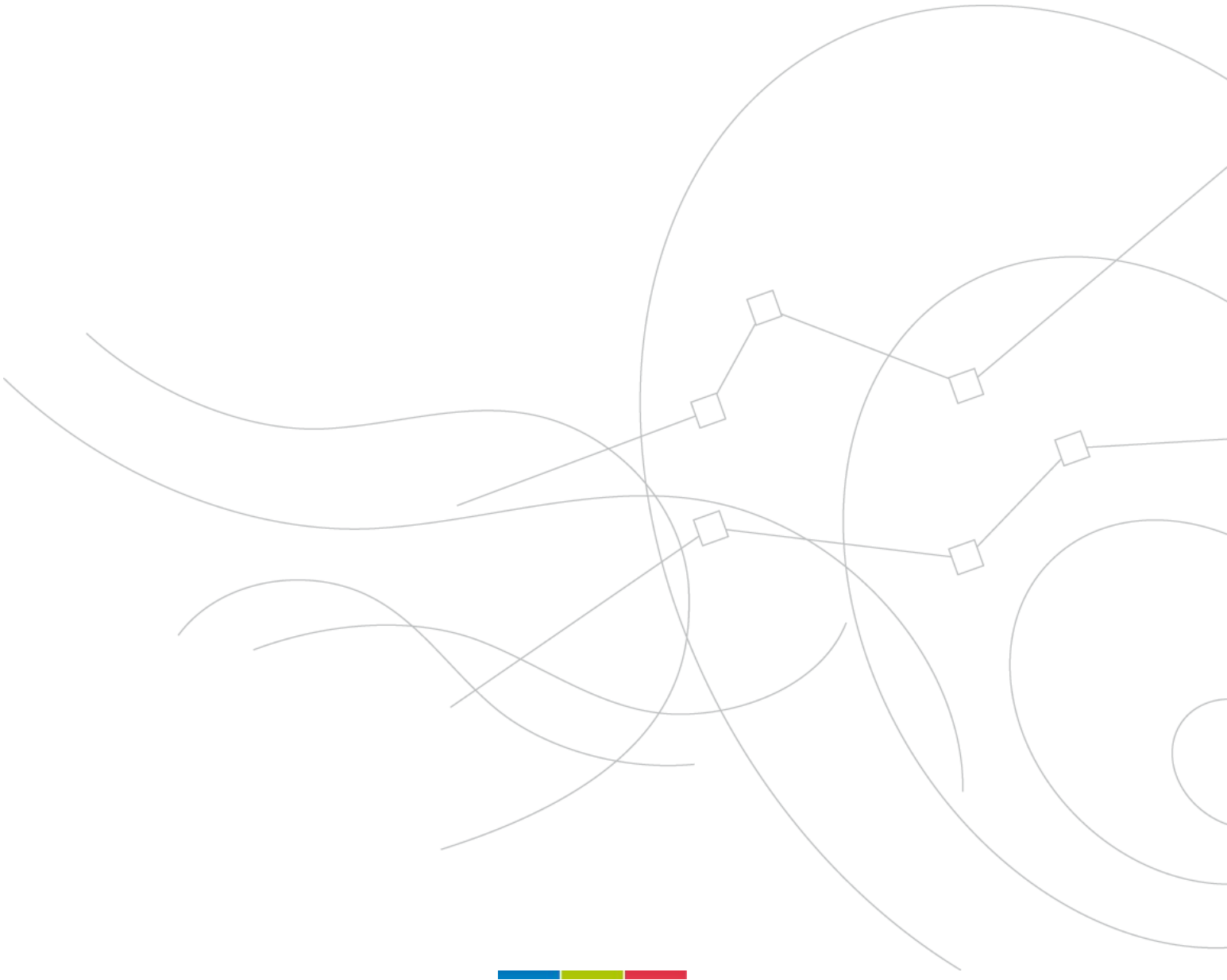
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Applicable documents

Nomenclature	Title	Edition Number	Revision Number
[S1-AD-14]	S1 RS-MDA-52-7441 Sentinel-1 Product Specification	3	2
[S1-AD-15]	S1-RS-MDA-57-7440 Sentinel-1 Product Definition	2	7

Reference documents

None



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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 sensor and product performance for orbit repeat cycle 81 from 8th June to 20th June 2016, cycle 82 from 20th June to 2nd July 2016, cycle 83 from 2nd July to 14th July 2016 and cycle 84 from 14th July to 26th July 2016.

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

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2. Executive Summary

The main topic during cycles 81 to 84 (8th June to 26th July 2016) was the unavailability of Sentinel1-A instrument between 16th and 27th June 2016 due to the issue related to the Tile 11 Transmit/Receive module failures.

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/

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3. Instrument Status

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

3.1. Antenna Status

There were new S1-A antenna transmit/receive module failures during the reporting period.

TRM	Description	Date of Failure
Tile 11, Rows 1 to 10 (Tx H, Tx V)	TPSU-1 failure and reduced TRM power	16 June – 27 June 2016

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

There was no instrument unavailability during the reporting period.

Start Date/Time	End Date/Time	MPC Reference	Summary
11/07/2016 21:32	12/07/2016 12:05	SOB-507	Sentinel-1A Unavailability on 11/07/2016
10/07/2016 06:39	10/07/2016 17:51	SOB-483	Sentinel-1A Unavailability on 10/07/2016
02/07/2016 04:52	02/07/2016 13:23	SOB-476	Sentinel-1A Unavailability on 02/07/2016
17/06/2016 11:45	27/06/2016 16:32	SOB-467	Sentinel-1A Unavailability between 17/06/2016 and 27/06/2016
16/06/2016 16:45	17/06/2016 11:26	SOB-448	Sentinel-1A Unavailability between 16/06/2016 and 17/06/2016
16/06/2016 05:59	16/06/2016 13:57	SOB-447	Sentinel-1A Unavailability on 16/06/2016

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. Level 1 Processor Issues

There were no updates to the Instrument Processing Facility (IPF) during the reporting period – the current IPF is v2.71 which became operational on 11th May 2016.

4.2. Auxiliary Data File Updates

There were no updates to S1-A Auxiliary Data Files (ADFs) during the reporting period. A full list of currently applicable ADF files is given in Appendix D.

Instrument ADF (AUX_INS)

ADF	Update Reason

Table 3 AUX_INS Updates

Calibration ADF (AUX_CAL)

ADF	Update Reason

Table 4 AUX_CAL Updates

L1 Processor Parameters ADF (AUX_PP1)

ADF	Update Reason

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

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5. Manoeuvres

Table 8 gives a list of the S1-A orbit manoeuvres that occurred during the reporting period[1]:

Start Date	Start Time	Stop Date	Stop Time	Comment
09/06/2016	00:36:45.440	09/06/2016	00:36:51.065	
16/06/2016	00:27:57.840	16/06/2016	00:28:30.215	
16/06/2016	01:17:47.832	16/06/2016	01:18:12.332	
23/06/2016	00:27:34.133	23/06/2016	00:27:44.633	
23/06/2016	01:17:03.220	23/06/2016	01:17:08.970	
30/06/2016	00:22:42.980	30/06/2016	00:22:56.355	
30/06/2016	01:12:15.631	30/06/2016	01:12:21.381	
13/07/2016	23:57:48.630	13/07/2016	23:58:18.255	
14/07/2016	00:47:36.207	14/07/2016	00:47:53.332	
20/07/2016	22:05:41.897	20/07/2016	22:08:17.022	
20/07/2016	23:45:44.102	20/07/2016	23:45:52.727	

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}'

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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):-

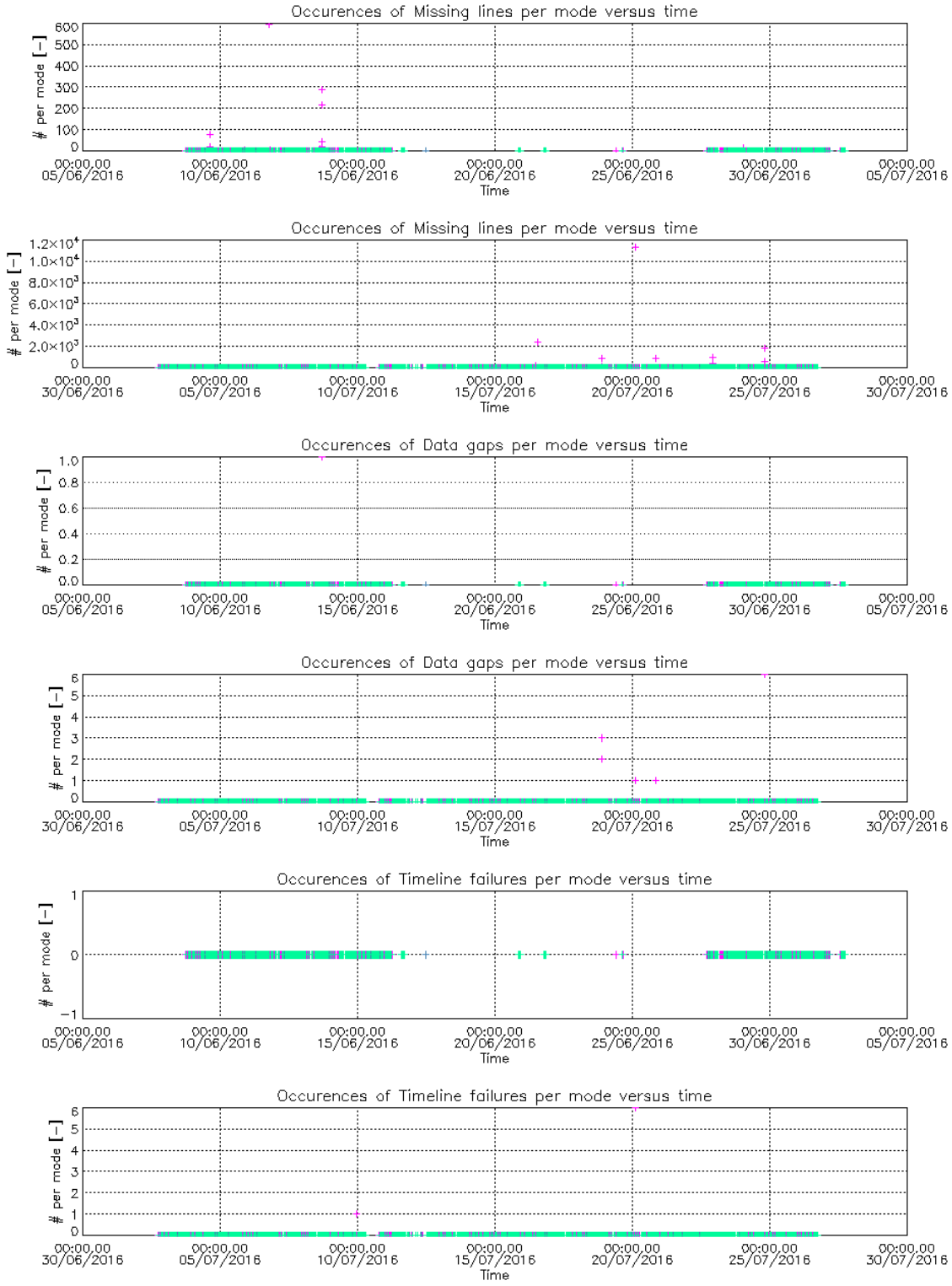


Figure 1 Missing Lines, Data Gaps and Timeline Failures.

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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:

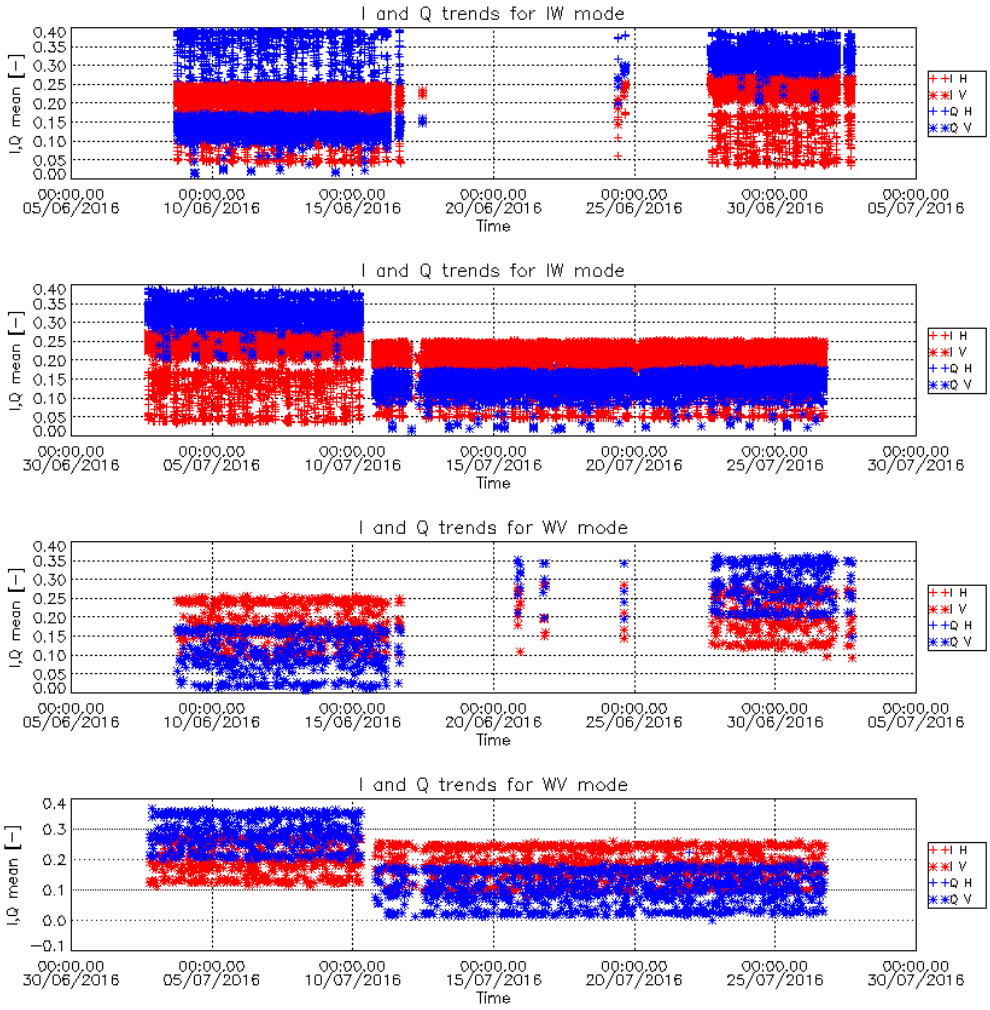
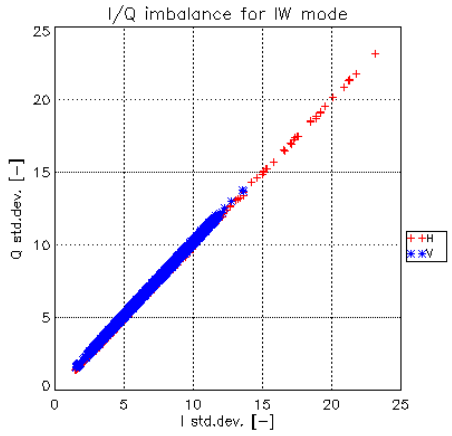
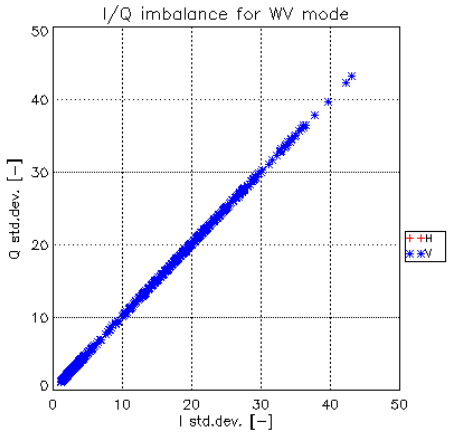


Figure 2 I&Q Channels

The jumps that can 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.



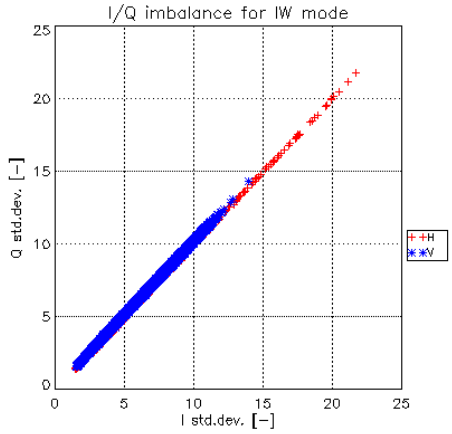
Cycles 81 & 82



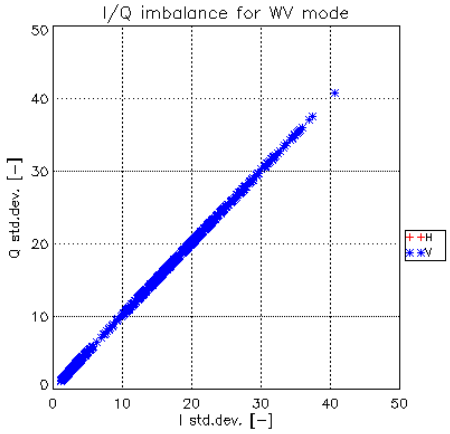
Cycles 81 & 82

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Cycles 83 & 84



Cycles 83 & 84

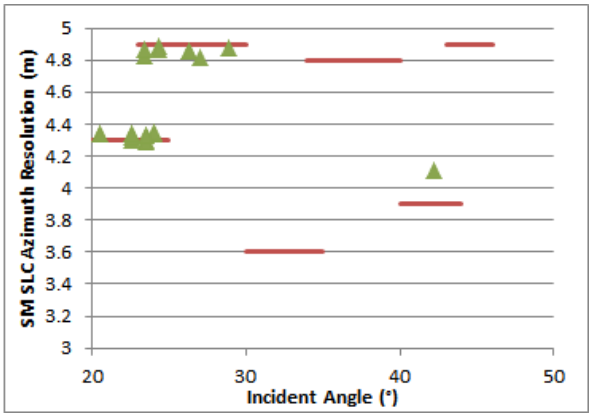
Figure 3 WV I&Q Channel Imbalance

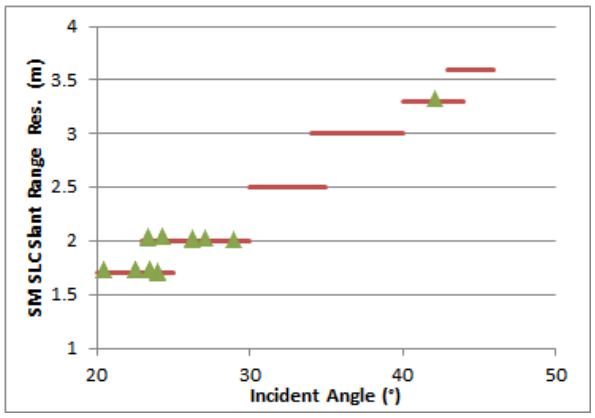
The I & Q imbalance plots in the figure above (*left*: IW mode, *right*: WV mode) indicate that the Rx I and Q channels are perfectly balanced.

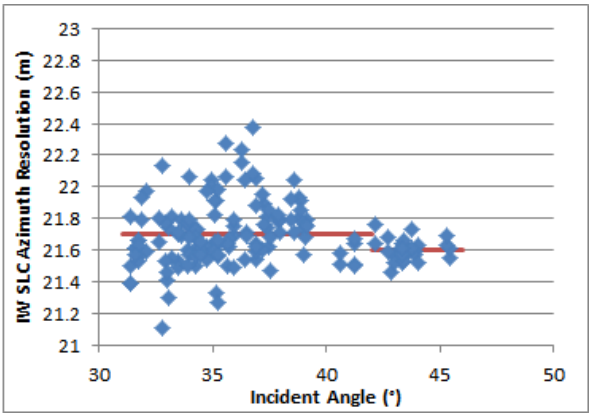
6.2. Level 1 Products

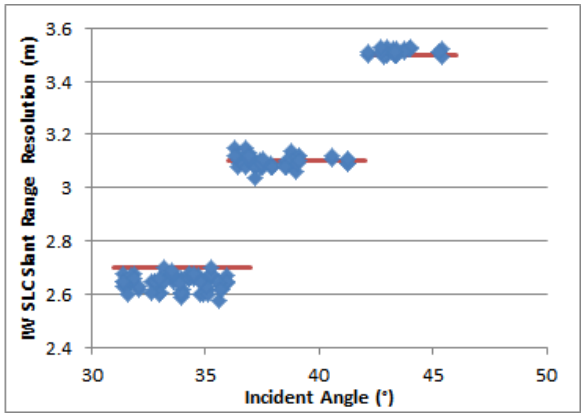
6.2.1. Image Quality

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 SM, IW & EW 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.









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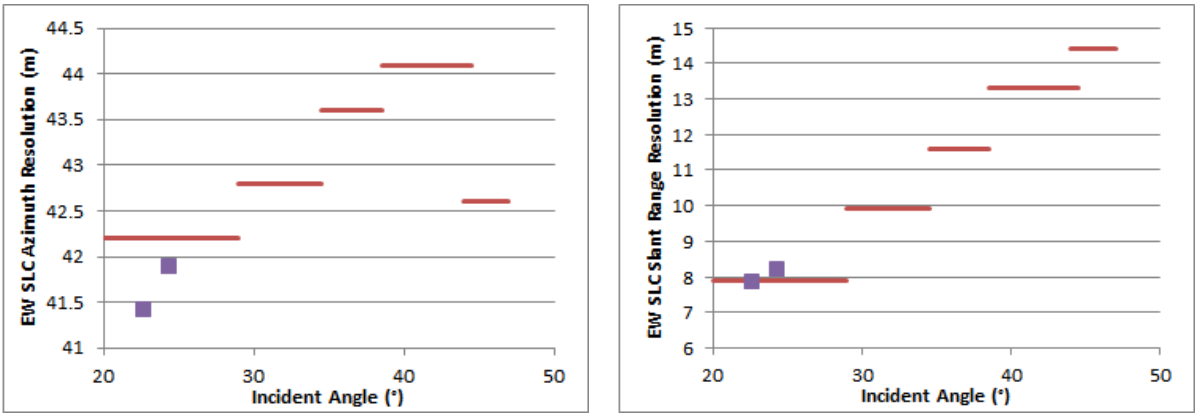


Figure 4 SM, IW & EW Azimuth and Slant Range Spatial Resolutions

Mode/Swath	Azimuth Spatial Resolution (m)	Slant Range Spatial Resolution (m)
S1	4.33±0.03	1.73±0.01
S2	4.86±0.02	2.03±0.01
S5	4.11	3.33
IW1	21.67±0.20	2.65±0.03
IW2	21.78±0.20	3.10±0.02
IW3	21.60±0.07	3.51±0.01
EW1	41.65±0.33	8.02±0.23

Table 9 EW Azimuth and Slant Range Spatial Resolutions

Mode/Swath	Integrated Sidelobe Ratio (dB)	Peak Sidelobe Ratio (dB)	Spurious Sidelobe Ratio (dB)
SM	-13.25±0.41	-20.71±0.39	-27.97±0.58
IW	-11.94±2.94	-19.61±1.26	-23.16±3.89
EW	-4.11±0.16	-17.06±0.40	-13.08±2.20

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

Erreur ! Source du renvoi introuvable. and **Erreur ! Source du renvoi introuvable.** give the relative radar cross-section using the Australian corner reflector array, the BAE corner reflector and the DLR transponders & corner reflectors derived from SM, IW and EW 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).

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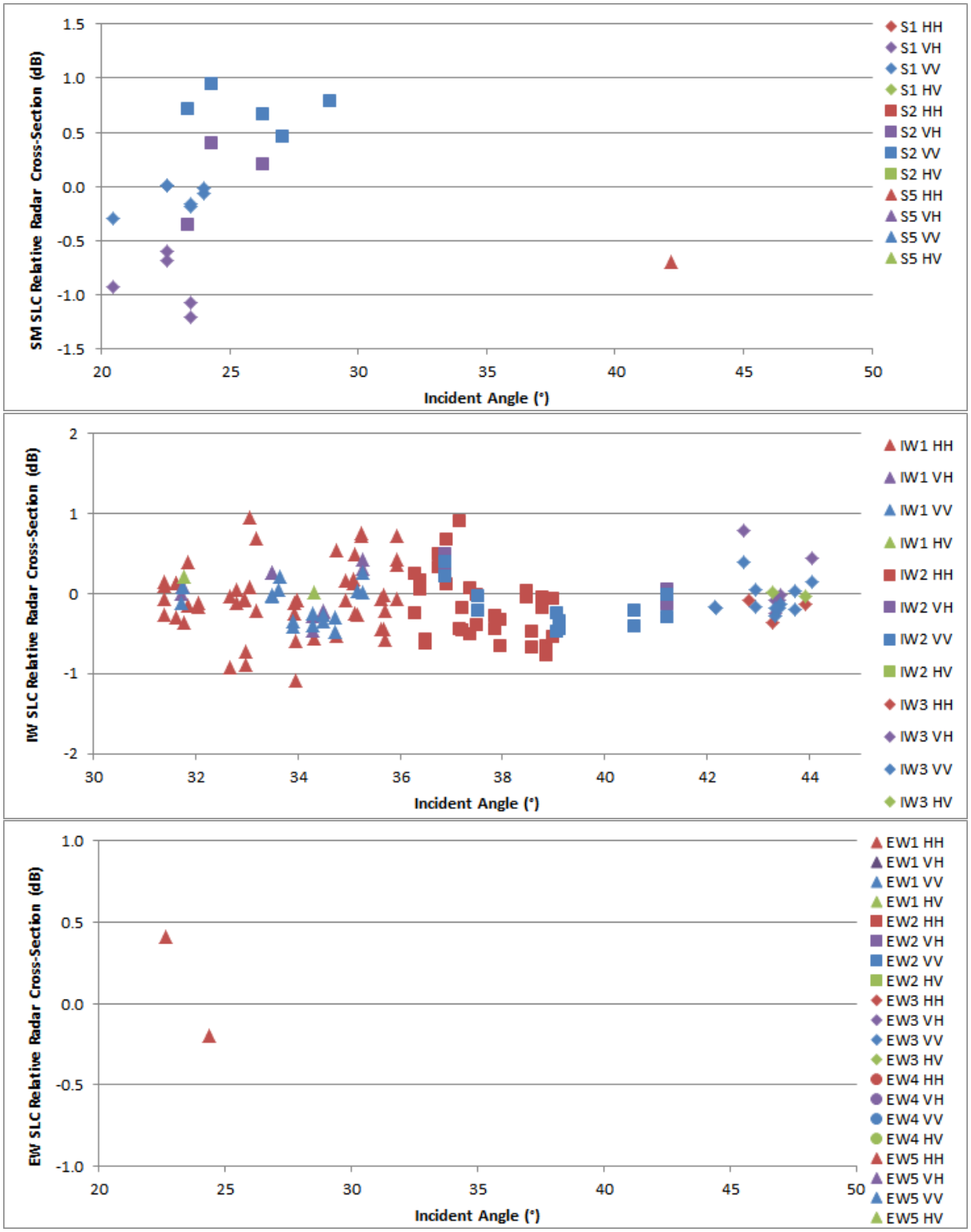


Figure 5 SM, IW & EW Relative Radar Cross-Section

Mode/Swath	Relative Radar Cross-Section (dB)				
	All	HH	VH	VV	HV
S1	-0.43±0.45		-0.90±0.25	-0.10±0.12	
S2	0.48±0.41		0.08±0.39	0.71±0.18	

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S5	-0.70	-0.70			
IW1	-0.06±0.38	-0.06±0.44	0.02±0.30	-0.13±0.23	0.12±0.13
IW2	-0.15±0.38	-0.18±0.41	0.18±0.28	-0.17±0.27	
IW3	-0.05±0.25	-0.19±0.13	0.09±0.38	-0.08±0.19	-0.04±0.06
EW1	0.11±0.43	0.11±0.43			

Table 11 SM, IW & EW Relative Radar Cross-Section

Erreur ! Source du renvoi introuvable. shows the IW long-term relative radar cross-section of the BAE corner reflector since the start of the Sentinel-1A routine phase (October 2014). The mean relative radar cross-section is -0.06±0.18 dB (the majority of the measurements are for VV polarisation).

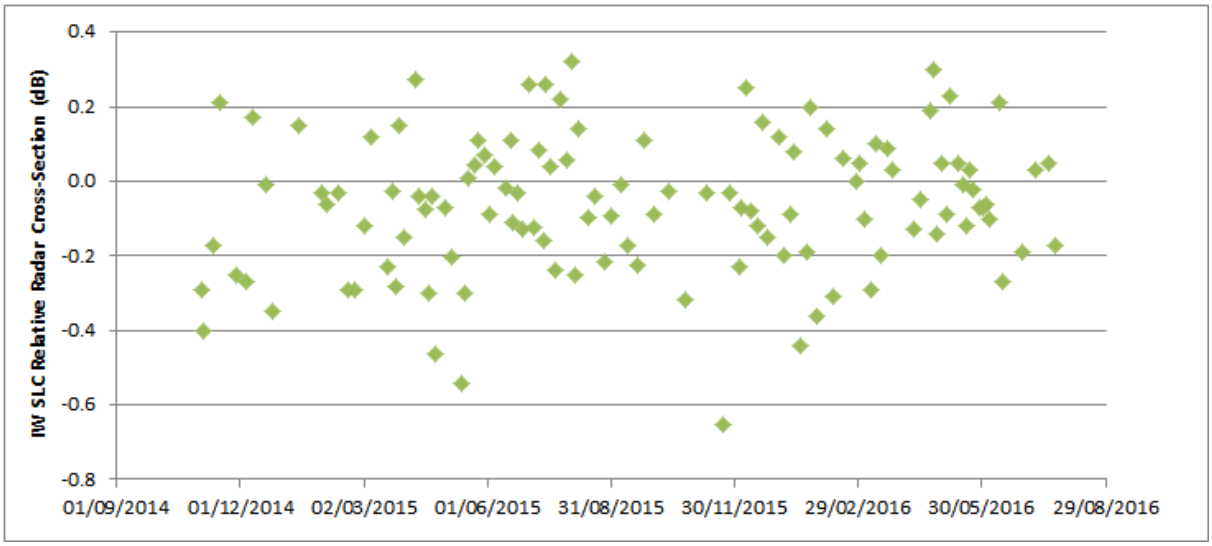


Figure 6 IW Long-Term Relative Radar Cross-Section

Figure 7 show a recent IW VV Permanent Scatter Calibration series over Houston. A drop in the radiometric calibration constant can be noticed during November 2015. This is related to the update of the antenna patterns (AUX_CAL) and of the processing gains (AUX_PP1) within the auxiliary files for IPF 2.60 deployment.

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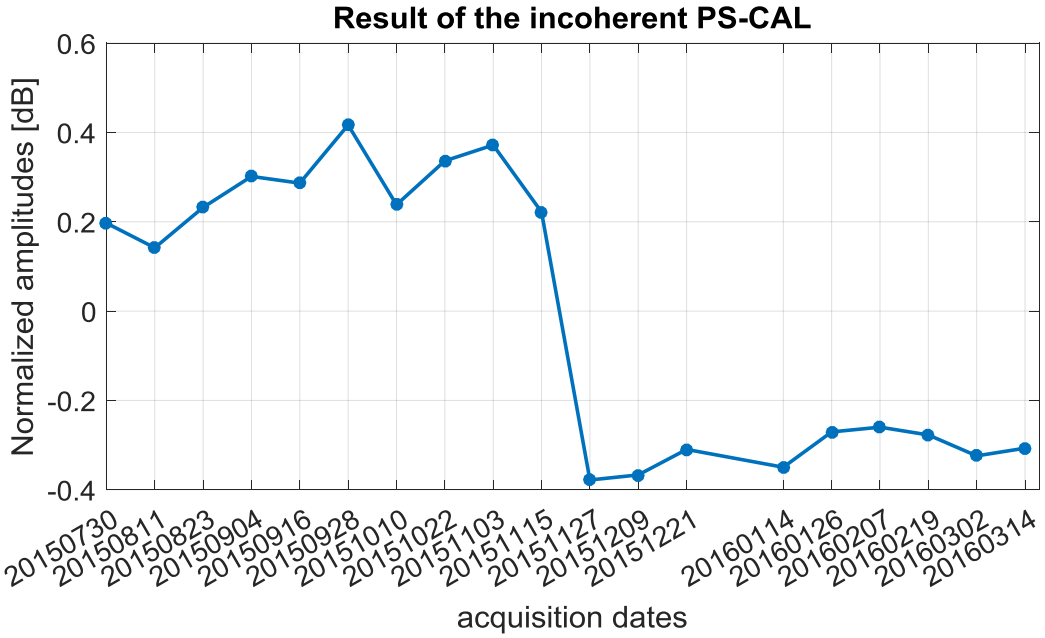


Figure 7 Permanent Scatter Calibration Time Series for TopSAR IW over Houston. The drop in the calibration series corresponds to the update of the AUX_CAL and AUX_PP1 files in November 2015 (IPF 2.60).

6.2.3. Geometric Calibration

Figure 8 shows the absolute localisation error (ALE) based on two SLC products from the IW acquisition mode acquired during the reporting period (two pairs of azimuth-adjacent products). The points have been colour-coded and labelled to reflect the numerical labels assigned to them by Geoscience Australia. The products were analysed using near-real-time restituted orbit files. Atmospheric path delay (PD) and azimuth timing errors (residual error from the bistatic correction made by the IPF) have also been mitigated. Note that PD correction depends on the local incident angle, which is considered here for the individual corner reflectors spanning the over-100km wide array.

As was discussed in previous reports, the corner reflector survey consistency is strongly correlated to survey dates, which suggests that absolute position accuracy of these targets are the main limiting factor in achieving low ALE standard deviations. Instead, relative changes of this ALE pattern are what determine the product consistency for this test site.

In spite of the limitations imposed mainly by the survey quality, the IW mode ALE plots indicate a nominal localisation performance; the range and azimuth ALE mean and standard deviations are annotated in the upper left corner of the figure subplot. The standard deviations are better than the specified 1-sigma ALE for IW mode products (3.3m, 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).

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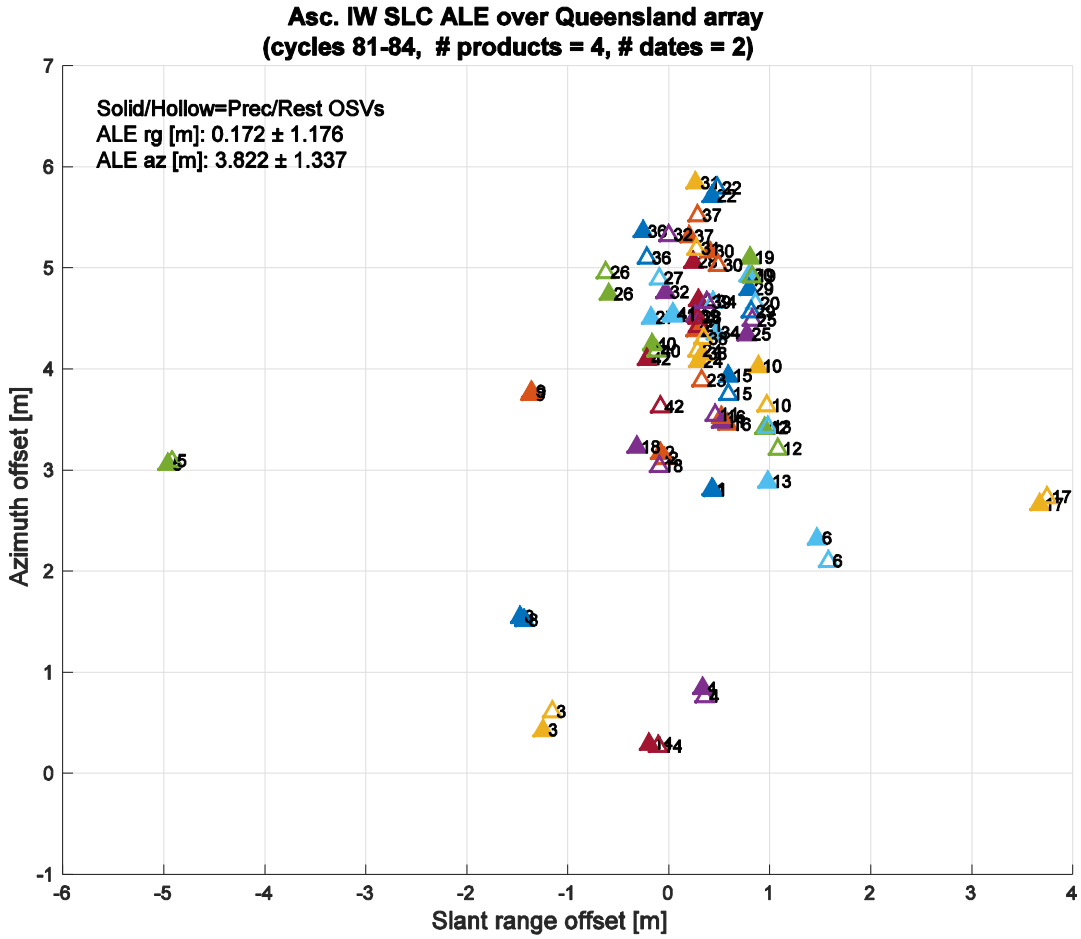


Figure 8 S1-A Absolute localisation error based on two pairs of azimuth-adjacent IW SLC products during the reporting period. Path delay and azimuth timing corrections have been made.

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.

Mode/Swath	Range Co-registration Accuracy (m)	Azimuth Co-registration Accuracy (m)	Channel Distortion (dB)
SM	0.00±0.00	0.00±0.00	
IW	0.06±0.12	0.00±0.00	
EW	0.00±0.00	0.00±0.00	

Table 12 Polarimetric Calibration Measurements

6.2.5. Elevation Antenna Patterns

No Elevation Antenna Pattern (EAP) updates were updated during the reporting period.

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6.2.6. Azimuth Antenna Patterns

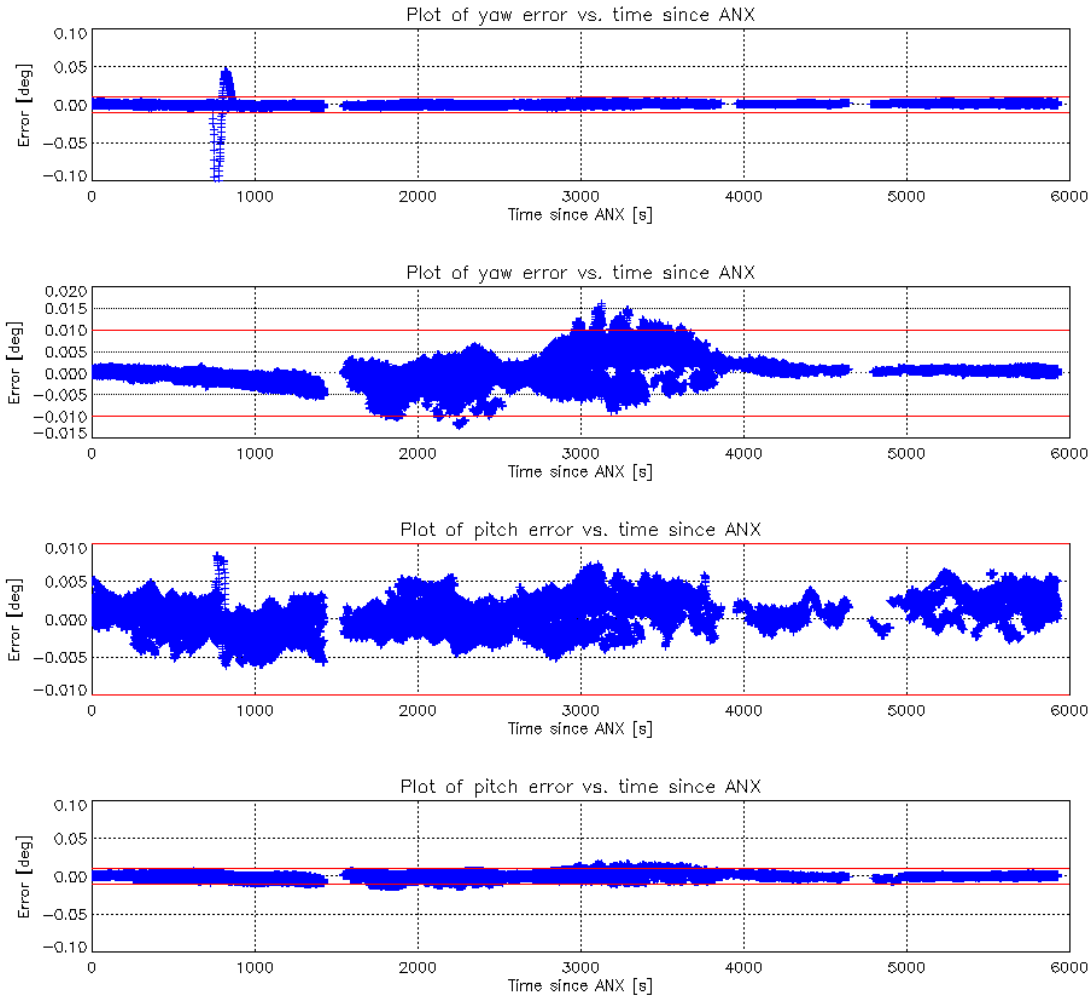
No Azimuth Antenna Patterns (AAPs) were updated during the reporting period.

6.2.7. Noise Equivalent Radar Cross-section

No Noise Equivalent Sigma0 Zero (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. The recent increase in calculated yaw around ANX of 3000 is not an issue with Sentinel1-A itself but with how the yaw is calculated on-ground. Consequently there is no impact of the quality of products.



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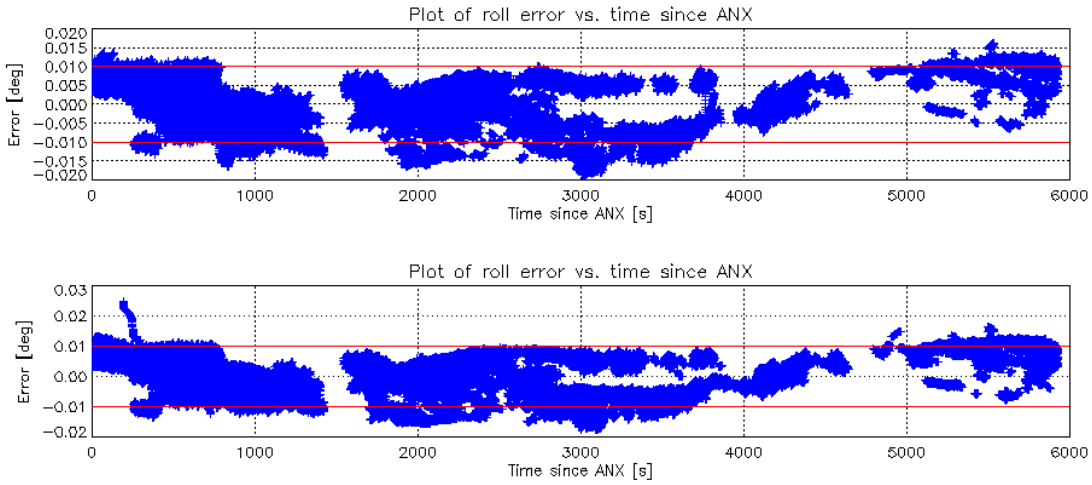
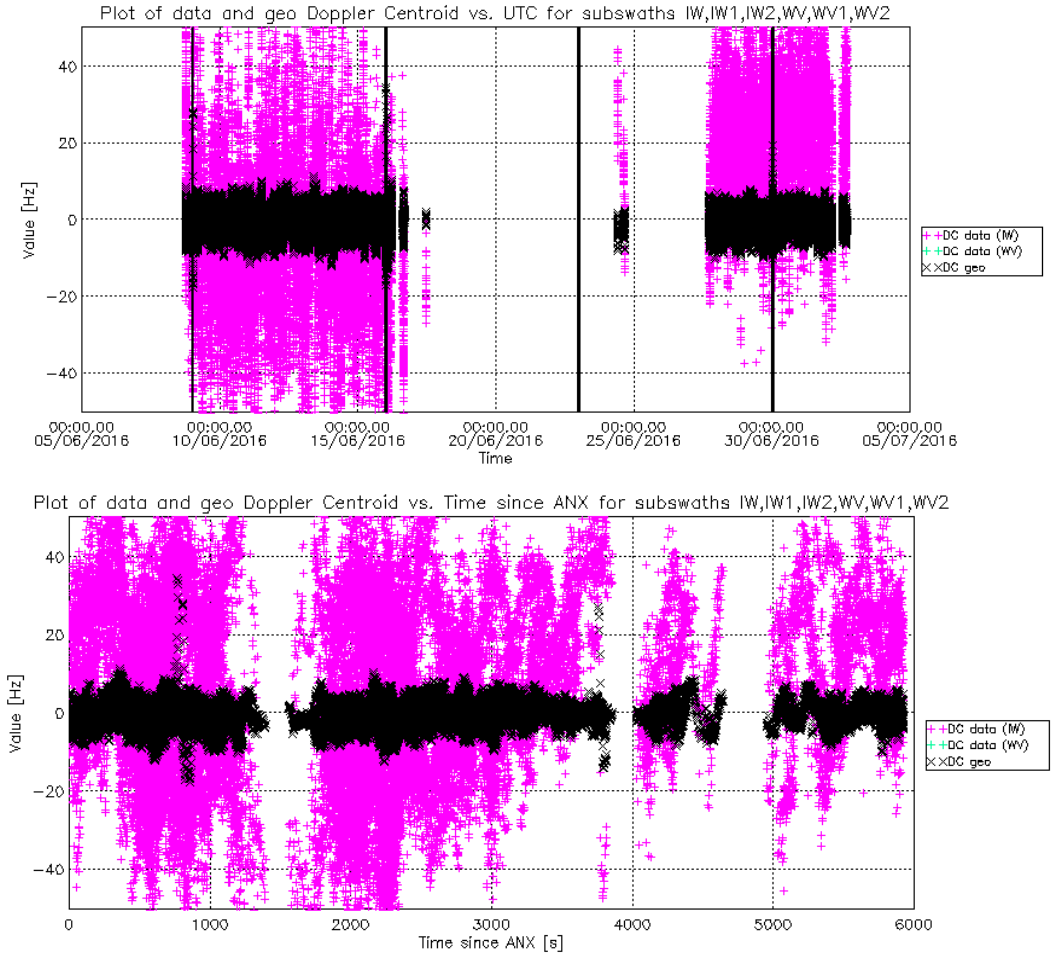


Figure 9 S1-A Yaw, Pitch and Roll Errors

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. An increase of the average DC can be observed after the S1A recovery on 27th June 2016. This was expected due to a change in the Star Tracker configuration.



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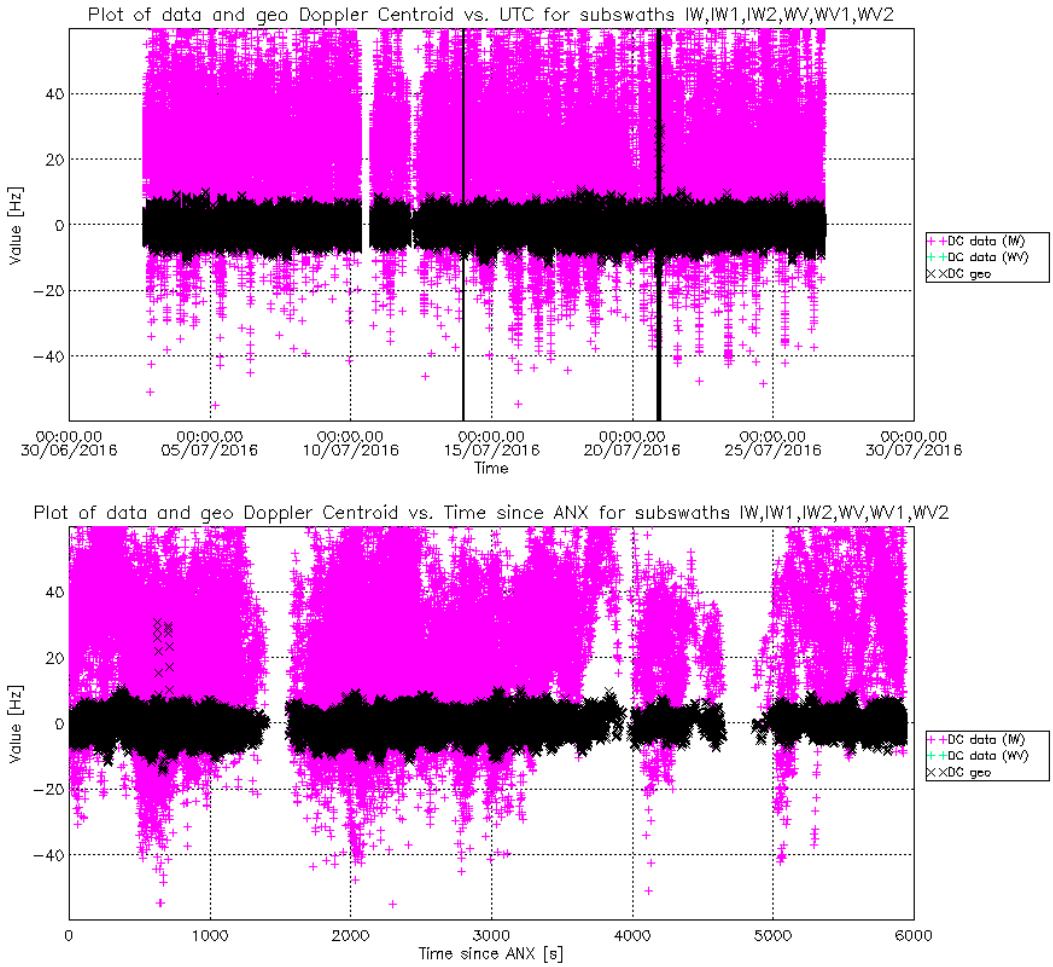


Figure 10 S1-A Doppler Centroid

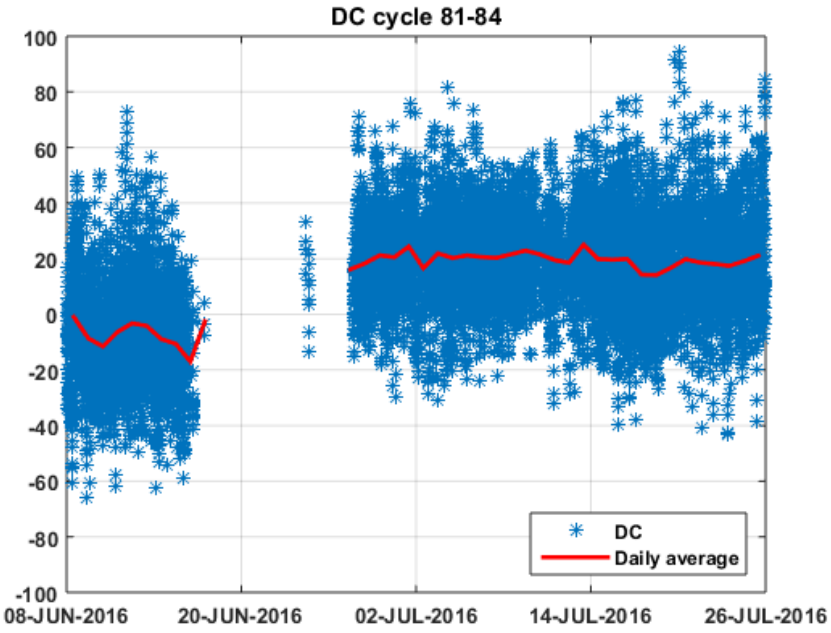


Figure 11 S1-A Doppler Centroid

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	Min (Hz)	Mean (Hz)	Max (Hz)
Cycles 81 & 82	-96.41	5.07±22.92	91.37
Cycles 83 & 84	-64.97	22.02±17.37	155.81

Table 13 Doppler Centroid Statistics

6.2.9. Summary of Anomalies

There were no anomalies during the reporting period.

6.2.10. Quality Disclaimers

One L1 product quality disclaimers was issued during the reporting period: this related to the satellite name (2014-016A) in the product annotation (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.

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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
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
Rx	Receive
SM	Stripmap
TBC	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**

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

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

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Appendix C - **S1-A Instrument Unavailability**

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

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Appendix D - **S1-A Auxiliary Data Files**

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

Instrument ADF (AUX_INS)

ADF	Update Reason
S1A_AUX_INS_V20140406T133000_G20160215T161024.SAFE	Updated PG model and default noise values related to RDB#1.
S1A_AUX_INS_V20140616T135500_G20160215T161549.SAFE	Updated PG model and default noise values related to RDB#2.
S1A_AUX_INS_V20140915T100000_G20160215T161938.SAFE	Updated PG model and default noise values related to RDB#3.
S1A_AUX_INS_V20150519T120000_G20160215T162440.SAFE	Updated PG model and default noise values related to RDB#4.
S1A_AUX_INS_V20150722T120000_G20160215T163523.SAFE	Updated PG model and default noise values related to RDB#5.

Calibration ADF (AUX_CAL)

ADF	Update Reason
S1A_AUX_CAL_V20140406T133000_G20151125T103600.SAFE	TOPS first recalibration (revised EAP for IW and EW). Related to RDB#1.
S1A_AUX_CAL_V20140616T133500_G20151125T103748.SAFE	TOPS first recalibration (revised EAP for IW and EW). Related to RDB#2.
S1A_AUX_CAL_V20140915T100000_G20151125T103928.SAFE	TOPS first recalibration (revised EAP for IW and EW). Related to RDB#3.
S1A_AUX_CAL_V20150519T120000_G20151125T104142.SAFE	TOPS first recalibration (revised EAP for IW and EW). Related to RDB#4.
S1A_AUX_CAL_V20150722T120000_G20151125T104733.SAFE	TOPS first recalibration (revised EAP for IW and EW). Related to RDB#5.

L1 Processor Parameters ADF (AUX_PP1)

ADF	Update Reason
S1A_AUX_PP1_V20150722T120000_G20160517T085710.SAFE	Update of the processing gains to improve WV calibration on VV polarization. Related to RDB#5.
S1A_AUX_PP1_V20150519T120000_G20160517T085640.SAFE	Update of the processing gains to improve WV calibration on VV polarization. Related to RDB#4.
S1A_AUX_PP1_V20140908T000000_G20160517T085612.SAFE	Update of the processing gains to improve WV calibration on VV

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	polarization. Related to RDB#3.
S1A_AUX_PP1_V20140616T133700_G20160517T085546.SAFE	Update of the processing gains to improve WV calibration on VV polarization. Related to RDB#2.
S1A_AUX_PP1_V20140402T000000_G20160517T085509.SAFE	Update of the processing gains to improve WV calibration on VV polarization. Related to RDB#1.

L2 Processor Parameters ADF (AUX_PP2)

ADF	Update Reason
S1A_AUX_PP2_V20140406T133000_G20151124T084156.SAFE	Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#1.
S1A_AUX_PP2_V20140616T135500_G20151124T084238.SAFE	Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#2.
S1A_AUX_PP2_V20140915T100000_G20151124T084308.SAFE	Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#3.
S1A_AUX_PP2_V20150519T120000_G20151124T084337.SAFE	Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#4.
S1A_AUX_PP2_V20150722T120000_G20151124T084401.SAFE	Update to handle long swell from WV (better resolution of long swell in OSW products). Related to RDB#5.

Simulated Cross Spectra ADF (AUX_SCS)

ADF	Update Reason
S1__AUX_SCS_V20150722T120000_G20160413T105410.SAFE	Introduction of AUX_SCS. Related to RDB#5.
S1__AUX_SCS_V20150519T120000_G20160413T105253.SAFE	Introduction of AUX_SCS. Related to RDB#4.
S1__AUX_SCS_V20140908T000000_G20160413T105124.SAFE	Introduction of AUX_SCS. Related to RDB#3.
S1__AUX_SCS_V20140616T133700_G20160413T104849.SAFE	Introduction of AUX_SCS. Related to RDB#2.
S1__AUX_SCS_V20140402T000000_G20160413T103855.SAFE	Introduction of AUX_SCS. Related to RDB#1.

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Appendix E - **S-1A Quality Disclaimers**

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

Number	Description	Start Validity Date	End Validity Date	Issue Status
1	S1A_WV_SLC_1S products filled with zero (black products)	2014-09-30 15:17:26 UT	2014-10-03 03:34:01 UT	Issued
2	Failure on tile amplifier #5 of the receiving antenna	2014-10-18 15:29:30 UT	2015-01-20 19:04:54 UT	Issued
3	Level 1 products processed with incorrect gains	2014-09-30 15:17:26 UT	2014-10-03 04:07:54 UT	Issued
4	Incorrect Cycle Number and Relative orbit number in products processed in PAC2/DPA	2014-12-09 11:45:25 UT	2015-01-21 03:53:00 UT	Issued
5	Failure on Tile amplifier #5 of the receiving antenna from 18/03/2015 and 20/03/2015	2015-03-18 04:09:00 UT	2015-03-20 11:46:30 UT	Issued
6	Failure on Tile amplifier #5 of the receiving antenna from 26/03/2015 to 28/03/2015	2015-03-26 16:20:00 UT	2015-03-28 02:50:30 UT	Issued
7	Failure on Tile amplifier #5 of the receiving antenna from 18/04/2015 to 24/04/2015	2015-04-18 17:40:21 UT	2015-04-24 17:48:08 UT	Issued
8	Failure on Tile amplifier #5 of the receiving antenna from 25/04/2015 to 30/04/2015	2015-04-25 17:37:37 UT	2015-04-30 23:01:11 UT	Issued
9	Failure on Tile amplifier #5 of the receiving antenna from 05/05/2015 to 06/05/2015	2015-05-05 05:12:51 UT	2015-05-06 00:44:43 UT	Issued
10	Denoising vectors not qualified	2014-10-03 00:00:00 UT	2015-07-03 06:33:15 UT	Issued
11	S-1 L2 OCN product preliminary qualified	2015-07-02 00:31:03 UT	2030-01-01 00:00:00 UT	Issued
12	Failure of TRM #5 between 2015-05-26 and 2015-05-27.	2015-05-26 21:10:28 UT	2015-05-27 05:53:00 UT	Issued
13	Failure of TRM #5 between 2015-06-06 and 2015-07-14	2015-06-06 06:44:28 UT	2015-07-14 07:50:55 UT	Issued
14	Invalid radiometric calibration of WV L1 and L2 products	2015-03-19 02:29:22 UT	2015-07-03 08:09:02 UT	Issued
15	Failure of TRM #5 from 2015-07-17 to 2015-07-21	2015-07-17 18:58:56 UT	2015-07-21 12:04:57 UT	Issued
16	Invalid Orbit Number at UPA - before 2014-10-10	2014-10-03 00:00:00 UT	2014-10-10 06:28:50 UT	Issued
17	Incorrect Cycle Number in S1-A Products acquired between 26/01/2016 and 04/02/2016.	2016-01-26 21:17:42 UT	2016-02-04 16:29:59 UT	Issued
18	Invalid annotation of NSSDC identifier of the Sentinel-1A (2014-016A) between April 2014 and July 5th 2016.	2014-09-30 15:17:26 UT	2016-07-05 10:16:00 UT	Issued
19	Long Duration Interference	2015-08-16 16:58:00 UT	ongoing	In preparation

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