NISP PV Phase

6° Meeting Euclid Italia - Roma – 19th January 2023

Paola Battaglia
IOT NISP Manager

On behalf of IOT NISP

Performance Verification Phase

Goals

- to assess the scientific performances of the commissioned instrument (operational conditions)
- to asses the mission scientific performances
- To state readiness to start nominal survey operations (end-of-mission scientific requirements are to be met)

To accomplish these goals the PV phase activities will obtain in-flight data.

- NISP will be operated in **Nominal Operational Mode** in an organisational set-up as close as possible to nominal survey operations.
- No further NISP parameter tuning during PV
- At successful completion of PV NISP shall be validated to start the nominal survey operations.

Performance Verification Phase

In-flight data will be used for:

	R.A.	Dec	Type	r [AB mag]	J [AB mag]	H [AB mag]	c
4502	17:53:18.65	+64:45:02.15	DA	17.45	18.26	18.36	ir
3533	17:49:11.78	+64:35:33.54	DA	17.01	17.86	18.26	
4916	18:11:44.96	+65:49:16.42	DA	17.76	18.62	19.14	
2542	04:00:27.30	-50:25:42.04	DA	18.28	19.38	20.00	
3726	04:13:45.06	-47:37:26.29	DA	17.00	17.71	18.27	
4142	04:22:11.36	-47:41:42.02	DB	15.77	16.66	17.17	v
51	17:53:00.90	66:31:51.30	Elliptical	19.30			f p

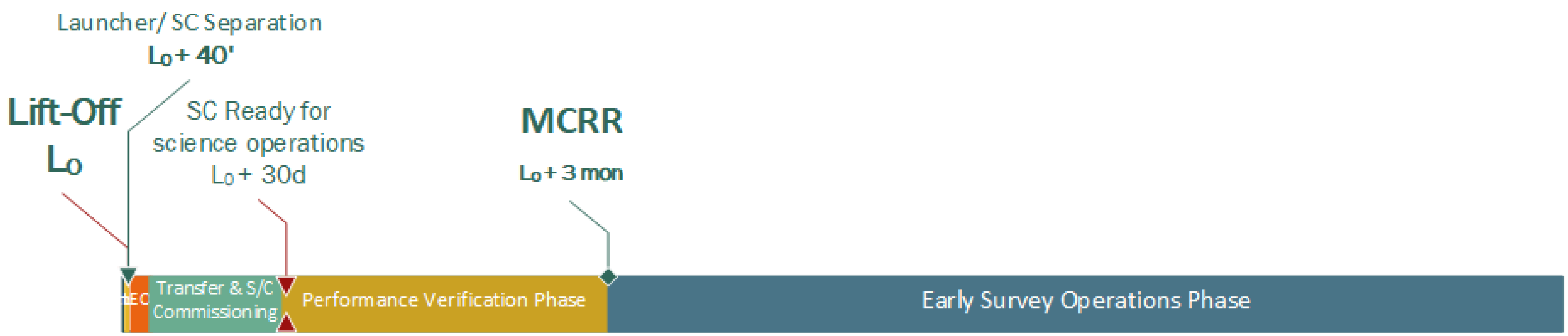
- Update on-ground calibration files with mission representative calibration data for the science data processing
- Commission the science data processing
- Measure the key performance parameters and compare to pre-launch expectations
- Validate the survey
- Verify the on-ground performance and calibration models and bootstrap the model parameters

Responsibilities and Timing (1/3)

The **IOT NISP starts its in-flight activities during PV phase** with a handover from the Instrument Development Team at successful Instruments Commissioning.

IOT NISP was officially established during ground tests at the beginning of 2020.

- IOT NISP is responsible for **Performance Verification** and **Instrument Routine Operations**
- PV Phase will last approximately 2 months (IOT NISP: 1 week @ MOC; 2 weeks @ SOC)



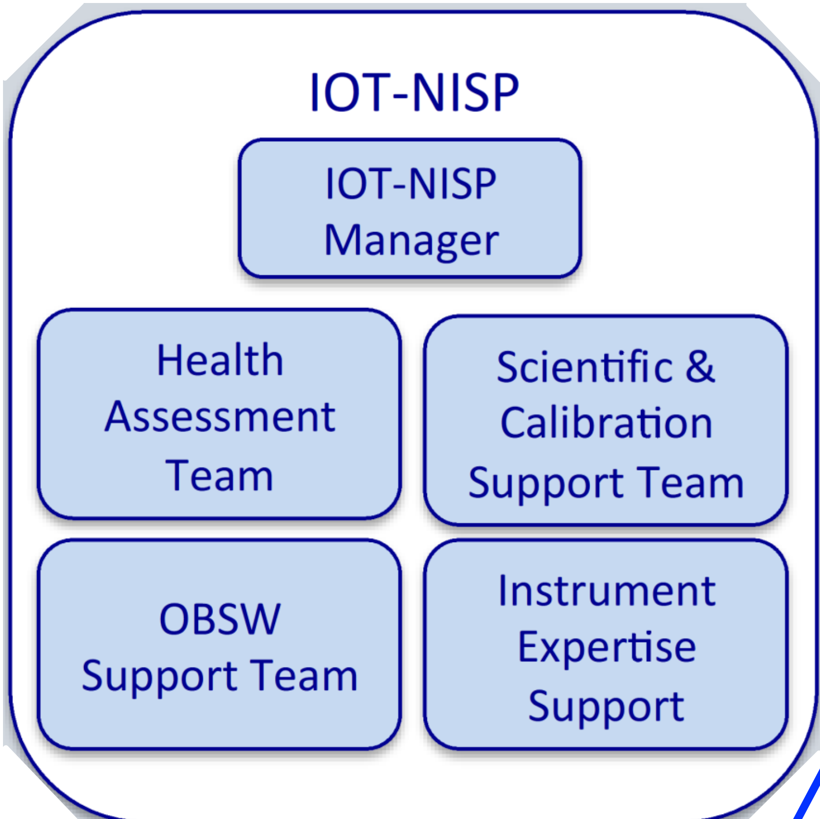
Commissioning and Early Operations allocated timeline
(EUCL-EST-PL-1-011, Euclid Mission Commissioning Plan)

Responsibilities and Timing (2/3)

- During **contingencies** the IOT NISP may operate the IWS to directly access the HK and science data for analysis.
- IOT NISP will provide command request inputs to the SOC for PV phase observations
- IOT NISP inform the SOC of the outcome of the executed observations.
- IOT NISP can request updates to the PV plan on a daily basis.
- IOT NISP is also responsible to perform and monitor instrument calibrations and long-term trend analyses (possibly leading to changes in the in-flight calibration plan of the nominal mission)

Euclid Control Room at Mission Operation center, Darmstadt (Germany)

Responsibilities and Timing (3/3)



- **IOT NISP Manager**: Paola Battaglia (INAF OAS Bologna)
- **Health Assessment Team Coordinator**: Chiara Sirignano UNIPd, INFN Padova)
- **Scientific & Calibration Support Team Coordiantor**: Stefano Dusini (INFN Padova)

  Contribution from OU-SIR (M. Scodeggio, INAF IASF Milano), OU-NIR (G. Polenta, ASI), William Gillard (Aix-Marseille Université, CPPM
- **OBSW Support Team Coordinators**:
  Eduardo Medinaceli (DPU; INAF OAS Bologna)
  Sebastiano Ligori (ICU, INAF OATo)
- **Instrument Expertise Support**
  Several contributors
  Enrico Franceschi (INAF OAS Bologna)
  Natalia Auricchio (INAF OAS Bologna)
  …

Link to OUs and Calibration Scientist

PV Plan and Calibration Sequences

- The PV plan and the routine calibration plan derive from the **Euclid Calibration Framework** (CalF).
- The CalF defines *in-flight* calibration products and survey characterizations
- Some calibration products (CalProducts) are directly observable (e.g. darks), others are derivative (e.g. zeropoints).
- All CalProducts have a correspondence in a **Calibration Block** (CalBlock) that provides the relevant data.

- The following blocks will be executed during PV phase

CALBLOCK-PV-001: Self Calibration
CALBLOCK-PV-002: NISP-P and VIS Absolute Photometric Standards
CALBLOCK-PV-003: NISP-S Absolute Photometric Standards
CALBLOCK-PV-004: Internal straylight check
CALBLOCK-PV-005: Survey Validation
CALBLOCK-PV-006: Background model
CALBLOCK-PV-006: Background model
CALBLOCK-PV-006: Background model
CALBLOCK-PV-009: NISP Wavelength Dispersion
CALBLOCK-PV-010: NISP LED Flats
CALBLOCK-PV-011: NISP IPC Verification
CALBLOCK-PV-012: NISP Dark Current
CALBLOCK-PV-014: NISP Baseline Map
CALBLOCK-PV-016: NISP Persistence
CALBLOCK-PV-017: NISP Reciprocity Failure
CALBLOCK-PV-018: NISP Nonlinearity
CALBLOCK-PV-019: NISP Grism Centers of Rotation

SOVT2 Calibration Sequences

- During **SOVT2** (Science Operations Verification Test), 94 h are available to test representative blocks of the commands that will be used in PV
- Test conduct: February 2023
- It will not a test of SGS (data sets are incomplete, and not representative for in-flight conditions)
- IOT NISP has prepared ICR for the Calblock that will be exercised during SOVT2:

Block	Name	Estimated time [h]
CALBLOCK-PV-001	Self Calibration	2.66
CALBLOCK-PV-002	NISP-P and VIS Photometric Standards	7.00
CALBLOCK-PV-003	NISP-S Photometric Standards	4.58
CALBLOCK-PV-004	NISP-S Photometric Standards	0.62
CALBLOCK-PV-006	Background model	1.14
CALBLOCK-PV-008	Phase diversity calibration demo	2.15
CALBLOCK-PV-009	NISP Wavelength Dispersion	8.18
CALBLOCK-PV-010	NISP LED flats	5.43
CALBLOCK-PV-011	NISP IPC Verification	1.64
CALBLOCK-PV-012	NISP Dark Current	1.57
CALBLOCK-PV-014	NISP Baseline Map	0.50
CALBLOCK-PV-016	NISP Persistence	3.72
CALBLOCK-PV-017	NISP Reciprocity failure	5.45
CALBLOCK-PV-018	NISP Nonlinearity	6.58
CALBLOCK-PV-019	NISP Grism Centers of Rotation	1.29

SOVT2 Calibration Sequences

	A	B	C	D	E	F	G	H	I	J	K	L
1	#COMMENT	NISP-P Absolute Photometric Standards										
2	DATE_TIME	17/01/23 15:54										
3	VERSION	01										
4	ICD_VERSION	1.4.2_candidate3										
5	ICR_ID	2020201										
6	ORIGINATOR	NISP_IOT										
7	JUSTIFICATION	PV										
8	SOURCE	CALBLOCK-PV-002										
9	VARIANT	PHOTO-J										
10	COMPONENT	PV										
11	INSTRUMENT	BOTH										
12	DITHER_TYPE	DELTA_XY										
13	DITHER_INST	NISP										
14	DITHER_CONFIG											
15	TARGET_CONFIG											
16	CALF_RST	calobs-block-pv-absolute-standards-imaging.rst										
17	Pointing	Activity	Pointing duration [s]	Offset [s]	Info	TCS	SW_CASW-wlmvseqflag	value	classifier			
18	01	01	460	0	GWA: REF to OPEN	NIFE251H	WCCF0399	Mvt Is Not Last	<e><><>			
19	01	02		40	FWA: REF to J	NIFE252B	WCCF0399	Mvt Is Last	<e><><>			
20	#COMMENT					TCS	SOC ID	value	classifier	File Name DPU1	value	classifier
21	01	03		58	Load DITH_CONFIG_TAB	NIFE502A	NISF0002	0	<r><dec><>	DSSF075A		<r><dec><
22	#COMMENT					TCS	DPU ID	value	classifier	DCU ID	value	classifier
23	01	04		63	Exposure 1	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>
24	01	05		180	Exposure 2	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>
25	01	06		297	Exposure 3	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>
26	#REPEAT	254										
27	#COMMENT					TCS	SOC ID	value	classifier	File Name DPU1	value	classifier
28	02	01	402	0	Load DITH_CONFIG_TAB	NIFE502A	NISF0002	0	<r><dec><>	DSSF075A		<r><dec><
29	#COMMENT					TCS	DPU ID	value	classifier	DCU ID	value	classifier
30	02	02		5	Exposure 1	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>
31	02	03		122	Exposure 2	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>
32	02	04		239	Exposure 3	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>
33	#END											
34	#COMMENT					TCS	SOC ID	value	classifier	File Name DPU1	value	classifier
35	256	01	414	0	Load DITH_CONFIG_TAB	NIFE502A	NISF0002	0	<r><dec><>	DSSF075A		<r><dec><
36	#COMMENT					TCS	DPU ID	value	classifier	DCU ID	value	classifier
37	256	02		5	Exposure 1	NIFE510A	NISF6007	Broadcast	<e><><>	NISF6009	Broadcast	<e><><>

Sheet1

Thank You!

INAF ISTITUTO NAZIONALE DI ASTROFISICA

ASI Agenzia Spaziale Italiana