



Agenzia Spaziale Italiana



On the SIR PF status As of February 2022

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SIR PF: recent milestones



Dec 2020 – Jan 2021: ESA Implementation Review

June 2021: ESA IR Close-out (extra step for IR)

May 2021 – Sept 2021: SGS Scientific Challenge #8

March 2022: ESA Readiness Review



Dec 2020 to Jun 2021 improvements



5.1.1. SPRs Summary Table

This section contains the summary table of the SPRs originated by the execution of the test cases listed in Table 4-1. The table associates to each test case: 1) the result of the execution, i.e. OK (success) / POK (partial success) / NOK (failure); 2) the list of SPRs originated by the execution of the test case. The list contains one SPR per row; each SPR is expressed in terms of a reference to the SPR management system where the SPR is stored.

Test Case ID	Result	List of SPRs
TC-SIR-000001-object-positions	OK	
TC-SIR-000002-zeroth-orders	OK	
TC-SIR-000003-zeroth-first-order-distance	POK	Redmine Issue #14828

5.1.2. Requirements Validation Summary Table

The table in this section provides an overview on the requirements validation at the end of the test campaign.

This table is used to feed the requirement validation values in Enterprise Architect.

#	Requirement	Coverage (%)	N.OK	N.POK	N. Tests
1	R-SIR-CAL-F-020	50	2	1	3
2	R-SIR-CAL-F-030	50	1	1	2
3	R-SIR-CAL-F-040	100	1	0	1

December 2020: 23 Test Cases
 11 OK; 7 POK
 5 Not executed

June 2021: 24 Test Cases
 15 OK; 6 POK
 3 Not executed

December 2020 on **simplified** simulations
 June 2021 on **full complexity** simulations

December 2020: 18 reqs
 Coverage: $1330 / 1800 = 0.74$

June 2021: 19 reqs
 Coverage: $1500 / 1900 = 0.79$



SIR PF status, Feb 2022



Primarily good news

Scientific and Calibration Pipelines have all main pieces in place

SC8 data reduction campaign overall OK

Work on Validation and Data Quality steadily progressing

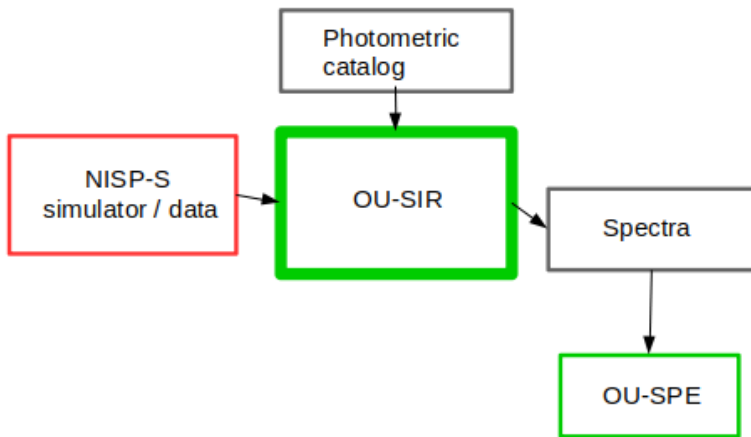
Ongoing work to improve the “small” details of spectra handling (CR-rejection, optimal extraction, spectra over-sampling)

But we also have some points that are not totally OK...

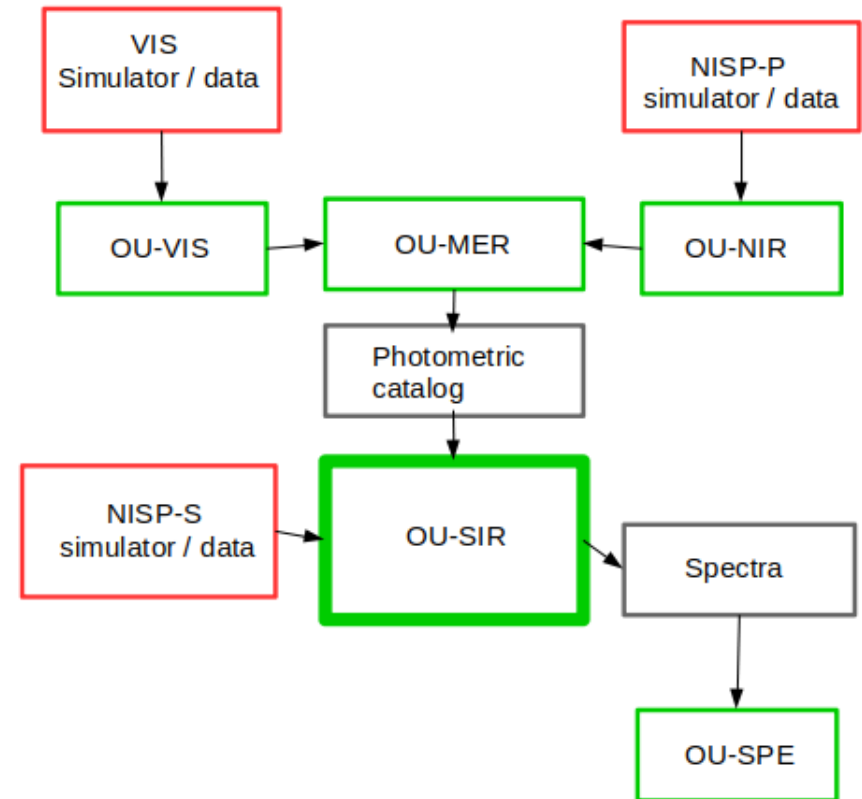


Things are quite complicated...

The common perception:
one simulator (instrument)
+ one pipeline



The real situation:
three simulators (instruments)
+ four pipelines



DQ monitoring in action

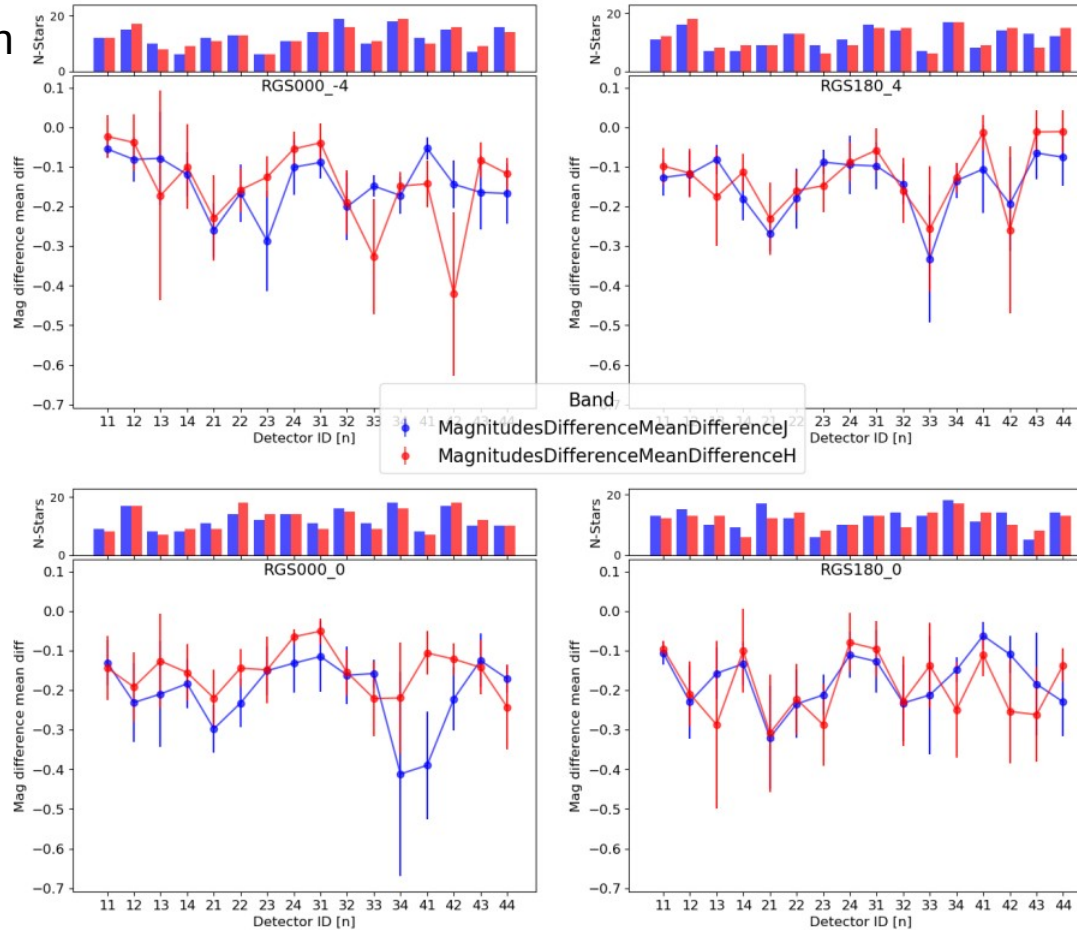


Magnitude comparison
Spectrum – MER

Monitoring bright stars
in all detectors and
all exposures

Extracted Spectra - Flux Calibration

Clipped Weighted-mean of magnitude diff from spectra and catalog in J, H bands

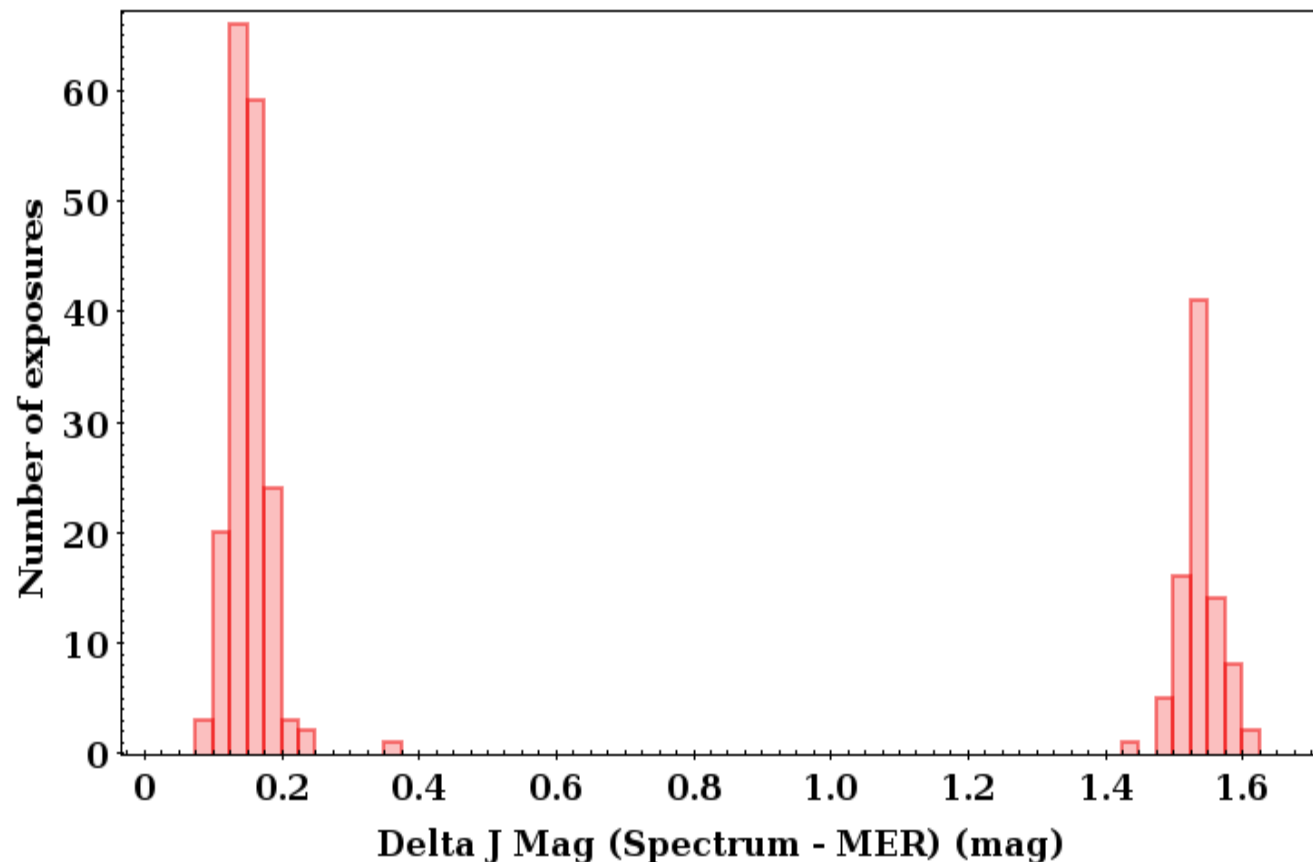


DQ monitoring in action

Magnitude comparison
Spectrum – MER

Cumulative distribution
For all RGS000
Exposures in SC8

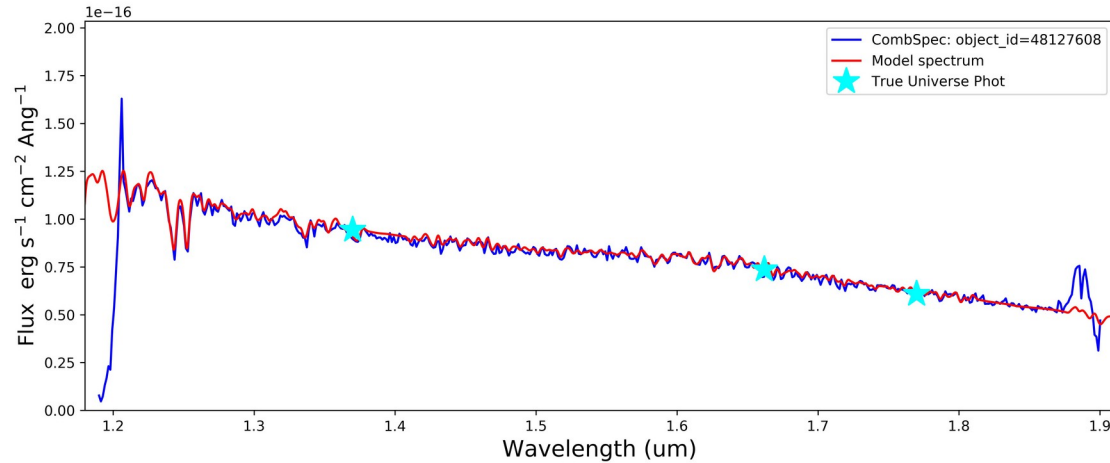
178 exposures OK
87 exposures NOT OK



Validation in action

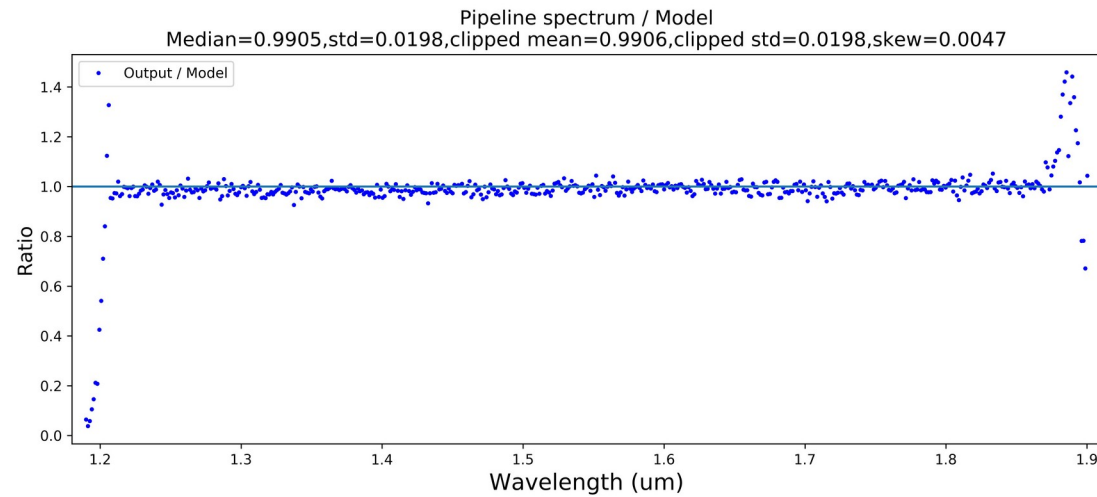


SIM Input Spectrum for star: 48127608, SED: 2624 Result: ACCEPTED



Absolute flux comparison

Spectrum / TU (spec)
Spectrum / TU (phot)



About the things that are NOT OK



Spectroscopic data: a really complex data-set

Before we can produce good data, we need VIS+NIR+MER to be almost perfect in dealing with the photometric data

To fully debug a problem it takes an insane amount of time

Still need to work on a data visualization tool capable of hiding most of the data complexity (but don't really have the time to do it)

Software development inside the SGS environment

Really complex environment; very difficult to keep up with changes for a small team like SIR



About the things that are NOT OK



The SIR PF: relationships inside the Euclid system

Not as much interaction among OUs as we would need or like to have; it becomes quite difficult to understand the other PFs data-products, or how the SIR data-products are used

This makes it quite difficult to have a complete validation of the full data-chain that leads to the redshift measurements (and when we manage to do it, it takes a lot of time...)

Not as much interaction with GC SWG as we would like to have: it becomes quite difficult to understand how to optimize the data handling to provide the best possible input to the data analysis part

We are actively working to overcome these limitations (but you guess it ... it takes time)



Summary



- Significant improvements for the SIR PF over the last 12 months
- 21 out of 24 Test Cases defined in the Validation Plan are now OK or POK
- Clear path forward to solve remaining uncertainties
- Still the Spectroscopic Pipeline Validation is a very complex exercise, with many important external dependencies: all three instrument simulators, the VIS, NIR, (EXT?) and MER pipelines
- It will take a lot of time before we will get good spectroscopic data out of Euclid
- We need to improve significantly the connection between the spectroscopic pipelines and the GC SWG



