



## TPM Meeting #2

**10<sup>th</sup> November 2016**

ESRIN, Frascati

Ruby Mannan

Massimo Cardaci

Sébastien Saunier

Amy Northrop

Sam Lavender

**Task 1, Mission Science Ops Co-ordinator** (Telespazio VEGA)

**Task 2, IPF & Tools Co-ordinator** (Serco)

**Task 1, Landsat and ALOS-Optical Team Lead** (Telespazio VEGA)

**Task 1, Landsat Team/Reprocessing Co-ordinator** (Telespazio VEGA)

**Task 1, OCM-2 and MOS-1 Team Lead** (Telespazio VEGA)

# Meeting Outline



9:30 - 9:40	Introduction
	o Scope and Objectives of the Meeting
9:40 - 10:20	ALOS Optical
	o Optical IPF Status
	o Pilot Processing QC Results
	o <i>DSI Status on ALOS Optical Reprocessing</i>
10:20 – 10:40	ALOS PALSAR
	o PALSAR Processing OTF (GMV)
10:40 - 11:30	Landsat 1-7
	o MSS IPF Update
	o TM/ETM Status
	o <i>DSI Status</i>
11:30 - 12:10	Landsat-8
	o L8 Performance Results
	o Proposed L8 QC Evolutions
12:10 – 12:20	OceanSat-2
	o QC Activity status
12:20 - 12:30	MOS-1
	o MOS IPF Status
	o MOS QC Results
12:30 - 12:40	JERS-1
	o JERS-1 IPF Status
	o JERS-1 QC Results
12:40 - 13:00	Conclusions & Lessons Learnt AOB

# Introduction



- Scope of the meeting
  - The meeting covers all ESA TPMs; Landsat 1-8, ALOS, OceanSat-2, MOS and JERS-1.
  - It covers operational and reprocessed data QC activities, reprocessing at DSI, OTF at GMV and NRT activities at USGS
- Objective of the meeting
  - To present to ESA the status of on-going IDEAS+ activities for each of the TPMs
  - Confirm and align visibility on decisions which have been made
  - Discuss some open points and take decisions where needed
  - Document and track ongoing risks



# **ALOS - Optical**

# Optical IPF Status



- L0:
  - SIP specification has been revised and is now stable
  - Request from GMV to support an issue detected with anomalous L0
    - L0 output cannot be processed to L1B1; processor fails
    - Investigation points to issue with input L0; in all cases the issue is with the accompanying L0 CSV file
- L1B Optical Wrapper:
  - Last release v1.4.4 has been successfully integrated within DSI
  - Release stable; no further pending issues
- L1C:
  - Release v4.10 Patch 2 is the latest version integrated within DSI
    - This version has been used for the L1C Pilot Processing
  - Release v4.10 Patch 3 under validation
    - This version includes resolution for AR-285: an issue detected on DIMAP files

# Optical QC Tools Status



- Amalfi:
  - AMALFI ALOS v1.1.2 successfully integrated in DSI

# Pilot Processing QC Results

(1) IDEAS+



- Approach
  - L0 and L1 data have been indexed and results stored into geospatial database, a data catalogue has been created; IDEAS+ is now able to build consistent a dataset for QC.
  - Stratification is applied for QC; dataset is selected to cover all possible observation scenarios (pointing, compression, gain setting, view) and applied different methodologies
  - Allow to check processing completeness (L0 / L1)
  - Allow to support for L1C filtering before release of data to the user
  - Allow to issue consolidated product accuracy specification covering mission lifetime.
- News
  - JAXA has released World coverage with PRISM DEM.  
[http://www.eorc.jaxa.jp/ALOS/en/aw3d/index\\_e.htm](http://www.eorc.jaxa.jp/ALOS/en/aw3d/index_e.htm)

# Pilot Processing QC Results

(2) IDEAS+

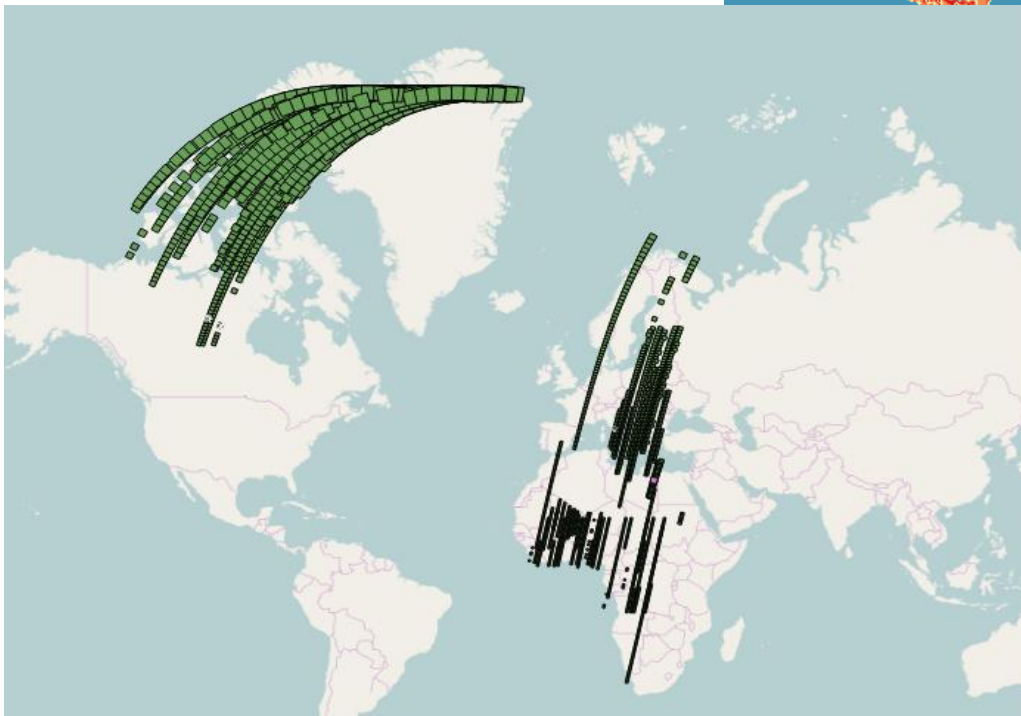
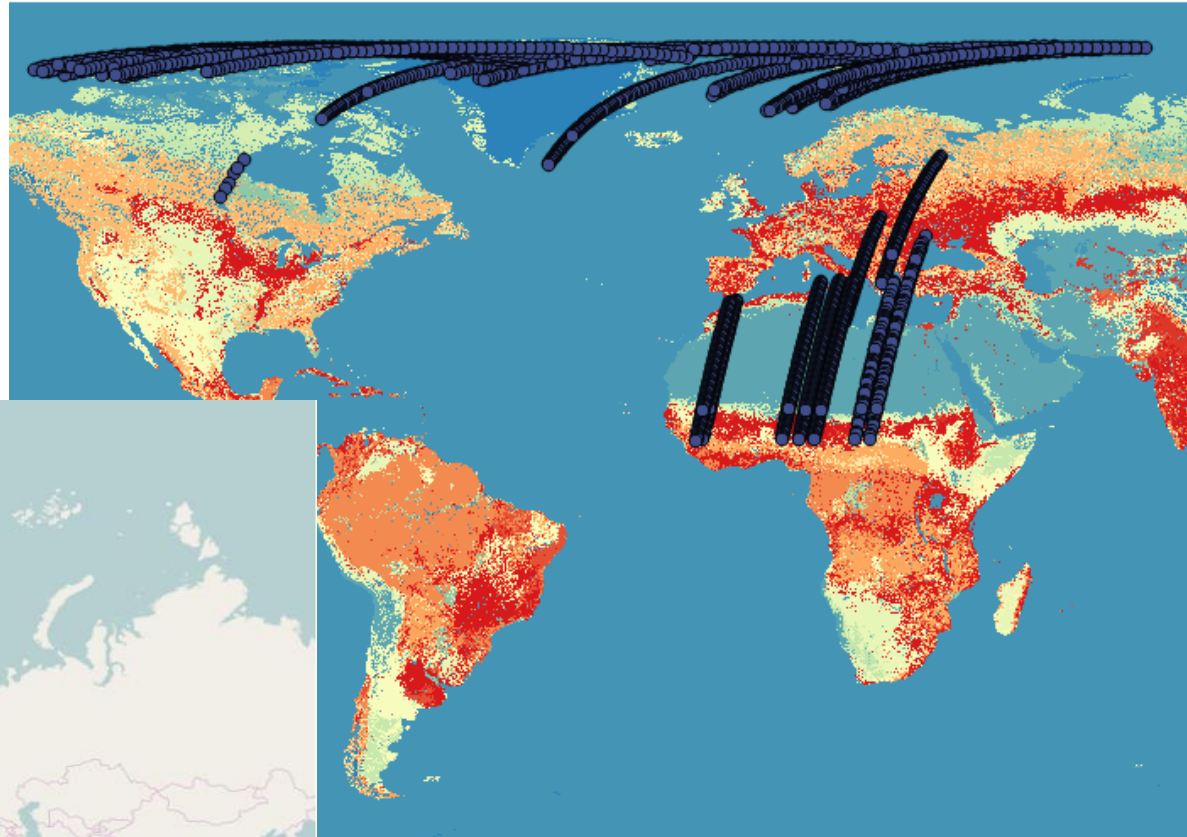


- Data Quality
  - Quality of current L1B / L1C DSI products configuration in agreement with quality of IDEAS+ products.
  - JAXA L1B product and ESA DSI L1B products have been compared and no significant difference has been found.
  - Time spent on investigation with support of DSI team because for certain products small time difference exist between L0 frame (from IV File) and L1B1 frame. In some cases, there is no difference. An explanation is that difference might be due the accuracy of orbit data used to generate L1B1 products.
  - L1C ZIP packaging is sometimes in failure
  - L1C geometric quality information written into DIMAP (CP\_DISTRIBUTION, GCP\_DENSITY, GCP\_RMSE ...) has been reviewed and discussed with DLR in order to better classify products depending on geometric accuracy and type of geometric processing applied (Tier 1, Tier 2, Tier 3)
  - L1C scene statistics written into the DIMAP includes bkg values; it has been recommended to perform an update
  - L1C geometric accuracy will probably be strongly degraded for certain regions (Africa), already spotted and discussed
  - L1C image quality at the scene margin is not so clean, but this is a minor issue
  - The PRISM L1C image view registration accuracy can be above 1.5 pixel in regions where terrain display hilly relief - the interest of having the three PRISM views as L1C is to be demonstrated.



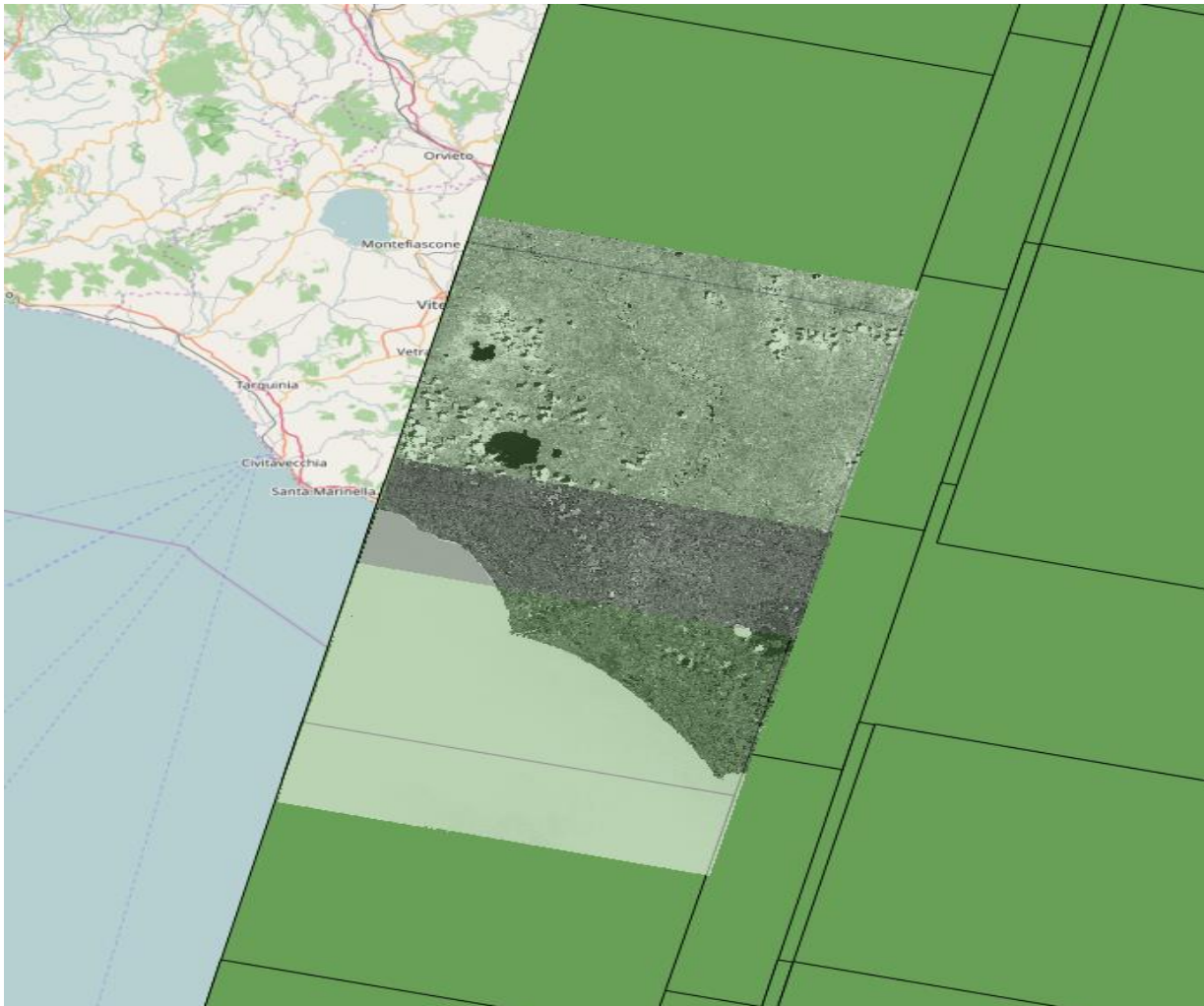
# Pilot Processing QC Results

(3)



# Pilot Processing QC Results

(4)



# Pilot Processing QC Results

(5)





# **ALOS - PALSAR**

# PALSAR Processing OTF (GMV)



- PALSAR IPF:
  - Release v4.16\_p7 is the latest version integrated in OTF (GMV processing)
  - Running smoothly since then; all anomalies closed, no new anomalies
    - On-going support to an investigation on a likely system-timezone issue is being provided
- PALSAR QC Pilot
  - QC checks to be performed on ~1000 L1.1/L1.5 PALSAR products, over Calibration sites, prior to reopening OTF data to users
    - Interactive Product Quality Control – performed manually by Aresys
    - Automated Product Quality Control – performed by Phoenix
  - Milestone 1 – within end of 2016: go-no-go recommendation based on subset of interactive and automated tests
  - Milestone 2 – within end of Q1/2017: completion of tests and of additional tools



# Sample Results

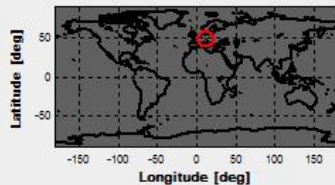


## SQT - SAR Quality Toolbox

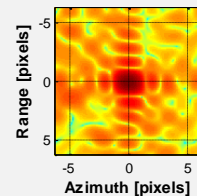
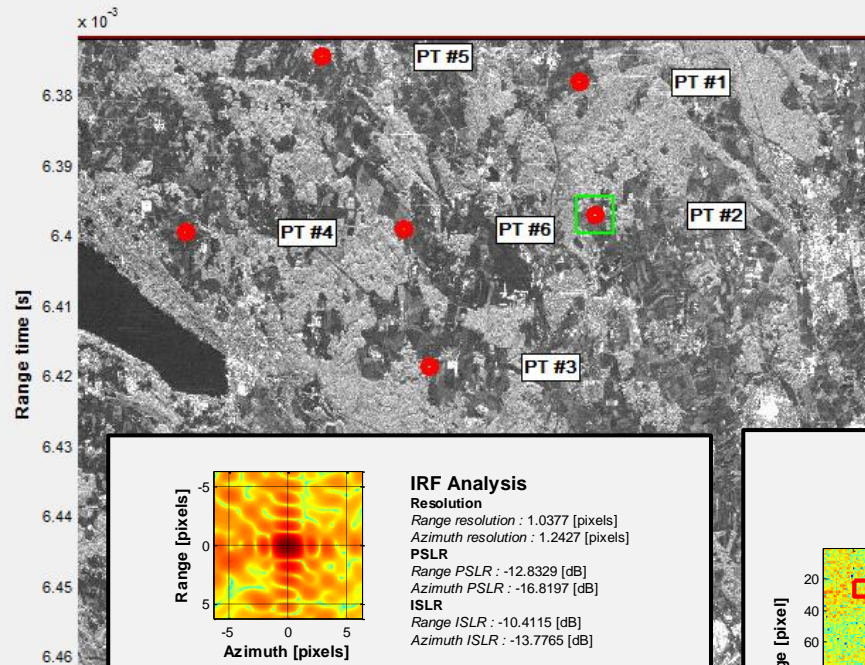
### Product Metadata

Product Name:	pfL11
Mission Id.:	PALSAR
Acq. Mode Id.:	STRIPMAP (FB_10)
Product Type:	SLC
Polarization:	HH
Acq. Date:	06-AUG-2006
Start Time:	21:39:53.61
Stop Time:	21:40:06.29

### Area of Interest



### Product Quick-look



### IRF Analysis

#### Resolution

Range resolution : 1.0377 [pixels]

Azimuth resolution : 1.2427 [pixels]

#### PSLR

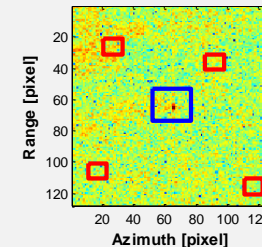
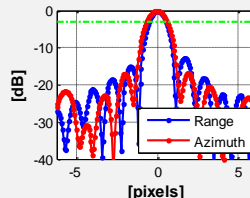
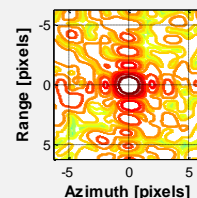
Range PSLR : -12.8329 [dB]

Azimuth PSLR : -16.8197 [dB]

#### ISLR

Range ISLR : -10.4115 [dB]

Azimuth ISLR : -13.7765 [dB]



### RCS Analysis

Sigma =

=  $1p \cdot PA_{sr} / K / S^2 =$

= 600373440 []

= 87.7842 [dB]

→ Setup and tuning of **SAR Quality Tools** for the analysis of PALSAR L1 data

*In the example, Point Target IRF analysis for a DLR Corner Reflector in a ALOS PALSAR FBS image acquired on 06/08/2006*

Ready

Hint: Select an operation from menus



# Landsat 1-7

# MSS IPF Update



- **Additional Logging**
  - To ensure traceability between L0 and L1 products, processing LOG files will be updated to include extra information on INPUT, OUTPUT, EXPECTED, GENERATED and FAILED products in the LOG files. The files will be compressed to ~90% of current 10MB size.
- **MODEL\_FIT\_TYPE (LMS)**
  - To provide greater visibility of processing type / level and greater confidence of product accuracy, a new field in the metadata will be used to inform of “MODEL” (L1G/L1G+/L1T/L1Gt(for ETM+)), FIT (Multiscene/Singlescene), TYPE (Suboptimal/Optimal).
- **L1G+ Handling**
  - To ensure L1G+ products with large geometric errors are being filtered out and processed to L1G, the constraint on distortions during single scene modelling will be increased, the method to interpolate and extrapolate data during multi-scene fit will be updated and the orbit propagator will be replaced.
- **AUX File (Saturation Management)**
  - To reduce the level of saturation being introduced during L1 processing, a change in MSS CPF format is being introduced for WRS based calibration coefficients for Landsat 5.
- **Residual GCP Error Update**
  - To better inform the users of geometric errors; to add quality parameters into the Level 1 product; to allow better detection of geometric anomalies and internal image distortion. Geometric refinement accuracy will be controlled by using covariance matrix; the maximum expected error shall be estimated; statistical distribution of GCP residual errors will be reported with skew and kurtosis measurements; additional fields will be added to the MTL i.e. # GCPs discarded, # windows without GCPs, # GCPs in each window (3x3). This will result in a maximum of 16 new fields in the metadata.



# MSS IPF Update



- QuickLook
  - To align with the USGS and to provide a more useful product for the users, a full resolution (~3600 x 3600 pixels) .PNG QuickLook will replace the existing low resolution QL in the SIP product (band combination 3-2-1, 1.8% radiometric stretch applied).
- GCP.txt
  - To allow better assessment of GCP distribution, a GCP.txt file will be produced for all products using GCPs during processing (single fit L1G+ / L1T scenes).
- Quality Assurance Band
  - To provide the users with an increased understanding of product quality, a 16-bit GeoTIFF Quality Band will be generated for each L1 product (within GeoTIFF product). Bits 0-10 will be fully aligned to the TM/ETM+ USGS BQA, bits 11-14 will be used to monitor Scan Line Anomalies (SLA) (striping/saturation/hot spots/sticky bit) in each band and bit 15 is reserved for future developments (possibly land/sea mask).
- Sticky Bit Correction
  - To correct sticky bit, algorithms will be used to compare pixel values with neighbouring values and ones of other spectral bands and values will be added or subtracted to affected pixels.
- Quality Classification (IMAGE\_QUALITY parameter)
  - To align more closely to the USGS specification and to provide a more sophisticated representation of product quality, the IMAGE\_QUALITY parameter in the metadata will be updated to align with the USGS 2-digit specification including image quality and PCD quality. Additional fields will be added for each image band to inform on the percentage of the scene affected by SLA (value 0-9).
- Considerations for a future release:
  - Land/Sea Mask bit in the BQA.

# MSS Schedule & Planning



- The IPF delivery is expected to be delayed by 11 weeks due to external factors related to the TDS provision

Activity Start Date	Original Activity End Date	New Activity End Date	Activity Duration	Activity → Deliverable
20 <sup>th</sup> July				IPF development KO
20 <sup>th</sup> July	28 <sup>th</sup> October	13 <sup>th</sup> January		MSS IPF v3.05 development → Delivery of IPF to IDEAS+ for verification
16 <sup>th</sup> January	18 <sup>th</sup> November	3 <sup>rd</sup> February	3 weeks	AMALFI v1.0.13 development → Delivery of AMALFI to IDEAS+ for verification
6 <sup>th</sup> February	25 <sup>th</sup> November	10 <sup>th</sup> February	1 week	AMALFI v1.0.13 verification** → Delivery of AMALFI verification report
13 <sup>th</sup> February	16 <sup>th</sup> December	3 <sup>rd</sup> March	3 weeks	Integration of IPF/AMALFI into IDEAS+ environment Processing of TDS (Stress Test) → TDS for verification
6 <sup>th</sup> March	3 <sup>rd</sup> February	21 <sup>st</sup> April	7 weeks	IPF verification** → Delivery of Software/Documentation package to DSI
24 <sup>th</sup> April				Pilot Phase

**\*\*Note: should validation fail, and further S/W developments/BUG fixes occur, this will be communicated to ESA as soon as possible, and this validation activity is expected to be extended. IDEAS+ would attempt to absorb the delay as much as possible, however this may not always be possible**

# TM/ETM+



- All baseline TM and ETM+ datasets have been QC'ed.
- IPF Patch 1 & 2 & 3 has been generated, verified and delivered to DSI for processing. It is expected to correct all known bugs (UTM/ASC/GCP/BSK).
- Unfortunately, all TM/ETM+ scenes previously affected with UTM/ASC bugs, currently fail to process (**AR 307**). IDEAS+ are supporting DSI with analysis of this error.
- A Matera delta dataset has been processed and delivered (by DSI) to IDEAS+ for QC, however the MSS IPF development is currently considered higher priority. This activity is expected to take place in 2017.
- The MSS IPF is being configured to be fully TM/ETM+ compliant for future reprocessing phases (with the exception of the updated AUX files for saturation management – applicable only to MSS LS05).

# TM/ETM+



- The MSS IPF is being configured to be fully TM/ETM+ compliant for future reprocessing phases (with the exception of the updated AUX files for saturation management – applicable only to MSS LS05).

MSS IPF Update	Compliance
Additional Logging	YES
MODEL_FIT_TYPE (LMS)	YES
L1G+ Handling	YES
AUX File (saturation management)	NO (only applicable to LS05 MSS)
Residual GCP Error Update	YES
QuickLook	YES
GCP.txt Production	YES
Quality Band	YES (reduced visibility of results for bands 5-7)
Sticky Bit Correction	YES
Quality Classification	YES



# Landsat 8

# L8 Status



- Handover of all activities from Magellium to Telespazio was successful
  - The Processing Infrastructure (PI) has been ported, improved and duplicated (France and UK)
- The current monthly performance analyses are focused on:
  - Absolute Geolocation Accuracy Assessment;
  - Multi temporal Geolocation Accuracy Assessment ;
  - Band to band Geometric Registration Accuracy Assessment;
  - Radiometric Calibration stability over PICS;
  - BQA band inspection, Image Artefact Analysis and Thermal band inspection.
  - Several revisions have been made to the previous performance monitoring methods:
    - Input data has been reordered; issues experienced regarding the older data which is no longer available from the LS08 ESA portal.
    - For geometry analysis, reference data has been redefined and additional test sites have been added to cover more cases:
      - Short term geolocation stability - data from the same path, observed on the same date are analysed
      - Cross track variability – different regions in the image located at several locations in the field view are compared
    - For radiometry analysis, the stability is analysed for the full degree square and for the half degree square
      - Statistical comparison between results of the two different ROIs is systematically performed
      - Influence of terrain content is better assessed.

# L8 Geometric Sites



La Crau  
Path 196/30

Balears  
Path 196/32

Ibiza  
Path 198/33

Grenada  
Path 200/34



To maximize cloud free scenes every month, it is foreseen to add Rome, Toulouse and Piemont in the future.

Note: Saragossa site has been discarded because it is considered too cloudy.



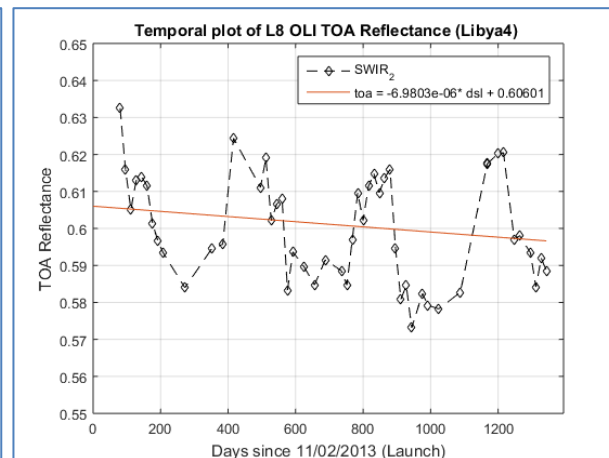
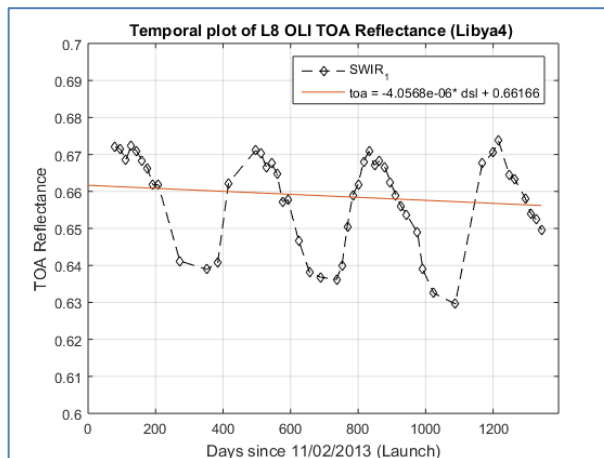
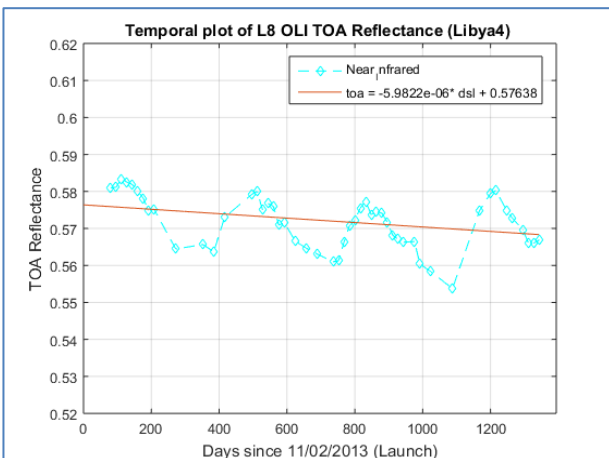
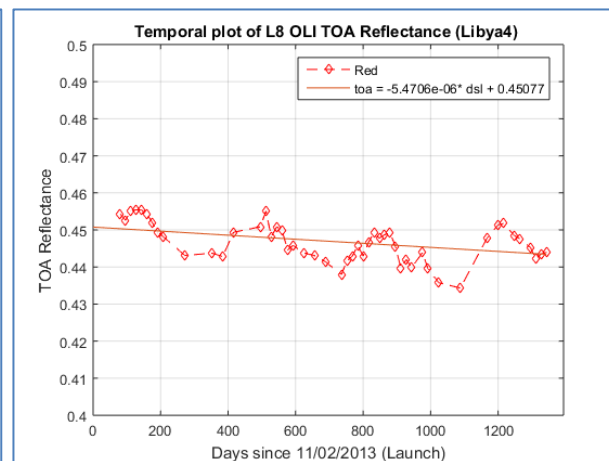
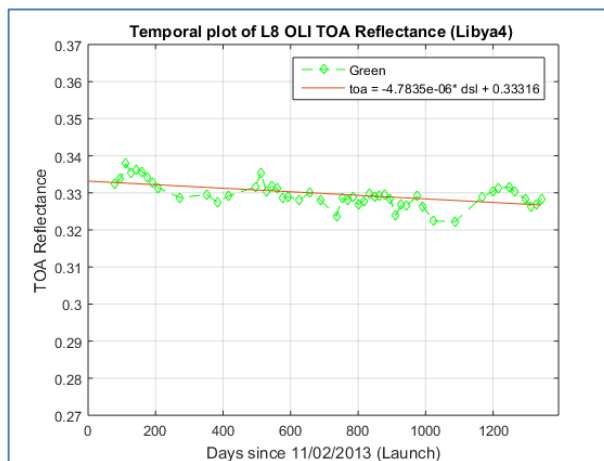
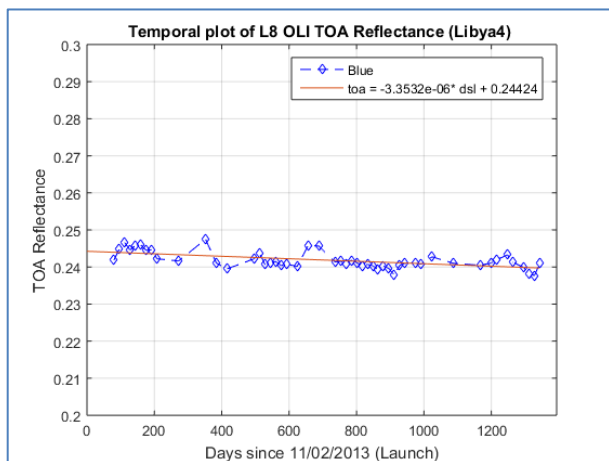
# L8 Temporal Stability

(1) IDEAS+



Radio stability performance over 53 L1T products (02/05/13 to 31/10/16)

Monitoring performed also against USGS products



For radiometric accuracy stability, the methodology consists of monitoring the Top of Atmosphere (TOA) reflectance acquired over a bright stable site (Libya4) as a function of time for a same view acquisition and sun illumination acquisitions.



# L8 Temporal Stability



- Results
  - Straightforward methodology is applied for the production of the LS08 Mission performance report and results are in agreement with NASA/USGS ones, as discussed in Nischal Mishra et al., 2014
  - Temporal Uncertainty for VIS / NIR bands is within 1.5 %
  - Temporal Uncertainty for SWIR bands is within 2.5 %
  - For comparison, temporal uncertainties are within 3 % for ETM+ VIR / NIR data
- Comparison with Magellium
  - Difference below 0.2 % regarding temporal uncertainties, as dataset has been extended, a very small degradation just after launch is now observed
  - Extended period (TPZ/MAG): (02/05/2013 to 31/10/2016) / (29/01/2014 to 24/04/2016)
  - More products (TPZ/MAG) : 53 / 25
- Sentinel 2 / LS08 data comparison – near simultaneous observations in PICS, (NASA/USGS) work
  - The TOA reflectance between S2A MSI and L8 OLI agree within 5 % for all similar reflective bands. With Following remarks:
    - Maximum difference found in coastal band 4.7 %  $[(S2-L8) / L8 \ %]$
    - Minimum difference found in green band 0.47 %  $[(S2-L8) / L8 \ %]$
    - Near Simultaneous MSI / OLI observations using Spectral band adjustment factor (SBAF); difference between observation dates might explain percent difference between bands
    - Note that the geometric resampling issue is not discussed by USGS
    - Reference : <https://calval.cr.usgs.gov/wordpress/wp-content/uploads/Storey-and-Haque-Landsat-Sentinel-2-Analyses.pdf>
- On going discussion with Argans (MPC), SDU and CNES to integrate into the report LS08 / Sentinel 2 inter comparison results by proposing synthesis.
  - Reference <http://www.preprints.org/manuscript/201610.0078/v1>

# L8 Temporal Stability



- The procedure consists of Top of Atmosphere reflectance inter-comparisons for data acquired in the same conditions.
- Results are within operational goals.
- No difference between the two regions (one x one degree) / (half x half degree)

## Radiometric Accuracy Stability Results (one x one degree)

Bands	Mean TOA reflectance (53 L1T products)	Std TOA reflectance	Uncertainty (100 * Std / Mean)
Coastal Aerosol	0.218	0.002	1.030%
Blue	0.242	0.002	0.910%
Green	0.330	0.003	0.990%
Red	0.447	0.005	1.147%
NIR	0.572	0.007	1.231%
SWIR1	0.659	0.012	1.888%
SWIR2	0.600	0.015	2.430%

# L8 Geometry

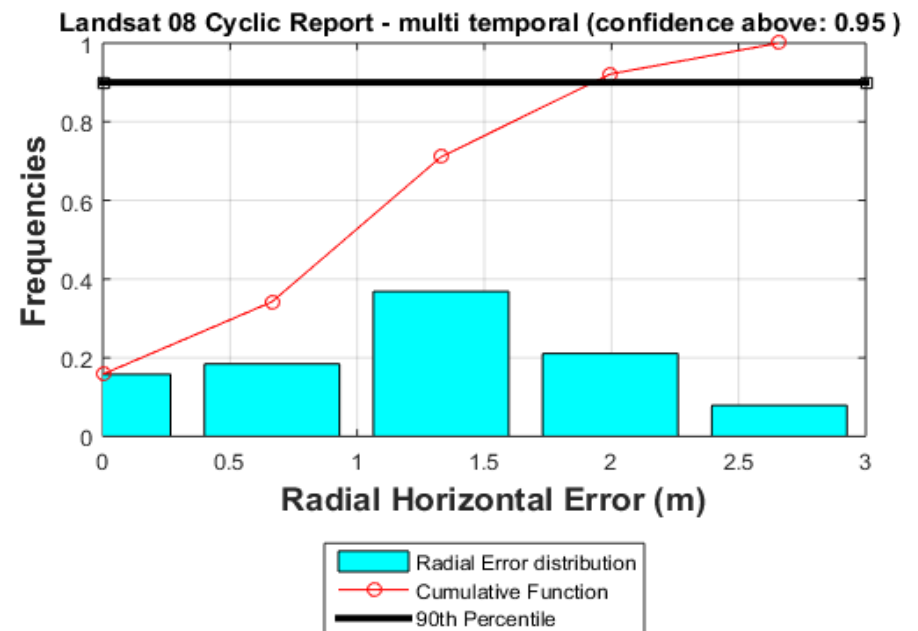
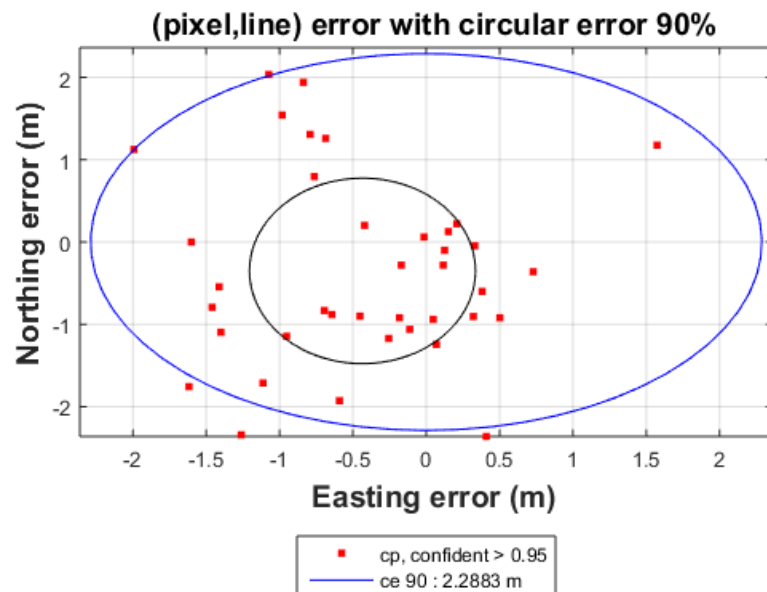


- Results
  - The geolocation of Landsat 8 panchromatic data is extremely stable
  - MS band to band registration accuracy is within 1 m for the input ROI, higher results expected in a full image
  - MS / PAN band to band registration accuracy is within 3 m
  - Thermal band registration has not been assessed
  - Displacements are mainly in the across track direction because of mis-registration between cameras
- Comparison with Magellium
  - Methodology has evolved, results remains within the same order
  - Period shortened (TPZ/MAG): (04/07/2015 to 31/10/2016) / (30/07/2013 to 08/01/2016))
  - Less products (TPZ/MAG) : 27 / 49
- Methods
  - The precision of the geolocation is excellent, and the multi temporal circular error is based on precise measurements (mean of error for each date).
  - The accuracy of the geolocation varies depending on the location of the ROI in the field of view, depending on the site and also depending on the season (only one reference date considered). It is not critical: 2 m RMSE for Grenada, 0.42 m RMSE for La Crau.
  - The latest aspect should be taken into account when reporting on product quality, plot of multi temporal RMSE instead of 'mean' (as done in the past) might be proposed.

# L8 Geometry



- Multi Temporal context => One measurement  $\Leftrightarrow$  One PAN product
- $|\text{Mean Error Easting (X)}|$  and  $|\text{Mean Error Northing (Y)}| < 0.5 \text{ m}$
- Standard deviation (X) and Standard deviation (Y)  $< 1 \text{ m}$
- Multi Temporal circular Error =  $2.28 \text{ m}$
- Results are explicit
- No degradation observed



# Proposed L8 QC Evolutions



- Foreseen analyses are:
  - Geometric Analysis – Registration of images in the overlapping region between two scenes (different tracks)
  - Geometric Analysis – S2 / LS08 registration
  - Radiometric Analysis – S2 / LS08 Temporal Uncertainties comparison
  - Radiometric Analysis – Use of dark target
  - Radiometric Analysis – Thermal band analysis
- Comparison with Sentinel 2 data – temporal series:
  - No external results / resource found
  - On going work @ IDEAS+
- Support:
  - Information regarding LS08 archive might be shared in order to align QC with production activities
  - Contact with NASA/USGS is important to clarify failure notification, recalibration campaign and on going performance
  - Seek inputs from other IDEAS+ CAL/VAL tasks in order to improve current methods
  - Output presentation from LTWG dealing with LS08 performance might be shared with IDEAS+.
  - Past Landsat 8 data obtained from ESA catalogue are no longer available, is there a solution to get them?



# OceanSat-2

# OCM-2 QC

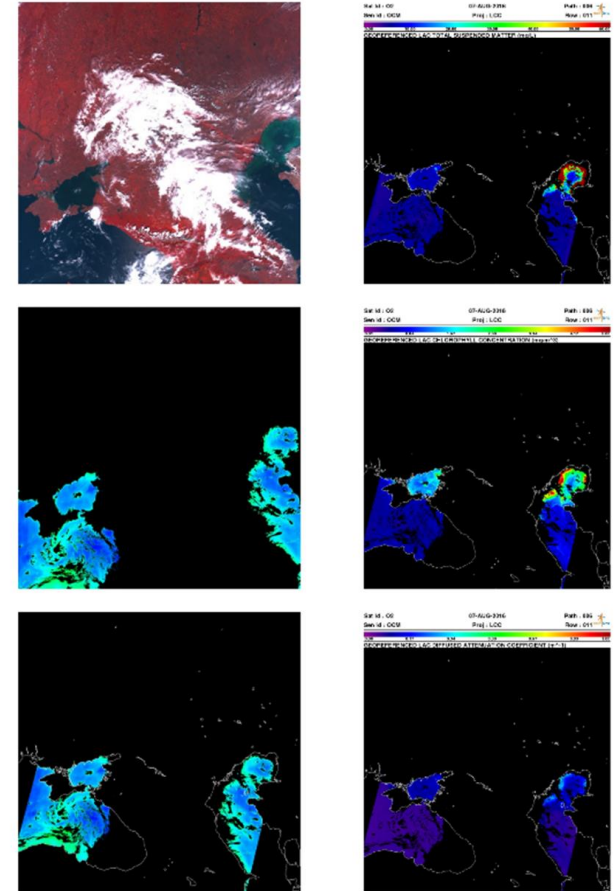


- IDEAS+ Task 3 WP 3550 (Brockmann Consult)
  - Includes an assessment of the quality of L2 products by matchup analysis and satellite intercomparison
    - The analysis performed demonstrates that the overall OCM data provides good results, however some issues which have been highlighted e.g., quality flags, land/sea mask, cloud screening
    - It has been recommended for further in-situ data to be collected in order to extend the validation
    - Noted that information regarding the algorithms and sensor has been difficult to access and was a limitation for this exercise performed.
- IDEAS+ Task 1 WP for the QC of OceanSat data
  - IDEAS+ to deliver Quarterly Quality Reports

# OCM-2 Quarterly Report Status



- Initial work has concentrated on developing a semi-automated process to perform an efficient quality assessment of the OceanSat data. This includes:
  - A python script to retrieve all files from a specific period;
  - Comparison against expected EO SIP format, and a check of the L2C HDF files to ensure they are readable with valid product metadata;
  - Python script creates PDFs for each scene, which contain all the QuickLooks so visual QC can be performed quickly
- Draft of the first Quarterly Quality Assessment Report is almost ready – due to be issued following internal feedback review;
- Next: Python script to be expanded to export the L2C data as GeoTIFF files; files can then be easily imported into SNAP or QGIS, allowing a more in-depth analysis of the data







# MOS-1

# IPF Status



- MOS IPF
  - IPF v1.08 installations resumed
  - Virtual machine installation has been created given incompatibility with the TPM common layer which had to be evolved because of Landsat
  - IPF confirms functioning on a virtual environment, even if not certified by ACS

# MOS-1 QC

(1)



- Verification report for the Visible and Thermal Infrared Radiometer (VTIR) and Multispectral Electronic Self-Scanning Radiometer (MESSR) products.
  - Focused on checking transcribed L0 products and the file-naming convention
- Feedback received from ESA was that IDEAS+ also needed to verify if the processor was able to handle MOS products generated with different versions of the transcription software, and quality assess the generated L1 products.
- Current work is focused on:
  - Running a selection of the L0 products through the version of the MOS processor installed on GAMME
  - Understanding the format of the MOS products so that the quality of the generated L1 products could be fully understood

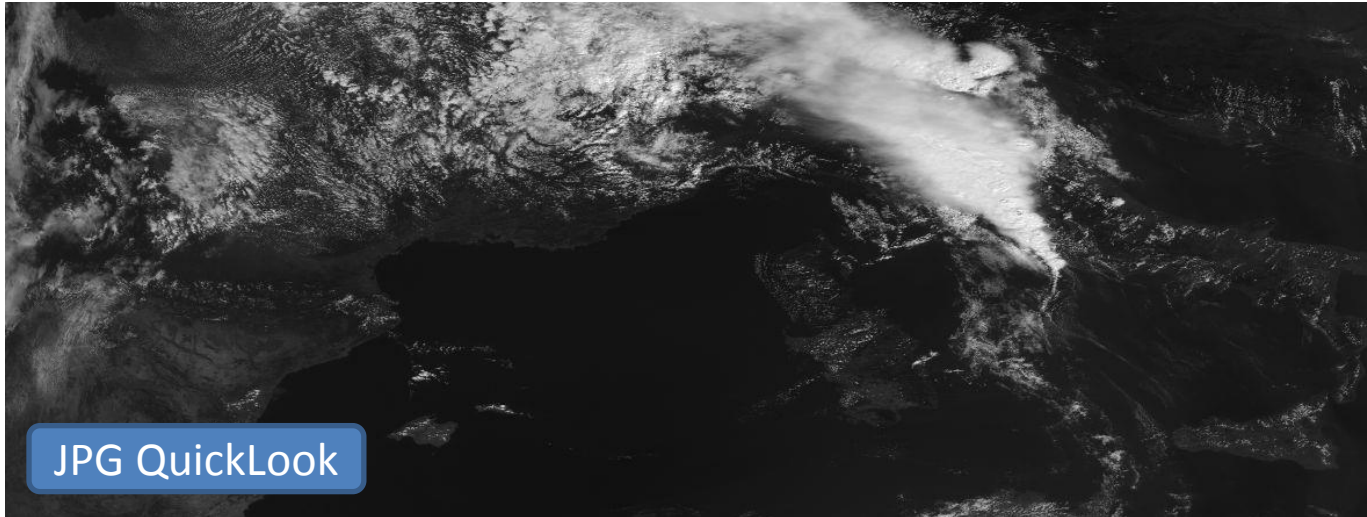


# MOS-1 QC

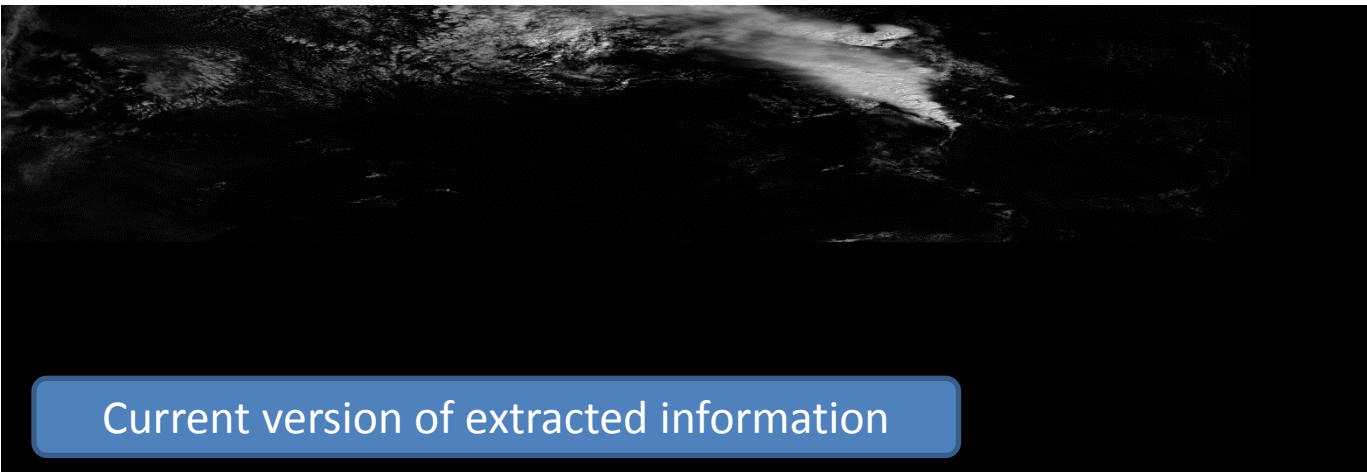


- Initial analysis indicates that where the data processing completed, the output was successfully generated.
  - However, the format is not compliant with the SAFE specification
  - There is a .SAFE file, but it has zero size and data is held in a "FAST" tar archive with separate binary files for each band of MESSR or VTIR
- In parallel, work continued on understanding the format of the MOS products so that the quality of the generated L1 products can be fully understood
  - The MESSR data can be read, as specified, and no issues were seen in the previously provided files
  - Can partly read the SAFE specification stored VTIR Measurement Data Files; single band is stored as six strips, which when read and joined together equates to a single band image that looks like the provided QuickLook
  - We are still working on extracting the other 3 bands, to be able to confirm the data in the SAFE specification L1 files exists in a readable format

# Reading MOS-1 VTI



JPG QuickLook



Current version of extracted information

The extracted single band image so far;  
work in progress



# JERS-1

# IPF and Tools Status



- JERS-1 SAR
  - Processor 2.05\_p2 successfully running the ACS reprocessing
  - Due to infrastructure issues, the reprocessing was paused and has only recently resumed in October - it is now planned to end mid November 2016
  - Once the QC is complete, there will be a recommendation on the follow-up: IPF 2.06\_p1 is already validated and in ESA hands; it allows to correct several input data corruptions, allowing to maximize the production. It was not endorsed during the initial reprocessing cycle since it was considered useful to arrive to the end of the reprocessing and see if there were further data-recoverability patterns to implement
  - JERS screening rel 1.04 tool from Phoenix successfully used to support ACS reprocessing
- JERS-1 Optical
  - Processor 1.11 is the latest stable version since 2014

# QC Status



- JERS-1 SAR QC
  - SAR QC team performed QC checks on selected products per month of reprocessed data
    - QC checks included metadata, header and filename consistency, scene quality, header/corner coordinate consistency and geolocation accuracy
  - QC report delivered to ESA on 3<sup>rd</sup> August 2016; overall the quality of data products was good, with two major issues to be fixed:
    - Discrepancy of start/stop time reported in MD and filename
      - Due to a known problem on the start/stop time of L0 (WILMA) that triggers a side effect during the production of higher level data
    - Offset of geolocation features
      - Features sometimes found to be offset by up to 500m w.r.t. Google Earth Pro (up to 1 km in extreme cases)
  - Proposed further reprocessing with evolved processor



# Risks Register



ID	Description	Likelihood	Severity	Open date	Status	Notes
R-01	The “need” to include as many as possible IPF MSS improvements may delay the consolidation of a stable IPF Evolution baseline	Medium	High	Sept 2016	Active	Two possible mitigations envisaged: 1) We have prepared a baseline presented to this mtg, as consolidation 2) Possibility to consider the option to have a further reprocessing campaign, should enough improvements elements emerge to justify it
R-02	The complexity of validation may easily cause a shift in the overall planning	High	High	Oct 2016	Active	Problems may arise if any anomaly is detected in the implementation of (so many) structural changes.  A significant (in size and coverage) Pilot should be envisaged prior giving the green light for the full reprocessing
R-03	ALOS PALSAR QC timeline very strict may reduce phase-1 recommendation completeness	High	Medium	Oct 2016	Active	Mitigations: 1) The plan did already envisage scanning 50% of products in phase1, which are the ones that will be made available. Their availability is anyway on the critical path

# Issues Register



ID	Description	Severity	Open date	Status	Notes
I-01	QC Data access not effective, regardless of cooperativeness of all parties	High	Sept 2016	Active	Access to L1 data (Landsat) granted, but direct access to L0 data not yet available (only provision on demand)
I-02	Provision of TDS to ACS for development is impacted by data unavailability (bad timing)	High	Oct 2016	Closed	Data not yet available in the data librarian, and with NAS travelling to USGS did require a complex set up and special ESA authorization to extract them from the DSI offline repository.
I-03	limitations with TPM data usability when sufficient documentation is not also made available.	High	Oct 2016	Active	<p>For MOS: schema based description is insufficient and the data is in binary files. So, to make the MOS data useful this does need to be updated.</p> <p>For OceanSat-2: data is held in NetCDF files, so can be read more easily but the user also needs to read Product Specification documents / published papers to get a full understanding</p>

# Conclusion & Lessons Learnt



- Systematic, on-the-fly or reprocessing campaigns have common needs, but to be tailored:
  - The need for extended pilots confirmed for all TPMs
  - Extent, duration and complexity of Reprocessing plans and relative QC needs to be tailored to the specific project needs: same approach not valid for all cases
- SIP specification now quite stable, after a long period of maturity ramp-up
- The need for IDEAS+ to have direct access to the Landsat L0/AUX for IPF development and testing has significantly increased following the delay in MSS TDS provision via the ESA Data Librarian
- The need to balance the USGS updates with the ESA ones is not always straightforward and a trade-off often has to be made between aligning with the USGS advancements and offering something new and different in the ESA products.