Agenzia Spaziale Italiana

SGS (Science Ground Segment) Status

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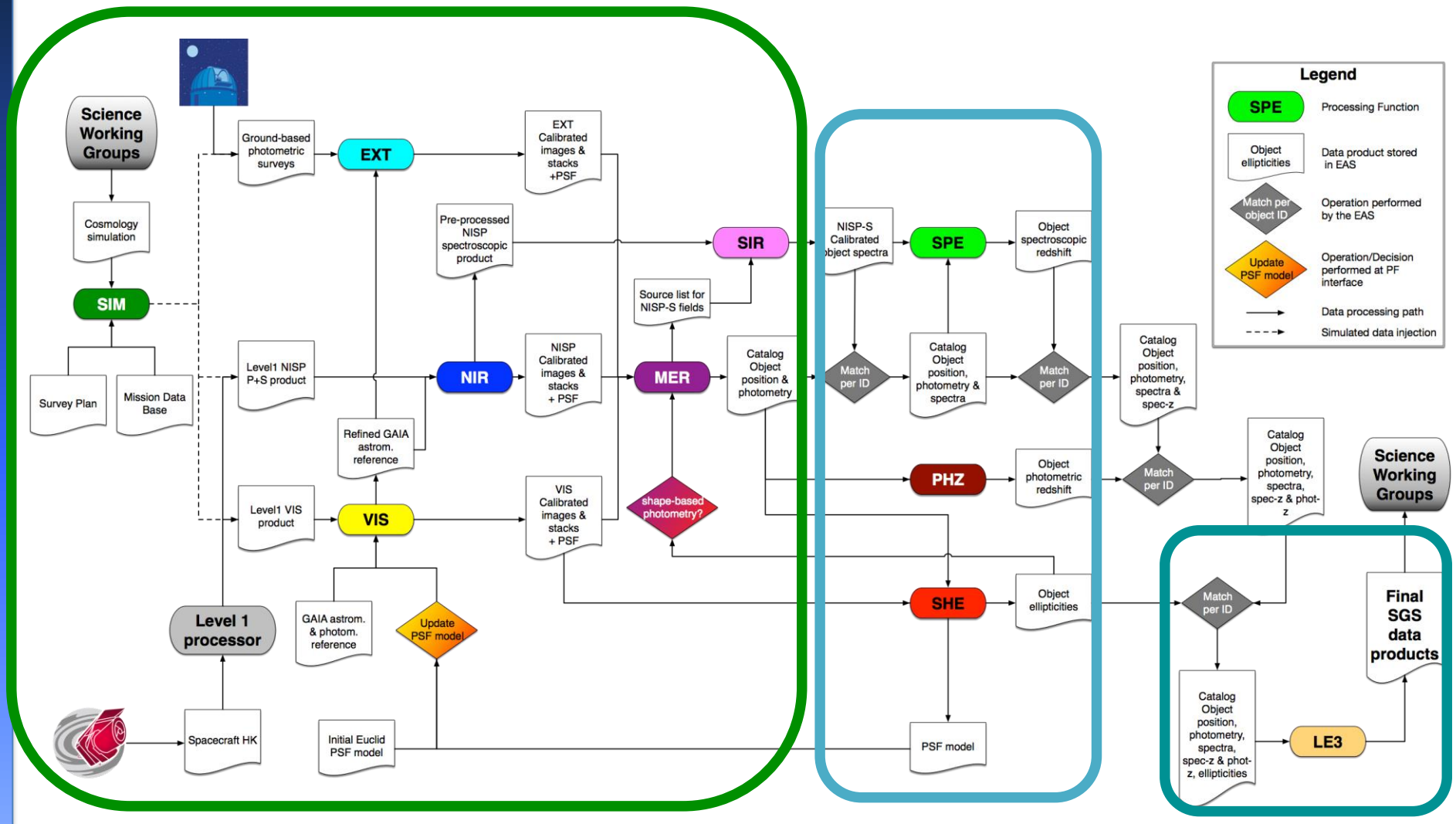
on behalf of Ec SGS Collaboration

Outline

- PVPRH concept
- GSRR
- Schedule

The Scientific Challenges path



End point of the SC3

End point of the SC4/5/6/7

End point of the SC8

PVRH# concept

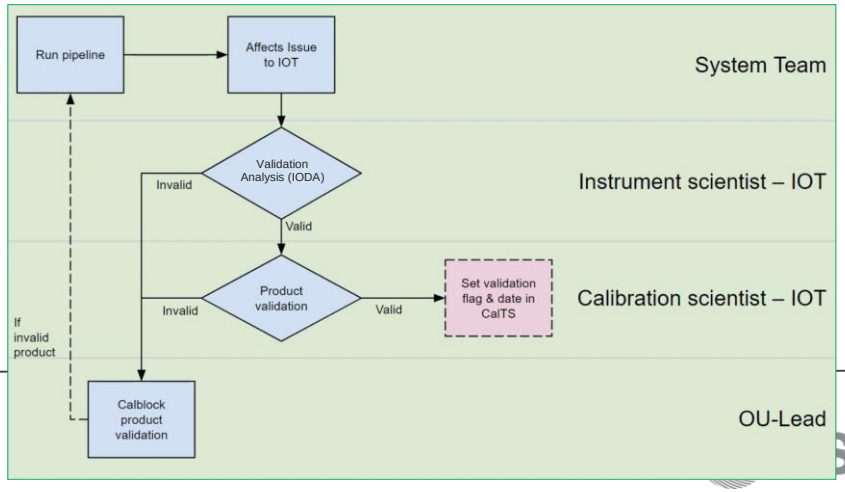
Simulate and process 16 CalBlocks and run an Operation rehearsal with the IOT.

CalBlocks selected to be mature enough from CalF defintion and model availability

IOT first E2E exercise:

- The Calblock validation is responsibility of the IOT.
- Process tracked trough redmine issues
- The validation is performed with the support of the Scientific and Calibration Support Team and Instrument experts, by using the IODA and additional analysis tools.

ID	CalBlock Name	Phase
PV-001	Self Calibration	PVPR#1
PV-002	NISP-P Absolute Photometric Standards	PVPR#1
PV-003	NISP-S Absolute Photometric Standards	PVPR#1
PV-006	Background model	PVPR#1
PV-008	Phase Diversity	PVPR#1
PV-009	NISP Wavelength Dispersion	PVPR#1
PV-010	NISP LED Flats	PVPR#1
PV-012	NISP Dark Current	PVPR#1
PV-019	NISP Grism Centers of Rotation	PVPR#1
PV-020	VIS Bias	PVPR#1
PV-021	VIS Darks	PVPR#1
PV-022	VIS PRNU and Brighter-fatter Effect	PVPR#1
PV-023	VIS Astrometric Solution	PVPR#1
PV-024	VIS nonlinearity	PVPR#1
PV-025	VIS PSF Calibration	PVPR#1
PV-031	VIS Blooming threshold and persistence	PVPR#1



PVPR#1 Outcome

PVPR#1 has been a good exercise, as it has permitted

- to develop and test pipelines never tested before
- to set up a validation process that will be useful for the real PV
- to simulate for the first time calibration products that Instrument Scientists and Calibration Scientist have analyzed.

It also has been challenging in all phases :

- OU-SIM had to adapt the simulation tools to the peculiarity of the sequences of observations defined in the calibration block;
- OUs had to develop/adapt their processing function to such peculiar sequences;
- Instrument Scientist had to learn how the products look like and identify the parameters to check and define a validation process.

Problems

- it drain more resources than expected on all OUs involved;
- Some instrument model where not yet complete (or arrive very in late) and MDB used was still the “as design”.
- OUs suffers lack of manpower.
- IOT needed some time to be *on the loop* and define what should have to check.

GSRR general Objectives

- To verify that the development and technical validation of the ground segment elements and their interfaces including management aspects such as resources, schedule and risk management are complete and commensurate with project requirements and schedule for a launch readiness by the first day of the launch period, defined as July-September 2023.
- To verify that the status and planning of any remaining system and operational validation activities with respect to validation objectives are complete and commensurate with project requirements and schedule.
- To verify that the development and validation status of operational products and plans (i.e. spacecraft user manual inputs, Flight Operations Plan (FOP), ground segment user manuals and procedures, commissioning and performance verification plans and procedures, etc.) are commensurate with the project schedule and mission needs.
- To verify that the key operational teams are identified, trained and adequately sized to perform the remaining activities up to Mission Commissioning Results Review (MCRR).
- To verify adequacy and compliance of quality assurance process with the applicable plans and project level requirements.
- To verify that the Science Ground Segment development and validation status and planning of non-schedule/launch critical systems are commensurate with the operational need dates as defined in the Annex G.
- To identify problem areas, which are potentially applicable to other programmes, as well as to identify, as appropriate, potential recommendations.

GSRR Organization

We provide 120 reference documents (+2 in common with OGS) and 67 review documents.

We presented the real status and a *realistic* schedule;

PO got request to present at the deep dive on 2 Nov and 8 of Nov:

- IOT status;
- a detailed schedule including IT and Validation Test, what should be done before the launch;
- margin and Plan B in case something goes wrong on PVRH#2;
- identify which Part of SPV3 is relevant and confirm the feasibility of SPV3 in parallel with other activity;
- roadmap for DR1 including SPV3, PDC, ESOP;
- SHE status for the processing point of view;
- Roadmap for PSF calibration.

SGS got 131 RIDs, 27 Major; on 29 we had the collocation and most of the RIDs has been clarified and some of them has been transformed in Actions.
51 Actions on SOC & MOC
32 Actions on SGS
Was agree to have a check point based on presentation round April to verify the SGS advancement

Steps	Relative timing	Dates
Delivery of documents expected for Internal GSRR (those highlighted in the list) [link to dedicated Livelink folder]	GSRR KO – 5 weeks	no later than **08 Sep 2022**
Feedback from the Internal GSRR reviewers	GSRR KO – 5 weeks GSRR KO – 4 weeks	08 - 15 Sep 2022
Discussion between custodians and Internal GSRR reviewers	GSRR KO – 4 weeks GSRR KO – 3 weeks	15 - 22 Sep 2022
Finalisation of documents after Internal GSRR feedback	GSRR KO – 3 weeks GSRR KO – 2 weeks	22 - 29 Sep 2022
Delivery of final documents to SGS managers: all Review and Reference documents [link to dedicated Livelink folder]	GSRR KO – 2 weeks	no later than **29 Sep 2022**
Data Package Readiness Check by ESA		30 Sep 2022
Review **Data package delivery** from SGS to ESA		4 Oct 2022
GSRR **Kick Off meeting** at ESOC, Darmstadt (hybrid format)	GSRR KO date	**13 Oct 2022**
Deep dive] #1, webconf (panelists to ask authors for clarifications): *SGS System* panel		20 Oct 2022
Deep dive] SGS System panel meeting #2, webconf (panelists to ask authors for clarifications): *SGS System* panel		2 Nov 2022
Deep dive] Data Processing panel meeting #2, webconf (panelists to ask authors for clarifications): *SGS Data Processing* panel		8 Nov 2022
RIDs available		no later than 14 Nov 2022
RIDs responses by documents authors		no later than **22 Nov 2022**
GSRR Panels **collocation meeting** at ESOC, Darmstadt (hybrid format): *SGS System* panel *SGS Data Processing* panel		29 Nov 2022
GSRR **Board report**		14 Dec 2022
GSRR **Board meeting**		20 Dec 2022

GSRR general Objectives

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GSRR Main Isssue

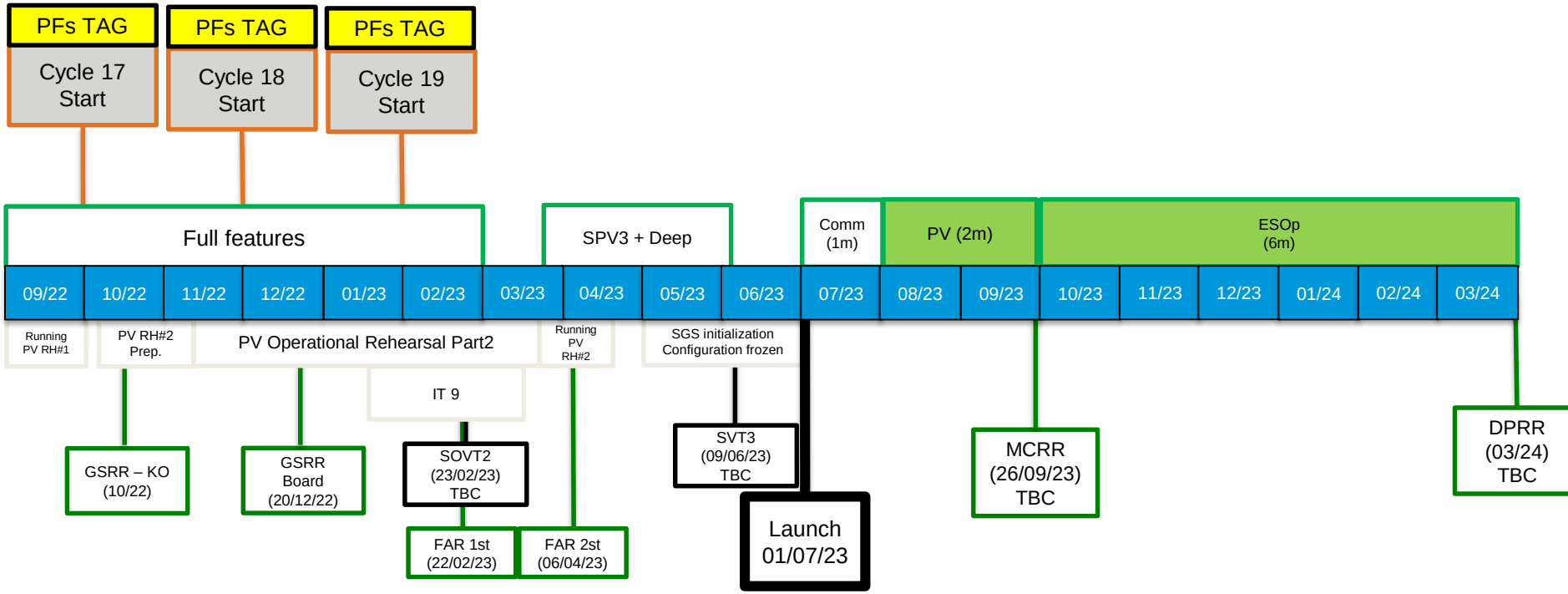
Board report is not yet available as the Data Processing report, what we received is only the System panel report:

- SOVT2 Planning and organization;
- data processing coordination and automation;
- impact of common Data Model changes during operations;
- overall schedule considerations;
- role of the SOST;
- SOC network bandwidth;
- VIS IOT manpower

Final recommendations:

- Project to step up the monitoring of the progress accordingly, to allow early identification of potential issues and timely implementation of mitigation measures as necessary;
- OGS and SGS prepare a report covering the closeout of the relevant actions and the status of SGS schedule critical activities, to be endorsed by the GSRR Panel Chairs and to be reported to the FAR Board, to allow a full closure of the GSRR.

SGS timeline – Launch July 2023

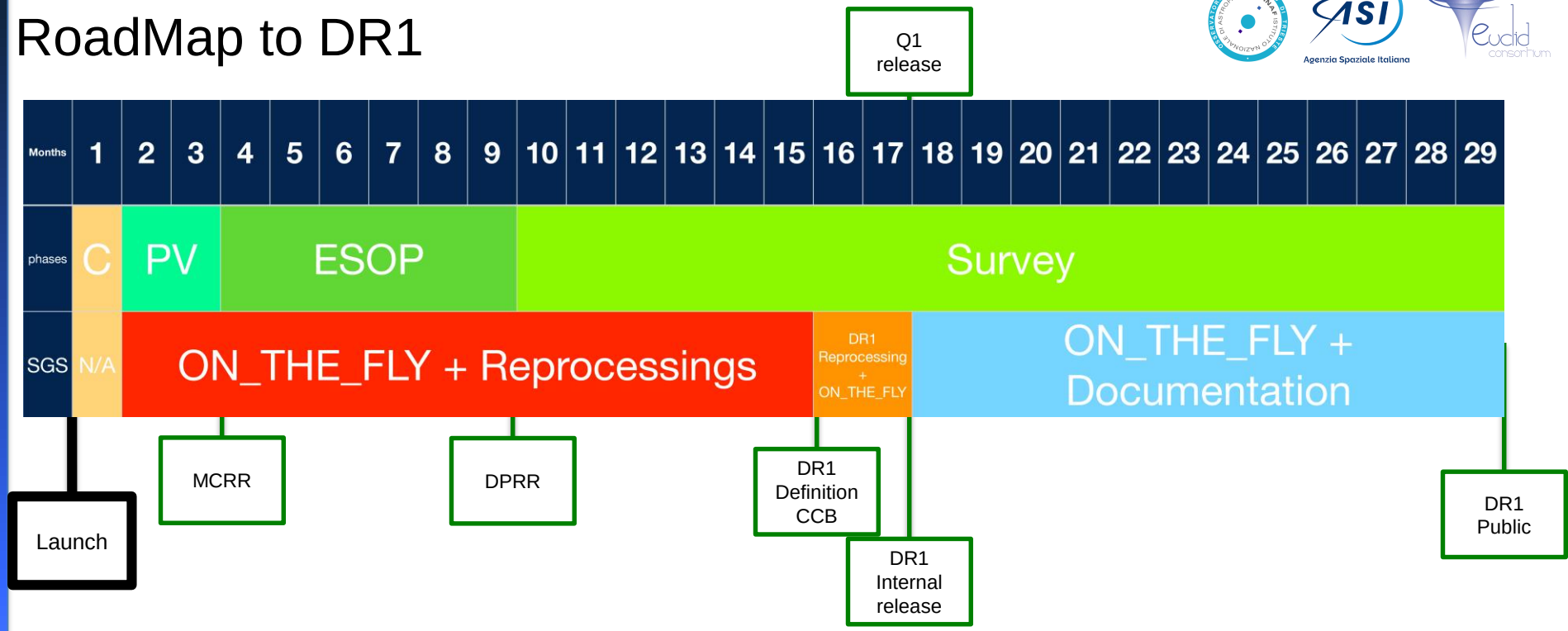


SGS Gantt schedule is available at the following link:
https://euclid.roe.ac.uk/projects/sgs-integration-planning/easy_gantt

SGS Schedule

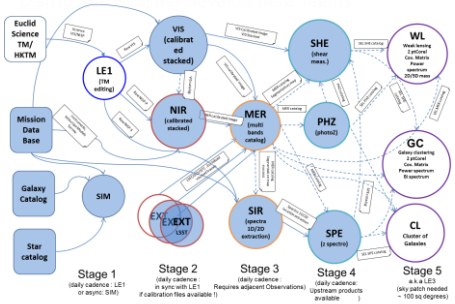
- SC8 data is still available and should used by OUs/SDCs to validate PF updates.
- The cycle based test continue, creating small simulations aimed at checking the inclusion of a specific feature at system level.
  - Cycle 16 only EXT was produced, cycle 17 with new VIS PSF is in production.
- We aim to have a small amount of Simulations (4 Obs) at Cycle 18 (to be available in a couple of week) with:
  - Survey 2022G
  - Flagship 2.0
  - “Real NISP layout”
  - Persistency
  - New Data Model
- PVRH#2 will include the already tested PVRH#1 calblock + new one (10 Calblocks). PVRH#2 will then be executed in March.
- Infrastructure Test campaign will be run between Jan to March 2023 (check all the components).
- In March - May 2023 just after the PVRH#2 ops we aim to have EDFN (few deg) + SPV3 (50 sqdeg).
- May June will be reserved to prepare our infrastructure to the real operations.

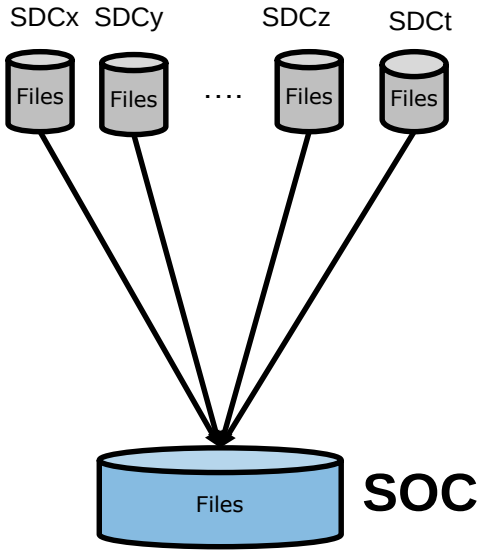
RoadMap to DR1



- SGS Ops team (Fr- It) will be in charge to submit *operate, monitor* PPO.
- The period of PV, ESOP and early survey phase is expected to have multiple reprocessing as calibrations and algorithms improve.
- From ESOP onwards, SGS will expose SWG to data every ~2 months to gather feedback
- The frequency of reprocessing is expected to decrease during Survey phase as the pipeline is stabilized, freeing OUs resources to validate the simulations.
- The DR1 production will last 2 months (per requirements). It may be faster if the production is based on the pipeline version used at the time for the ON_THE_FLY processing.
- The DR1 production will go through validation by the SWG, first with cosmology independent tests.

Operations related to Scientific Data Products publication





Euclid Archive DPS

DataProducts

- Quality Check Flags
- Technical Validation Status against GDPRD reqs
- Results of automatic/manual inspection of products

OUs & SDCs

Authentication and Authorization req.

Data products Filtering on Quality Check criteria to set 'To be published' flag for each product

Frequence of publication in line with :

Quick Release

Intermediate Release

Public Data Release

Requirements

SWGs

After proprietary period

Scientific Community

SGS Issues

OU-SIM (Spain leadership, France co-Lead)

SIM is one of the most critical OU. All our Processing Functions tests are based on Simulation and all the instrument effects identified during ILT should be simulated. Additional manpower was already asked.

IOT already performed SOVT1 and is preparing SOVT2 test together with MOC and SOC. IOT – SGS interface was for the first time exercised during PVRH#1 and is now fully engaged in the PVRH#2. IOT-VIS is, from my point of view, already at the minimum from manpower point of view. An urgent action was asked to UK. This point was discussed at the GSRR Collocation under panel request.

EAS has been moved at SOC (operational place).
Query optimization is ongoing and needed to support processing function operations and COORS interface to create Production Plans. SC8 data are available into SAS to experiment the interface versus the SWG.

MDB is the entry point to the SGS. It should contain all information extracted from the various ILT
We are still using MDB based on “design”, plan was to use an MDB based on “as built” for the incoming test to be more *near* to the reality. Process is finally converging, hoping will maintain the same attention.

Instrument models

Some instrument model are still missing or should be upgraded.
Some model (e.g. VIS BFE) don’t exists (and will never exist) due to not have been performed dedicated test during ILT, SGS should face with it.

SGS Operations Team

Team in charge of submit/control/verify the execution of various Pf is in creation. First two years will be under Fr responsibility then go to Italy.