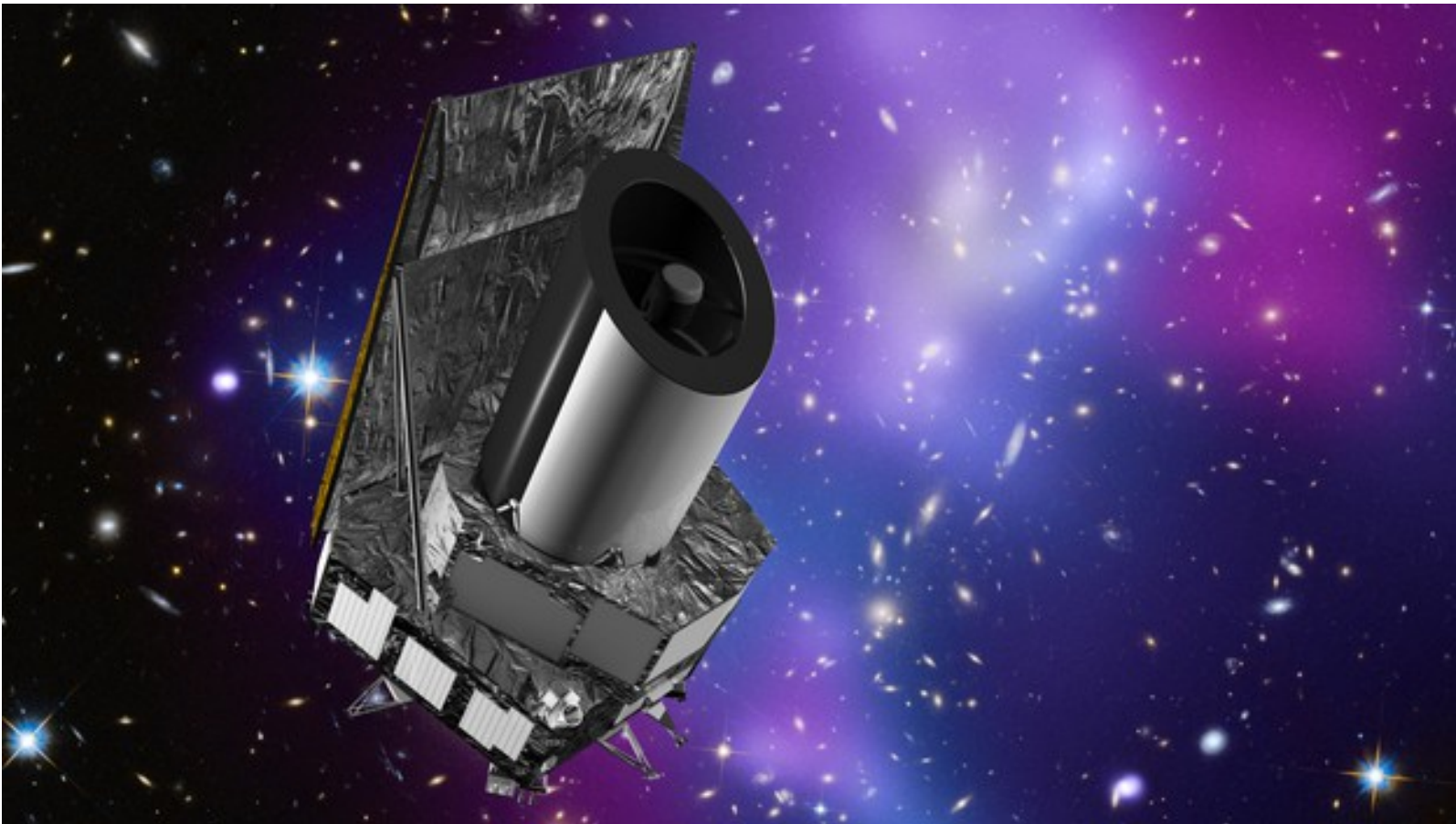
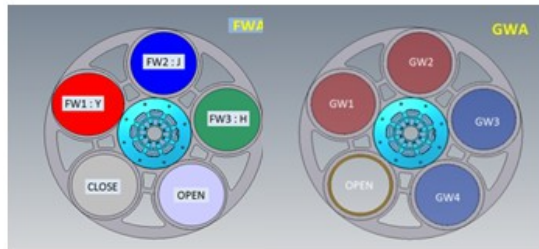
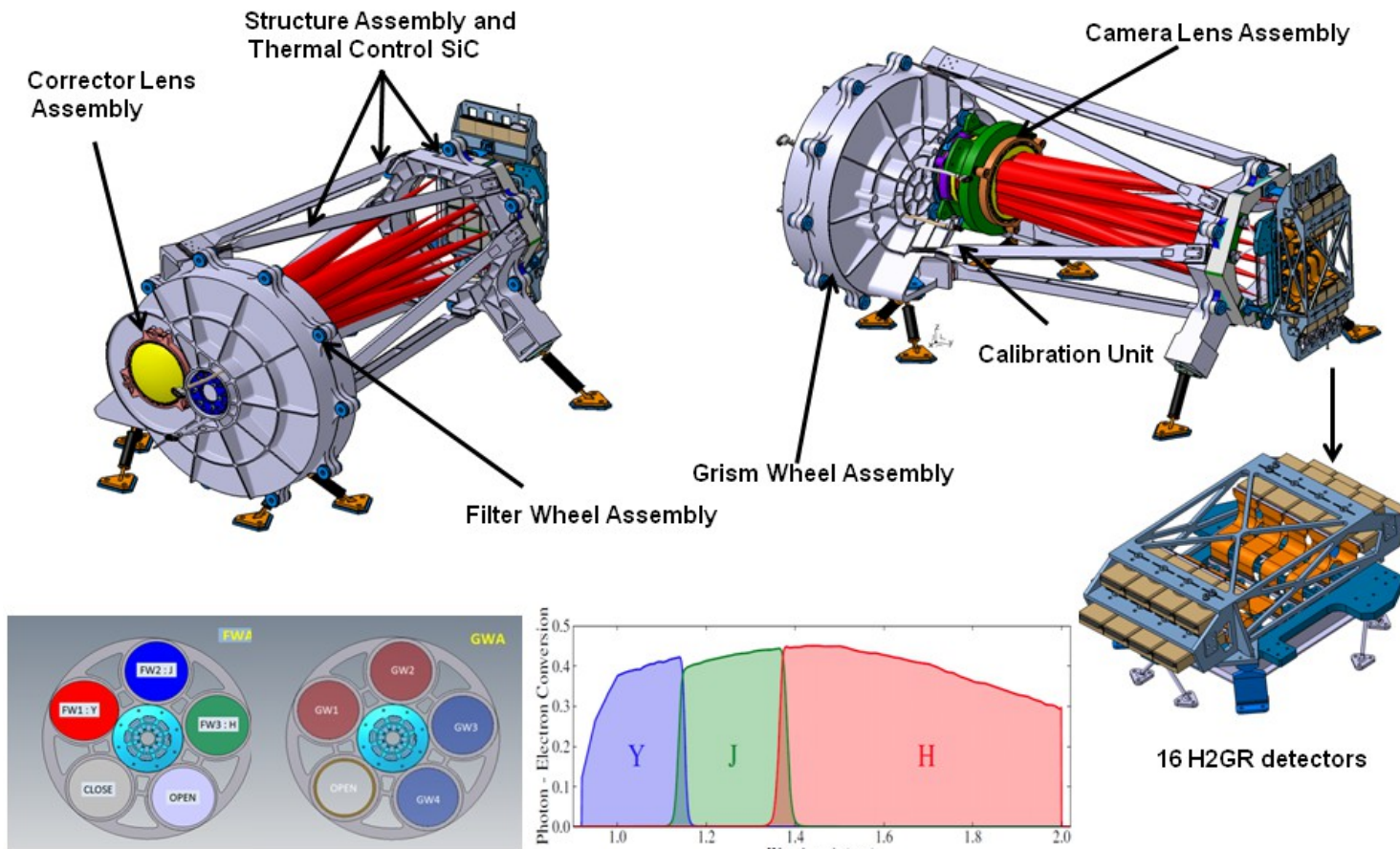


Acquisition pour la caractérisation des capteurs du Near IR Spectrometer Photometer (NISP)

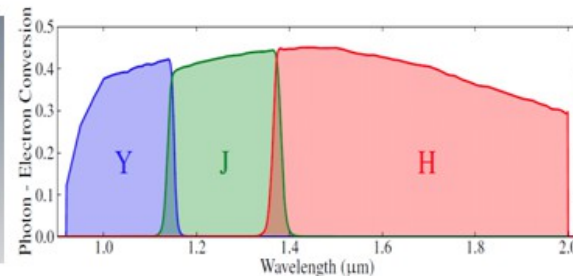
Sylvain Ferriol, IPNL



Acquisition pour la caractérisation des capteurs du Near IR Spectrometer Photometer (NISP)

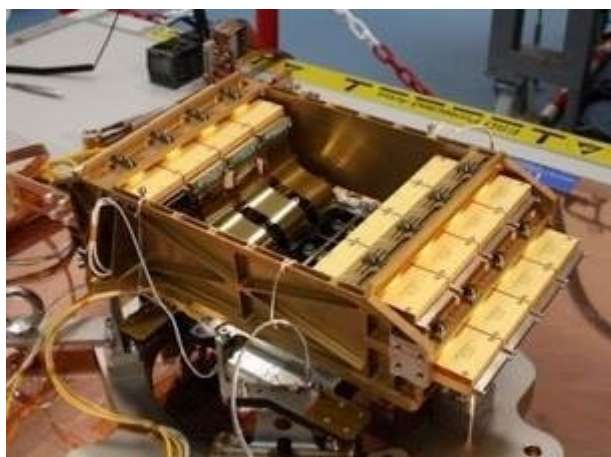


Filters and grisms positions in wheels

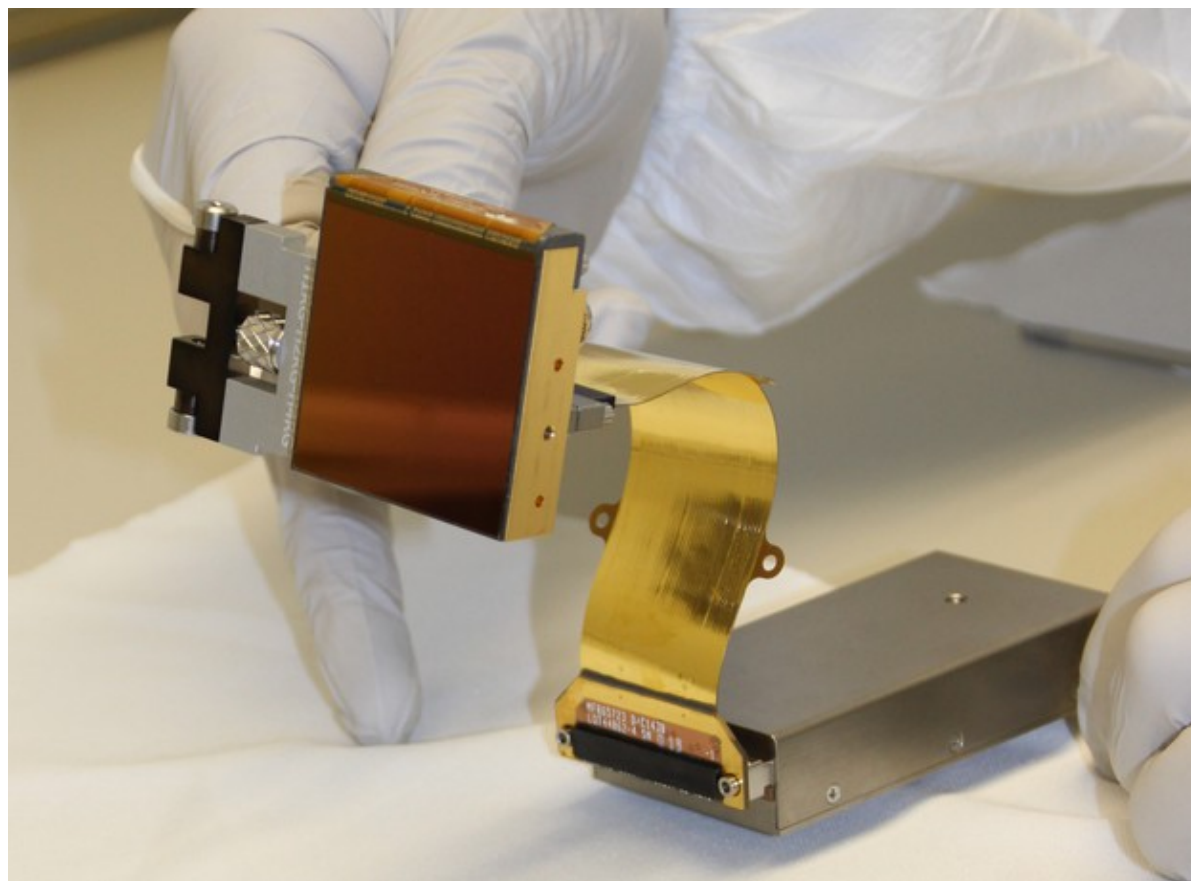


NISP throughputs through the Y, J and H filters

Acquisition pour la caractérisation des capteurs du EUCLID / NISP



Focal plane
16*(H2RG+ASIC)



Acquisition pour la caractérisation des capteurs du Near IR Spectrometer Photometer (NISP)



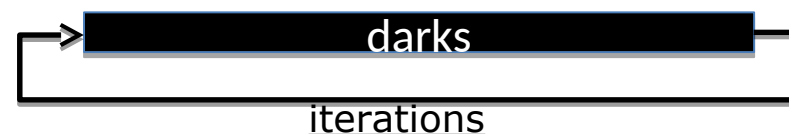
4 octobre 2018

Sylvain FERRIOL (IPNL)

Crédit photo : Camille Moirenc

Workflow de caractérisation implique différents types d'acquisition (runs)

- Dark
 - Reset Voltage
 - Baseline (pedestal)
 - First G, Reset noise
 - Inter Pixel Capacitance
 - SPR method
 - Electrical test $V_{in}=f(DN)$
 - V/V non-linearity
- Flat with various Illumination patterns
 - non-linearity test
 - e/V non-linearity
 - Latency/reciprocity
 - de-trapping/trapping



Context de Workflow

Global description

- SCS description: ID, personality file, position
- EGSE: ID, s/n, type, ID
- ENV description: led type, flux calib, slow control host (ip/port)
- Other: mail, nb. CPUs

Execute Workflow's Runs

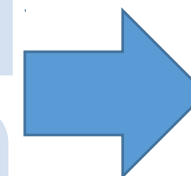
- List of runs
- Acquisition script
- quality checks script

QC generates Maps

- baseline
- KTC
- Cds noise
-

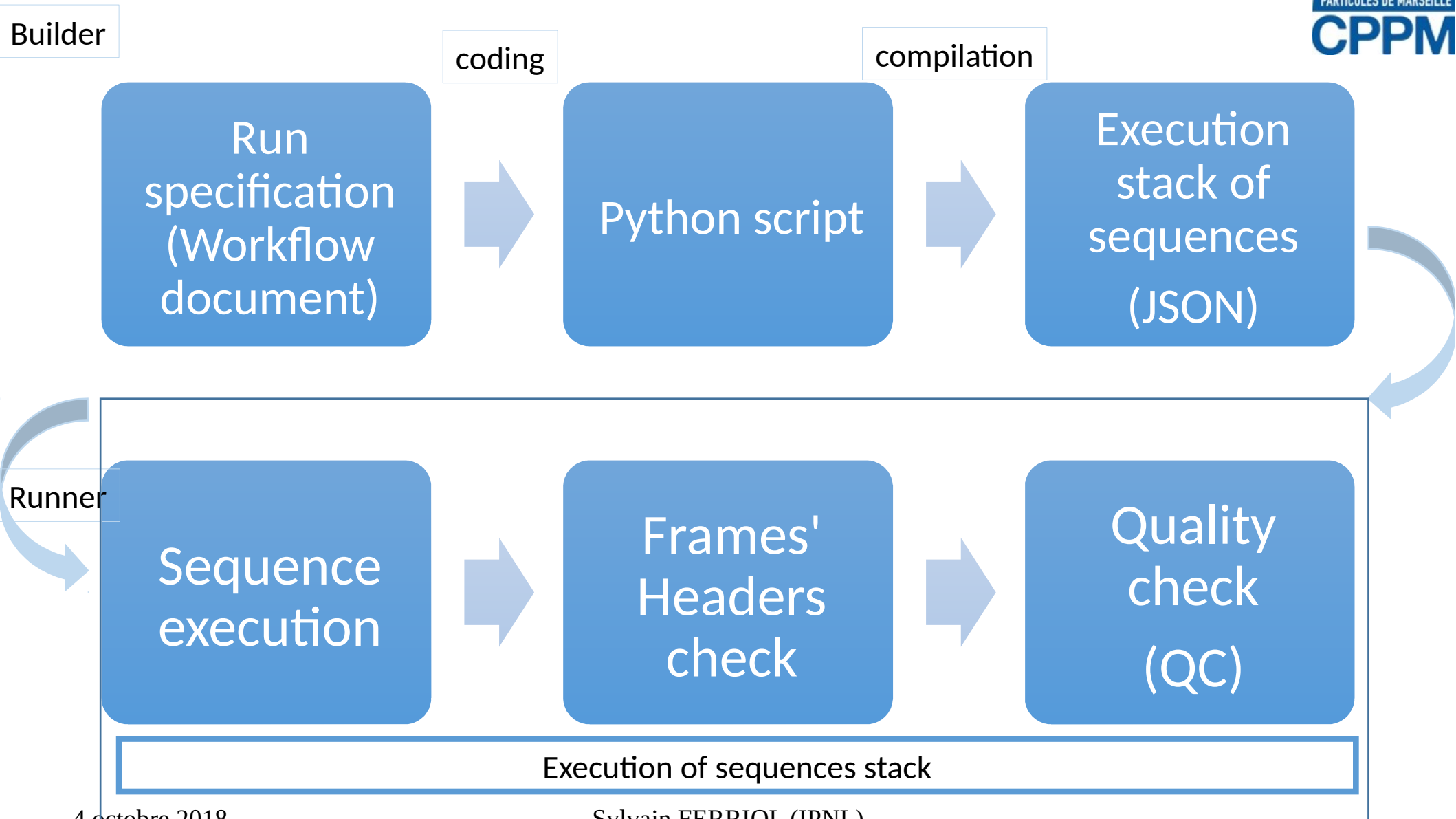
QC reads Reference Maps

- DCL maps
- Maps generated by previous runs in the workflow

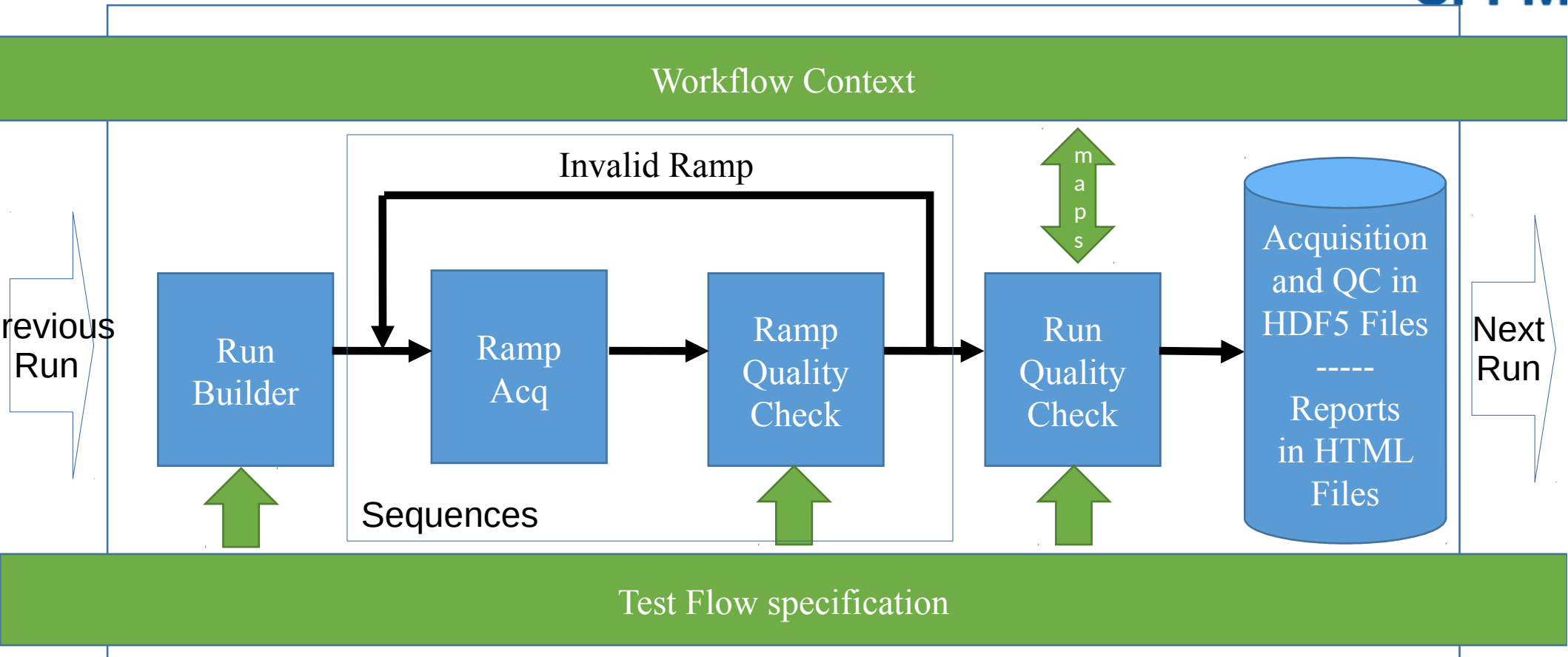


Additional
Metadata
shall be stored in
a tiny database
embedded
in HDF5 files:
**Workflow
Context**
(JSON structure)

Description d'un Run



Description d'un Run



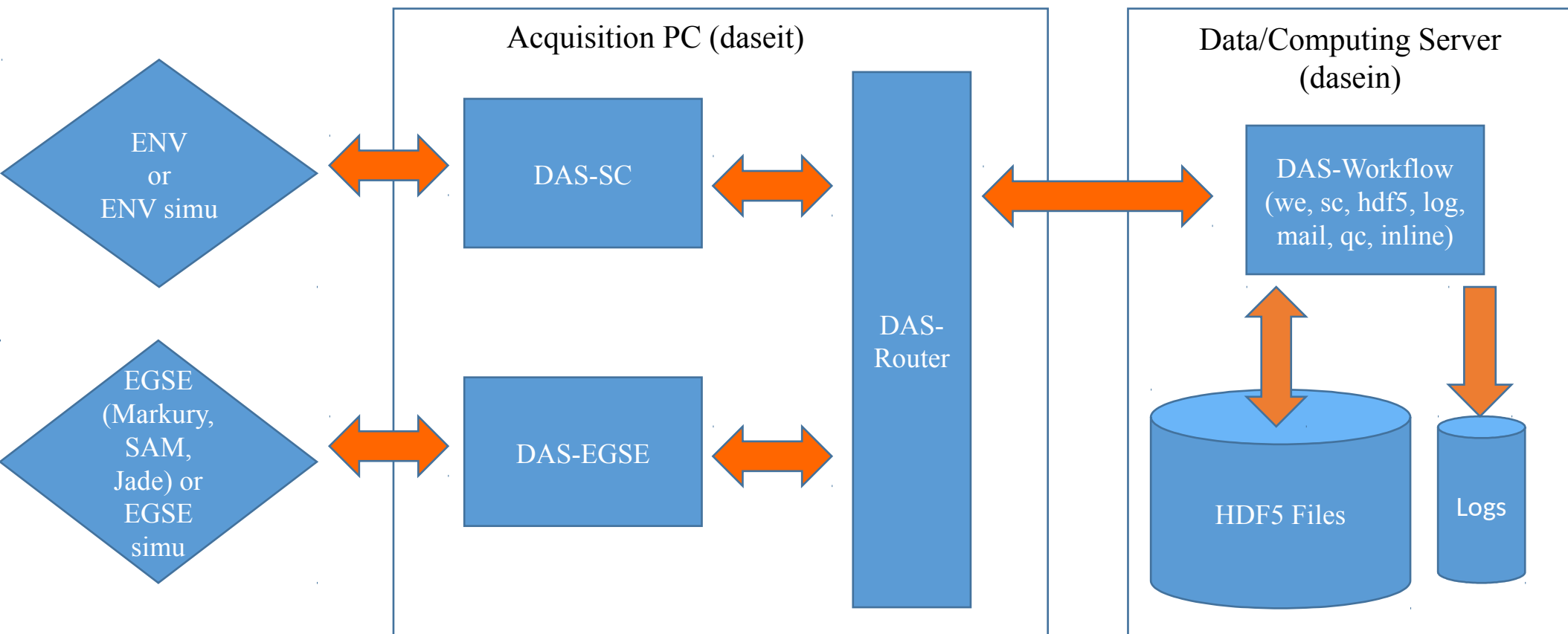
Script d'acquisition d'un Run

```
def script(setup):  
    p = Params(  
        version = 1.0, #RB 01/07/2016  
    )  
  
    run = new_run("zodi", p, setup)  
  
    init(run, setup.flux_fpa_es(0).shutter('close').acquire(1, 1, 0, 400, 1, 0))  
  
    cycle(run, nb_iterations = 1,  
        pattern = pattern(  
            sequence(setup.flux_fpa_es(2).shutter('open').acquire(100, 1, 0, 400, 1, 0)),  
        ))  
  
    end(run, setup.flux_fpa_es(0).shutter('close').acquire(1, 1, 0, 400, 1, 0))  
  
    return run
```

Estimation d'un Workflow

```
(euclid)euclid@mareuclid:~$ andromede-cmd workflow.estimate
2016-09-21T16:57:35+0200 [['1:03:33.970000', 'initial_check', '1:03:33.970000', '40.8GiB'],
2016-09-21T16:57:35+0200 ['1:13:40.005000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['9:24:53.455000', 'baseline', '8:11:13.450000', '255.2GiB'],
2016-09-21T16:57:35+0200 ['9:34:59.490000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['2 days, 1:17:35.940000', 'dark_science', '1 day, 15:42:36.450000', '1.6TiB'],
2016-09-21T16:57:35+0200 ['2 days, 1:27:41.975000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['3 days, 2:56:46.745000', 'dark_long', '1 day, 1:29:04.770000', '1.0TiB'],
2016-09-21T16:57:35+0200 ['3 days, 3:06:52.780000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['4 days, 23:55:11.645000', 'latency_low_flux', '1 day, 1.8TiB'],
2016-09-21T16:57:35+0200 ['5 days, 0:05:17.680000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['7 days, 0:50:36.375000', 'nl_low_flux_dark', '2 days, 0:45:18.695000', '1.9TiB'],
2016-09-21T16:57:35+0200 ['7 days, 1:00:42.410000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['9 days, 1:17:48.190000', 'nl_low_flux_zodi', '2 days, 0:17:05.780000', '1.9TiB'],
2016-09-21T16:57:35+0200 ['9 days, 1:27:54.225000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['9 days, 18:43:31.840000', 'nl_med_flux', '17:15:37.615000', '704.2GiB'],
2016-09-21T16:57:35+0200 ['9 days, 18:53:37.875000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['10 days, 11:06:59.240000', 'nl_hig_flux', '16:13:21.365000', '662.2GiB'],
2016-09-21T16:57:35+0200 ['10 days, 11:17:05.275000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['11 days, 6:35:32.340000', 'latency_hig_flux', '19:18:27.065000', '788.2GiB'],
2016-09-21T16:57:35+0200 ['11 days, 6:45:38.375000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['11 days, 22:50:53.325000', 'zodi', '16:05:14.950000', '659.0GiB'],
2016-09-21T16:57:35+0200 ['11 days, 23:00:59.360000', 'reference', '0:10:06.035000', '6.5GiB'],
2016-09-21T16:57:35+0200 ['TOTAL', '11 days, 23:00:59.360000', '11.4TiB']]
```

Architecture DAS



Programmation asynchrone

- By the nature the Workflow is a non fully deterministic system due to
 - EGSE errors
 - Env. Errors
 - Abort signal
 - Dispatched processes on different hosts
- Asynchronous System
 - Event-Driven Programming
 - IOT technology
 - Objects communicate by messages instead of directly invoked by name

Programmation asynchrone



Synchronous
one task after another
one execution flow



Multithreaded
parallel execution
complex execution flow
hard synchronization

Asynchronous
Sequence of small steps triggered by network events
No parallelism, easy synchronization
More complex programming because it is non-sequential



Time

Structure d'un fichier HDF5

	time	R-ERROR	R-T_PT10...	R-SHUTTER	W-T_SCA	R-I_PHD_1	W-T_SCE	R-T_PT100_9	R-T_PT10...	R-T_PT10...	R-T_PT10...
0	1.4739999779543...	0	82.00222...	FALSE	90.0	0.0	135.0	116.0195022167	91.95282...	86.74367...	81.94259...
1	1.4739999843508...	0	82.00222...	FALSE	90.0	0.0	135.0	116.0195022167	91.95282...	86.74367...	81.94259...
2	1.4739999857276...	0	82.00236...	FALSE	90.0	0.0	135.0	116.0189261619	91.95296...	86.74311...	81.94496...
3	1.4739999871135...	0	82.00236...	FALSE	90.0	0.0	135.0	116.0189261619	91.95296...	86.74311...	81.94496...
4	1.4739999884333...	0	82.00236...	FALSE	90.0	0.0	135.0	116.0189261619	91.95296...	86.74311...	81.94496...
5	1.4739999898400...	0	82.00236...	FALSE	90.0	0.0	135.0	116.0189261619	91.95296...	86.74311...	81.94496...
6	1.4739999914601...	0	82.00305...	FALSE	90.0	0.0	135.0	116.019358203	91.95296...	86.74269...	81.94343...
7	1.4739999928942...	0	82.00305...	FALSE	90.0	0.0	135.0	116.019358203	91.95296...	86.74269...	81.94343...
8	1.4739999942628...	0	82.00305...	FALSE	90.0	0.0	135.0	116.019358203	91.95296...	86.74269...	81.94343...
9	1.4739999956528...	0	82.00305...	FALSE	90.0	0.0	135.0	116.019358203	91.95296...	86.74269...	81.94343...

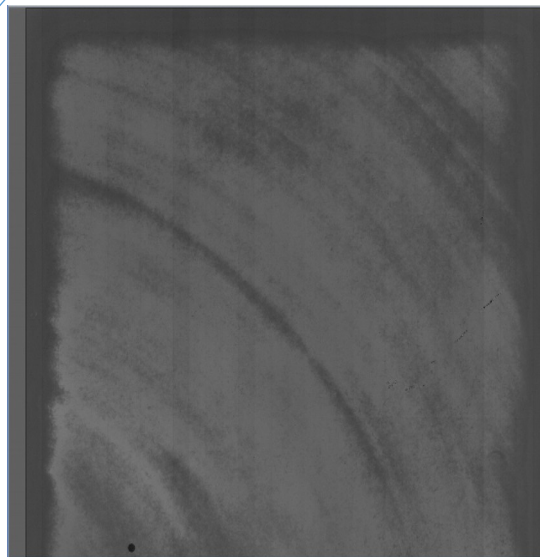
```

{SETUP_LAB": "cppm",
"CTX_VERSION": 1,romede",
"MAIL__SMTP_HOST": "zrelay.in2p3.fr",
"MAIL__SMTP_FROM": "workflow.andromede@ipnl.in2p3.fr",
"MAIL__SMTP_TO": ["Thorlabs 2050P",
"legras@cppm.in2p3.fr",
"ctlemens@cppm.in2p3.fr",
"secroun@cppm.in2p3.fr",
"herrerros@ipnl.in2p3.fr",
"s.ferriol@ipnl.in2p3.fr",
"r.barbier@ipnl.in2p3.fr"
],
"SETUP_USER": "Benoit",
"SETUP_VERSION": "4",
"SETUP_DP_PATH": "/renoir/euclid/euclid/git/setup_andromede/soft",
"SETUP_MCD_DP_PATH": "/mcd",
"SETUP_ENV_MODEL_FPATH": "./setup/sc_params.json",
"SETUP_LAB": "cppm",
"SETUP_ID": "andromede",
"SETUP_SITE": "cppm",
"SETUP_LED_ID": "2050P_1",
"SETUP_LED_NAME": "Thorlabs 2050P",
"SETUP_LED_WL": 2.05,
"SETUP_LED_FLUX_CONV_ES_UA_CSV": "./setup/leds/calib_2050p_1_20160728.csv",
"SETUP_LED_FLUX_ADU_F_ES_CONV": 1.19,
"SETUP_OT_SCA": 90,
"SETUP_OT_SCE": 135,
"SETUP_WE_ID": "markury",
"SETUP_WE_NAME": "Markury",
"SETUP_WE_SN": 12345,
"SETUP_WE_ASIC_SCS_1": 3,
"SETUP_WE_ASIC_SCS_2": 4,
"SETUP_NB_SCS": 2,
"SETUP_SCS_1_ID": "188-228-579",
"SETUP_SCS_1_SCA": "H2RG-17188",
"SETUP_SCS_1_SCE": "17579",
"SETUP_SCS_1_CFC": "2-28",
"SETUP_SCS_1_POSITION": "1",
"SETUP_SCS_1_VERSION": "1",
"SETUP_SCS_1_MCD": "scs-188-228-579_v1.mcd",
"SETUP_SCS_2_ID": "192-828-492",
"SETUP_SCS_2_SCA": "H2RG-17192",
"SETUP_SCS_2_SCE": "17492",
"SETUP_SCS_2_CFC": "17828",
"SETUP_SCS_2_POSITION": "2",
"SETUP_SCS_2_VERSION": "1",
"SETUP_SCS_2_MCD": "scs-192-828-492_v1.mcd",
"WORKFLOW_DATA_DP_PATH": "/euclid_data_03/Andromede/PR2",
"WORKFLOW_LOG_DP_PATH": "./log",
"WORKFLOW_NB_CPUS": 16
}

```

Env. Measures

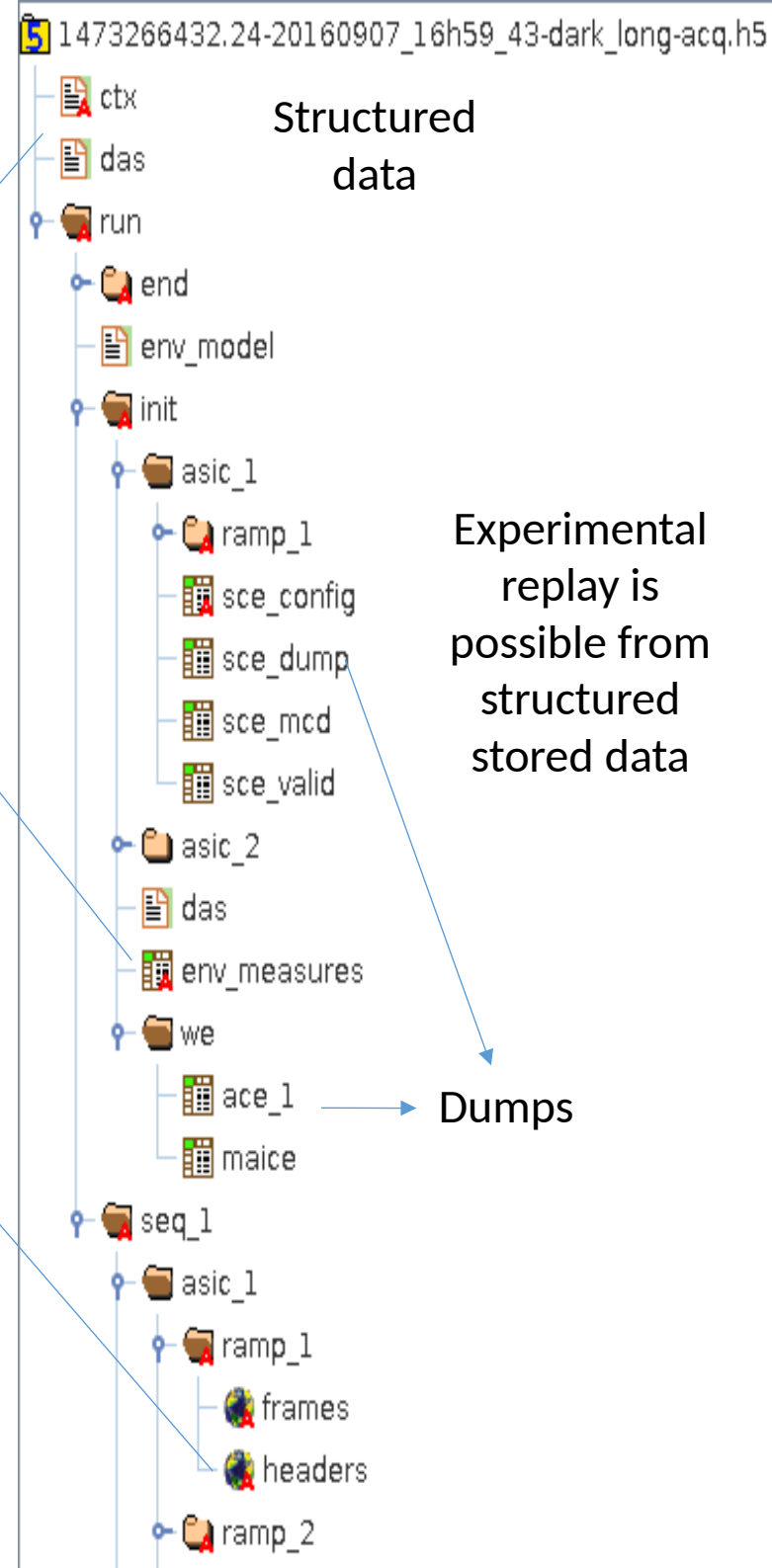
Frames



Context and Workflow run config

4 octobre 2018

Sylvain FERRIOL (IPNL)



Structured data

Experimental replay is possible from structured stored data

Dumps

Rapport du Quality Checking (QC)

🏠 SCA: 18223, SCE: 0033-F056

initial_check_led
dasein 0.14.15.fr6.5478c0b

ROOT LIST

conv_gain
led
ref_maps
telemetry

[Docs](#) » Analysis report

[View page source](#)

Analysis report

Contents:

name	doc	value	bool	Pass/Warning	Warning/Fail
seq_1_R-T_SCE	NA	NA	Passed	≤ -0.1	≤ -0.1
seq_1_R-T_SCA	NA	NA	Passed	≤ -0.01	≤ -0.01
seq_1_R-ERROR	NA	NA	Passed	$\neq 0$	$\neq 0$
cds_led_max	cds_led.percentile(95)	1.5287E+01	Passed	$< 16.41 * 1.15$	$< 16.41 * 1.20$
llk_l_qf_ioj	llk_l_qf_ioj	1.5266E+00	Passed	< 8	< 10
cds_l_i_max	cds_l_i.percentile(95)	1.5057E+01	Passed	$< 16.41 * 1.15$	$< 16.41 * 1.20$
llk_l_min	llk_l.percentile(5)	1.3976E+01	Passed	$> 16.41 * 0.85$	$> 16.41 * 0.80$
cds_l_ioj	cds_l_ioj	1.4792E+01	Passed	$< 16.41 * 1.05$	$< 16.41 * 1.10$
llk_l_ij	llk_l_ij	NA	Passed	$< 16.41 * 1.05$	$< 16.41 * 1.10$
llk_flat_max	llk_flat.percentile(95)	1.0269E+00	Passed	< 1.15	< 1.20
llk_flat_x_max	llk_flat_x.percentile(95)	-2.0704E+03	Passed	< 0.05	< 0.10
cds_flat_min	cds_flat.percentile(5)	9.4885E-01	Warning	> 0.95	> 0.90
cds_flat_x_min	cds_flat_x.percentile(5)	-2.1699E+03	Failed	> -0.05	> -0.10
llk_l_max	llk_l.percentile(95)	1.5285E+01	Passed	$< 16.41 * 1.15$	$< 16.41 * 1.20$
cds_l_ij	cds_l_ij	NA	Passed	$< 16.41 * 1.05$	$< 16.41 * 1.10$
llk_led_min	llk_led.percentile(5)	1.3962E+01	Warning	$> 16.41 * 0.90$	$> 16.41 * 0.8$

Rapport du Quality Checking (QC)

🏠 SCA: 18223, SCE: 0033-F056

initial_check_led
dasein 0.14.15.fr6.5478c0b

ROOT LIST

conv_gain

led

cds_flat

cds_flat_max

cds_flat_min

cds_flat_std

cds_l

cds_l_i

cds_l_i_max

cds_l_i_min

cds_l_ij

cds_l_ioj

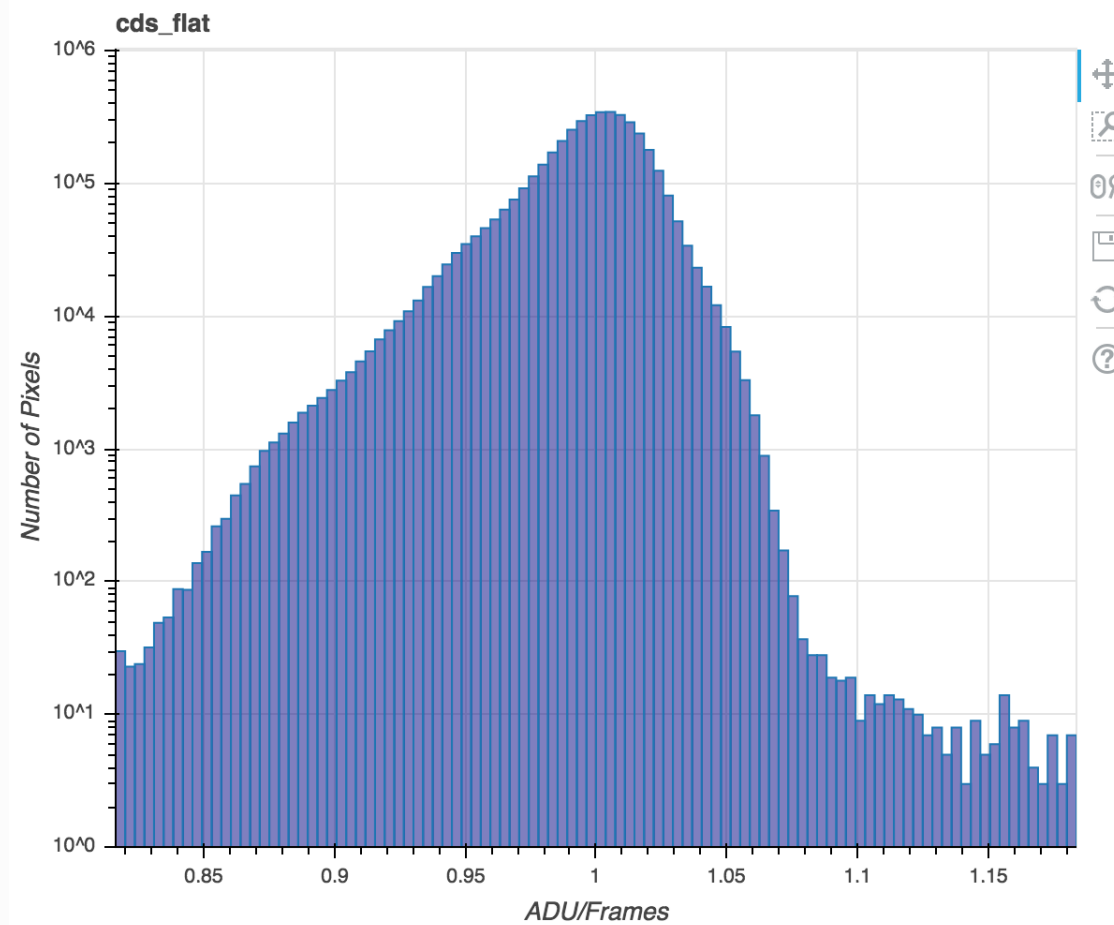
cds_l_oj

cds_l_oj_max

Histogram

Colormap

Statistic



Raw_Data_cds_flat

4 octobre 2018

Sylvain FERRIOL (IPNL)

Rapport du Quality Checking (QC)

🏠 SCA: 18223, SCE: 0033-F056

initial_check_led
dasein 0.14.15.fr6.5478c0b

Search docs

ROOT LIST

conv_gain

led

cds_flat

cds_flat_max

cds_flat_min

cds_flat_std

cds_l

cds_l_i

cds_l_i_max

cds_l_i_min

cds_l_ij

cds_l_ioj

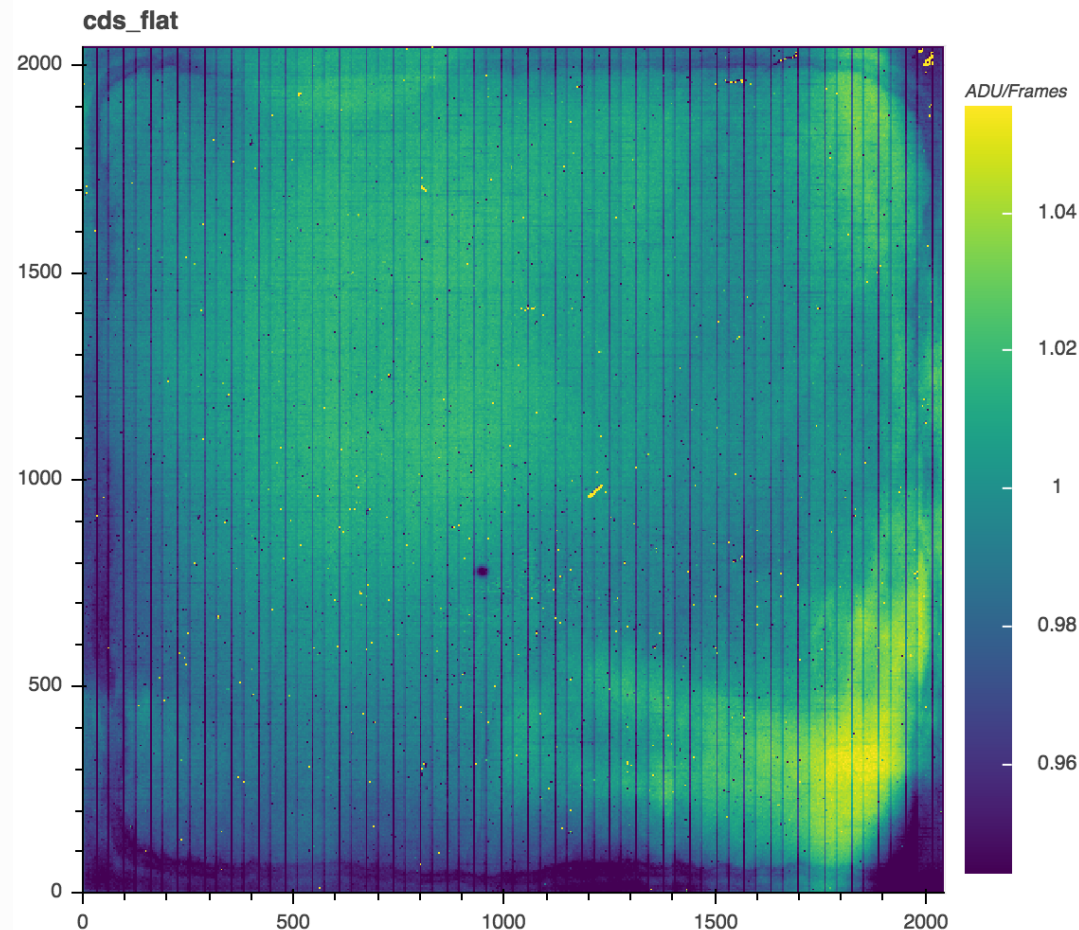
cds_l_oj

cds_l_oj_max

Histogram

Colormap

Statistic



4 octobre 2018

Sylvain FERRIOL (IPNL)

Résumé de la campagne 2017-2018

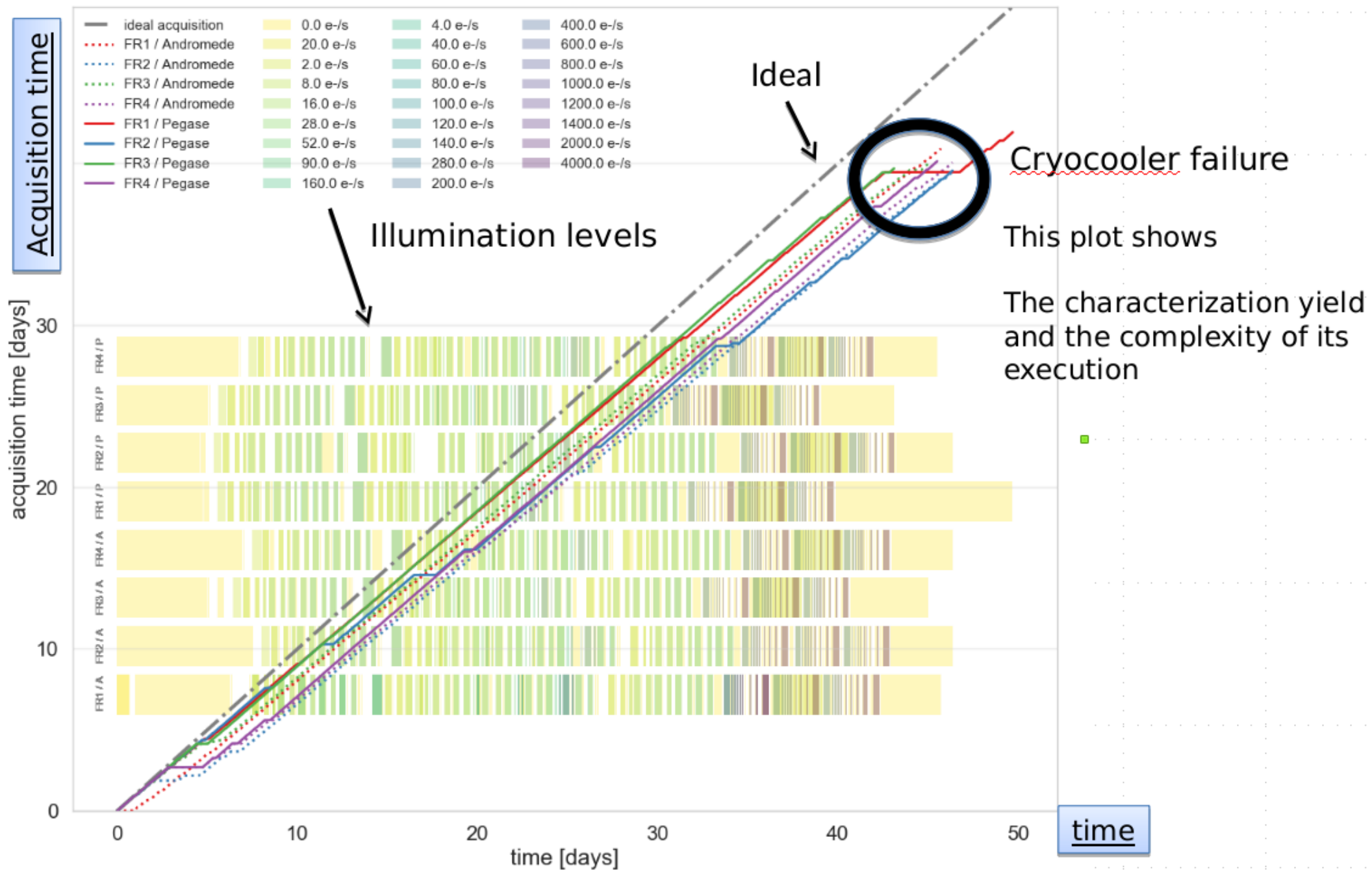
- 16 FM SCSs tested with 4 Flight Runs - 4 SCS in //
- 1 Flight Run represents 45 days of tests
- 2 cryostats run in //: with 2 SCS/cryostat
- 4 OTs = 100K, 90K, 85K, 80K
- Illumination levels: 26

- **Characterization "efficiency" or yield:** $Y = \text{acquisition time} / \text{total time}$
 - **$Y \sim 85\%$**
 - **120 days**

1 Flight Run is

- *~ 150 runs/SCS*
- *~ 35000 ramps/SCS*
- *$\sim 2.4 \cdot 10^6$ frames/SCS*
- *~ 20 TB of data/SCS*

Résumé de la campagne 2017-2018





Merci

4 octobre 2018

Sylvain FERRIOL (IPNL)