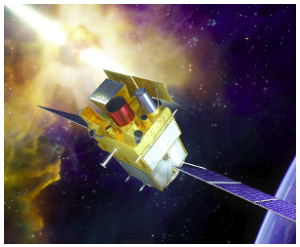
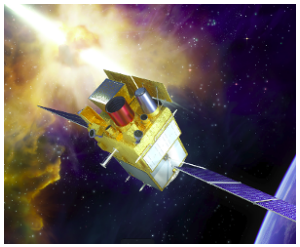


DC-1 ECLAIRs-GRM VHF pipeline

Maxime Bocquier & Claude Zurbach

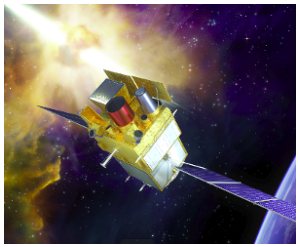
Point-clé Svom-Sol-Dev (CEA, April 10-11, 2019)

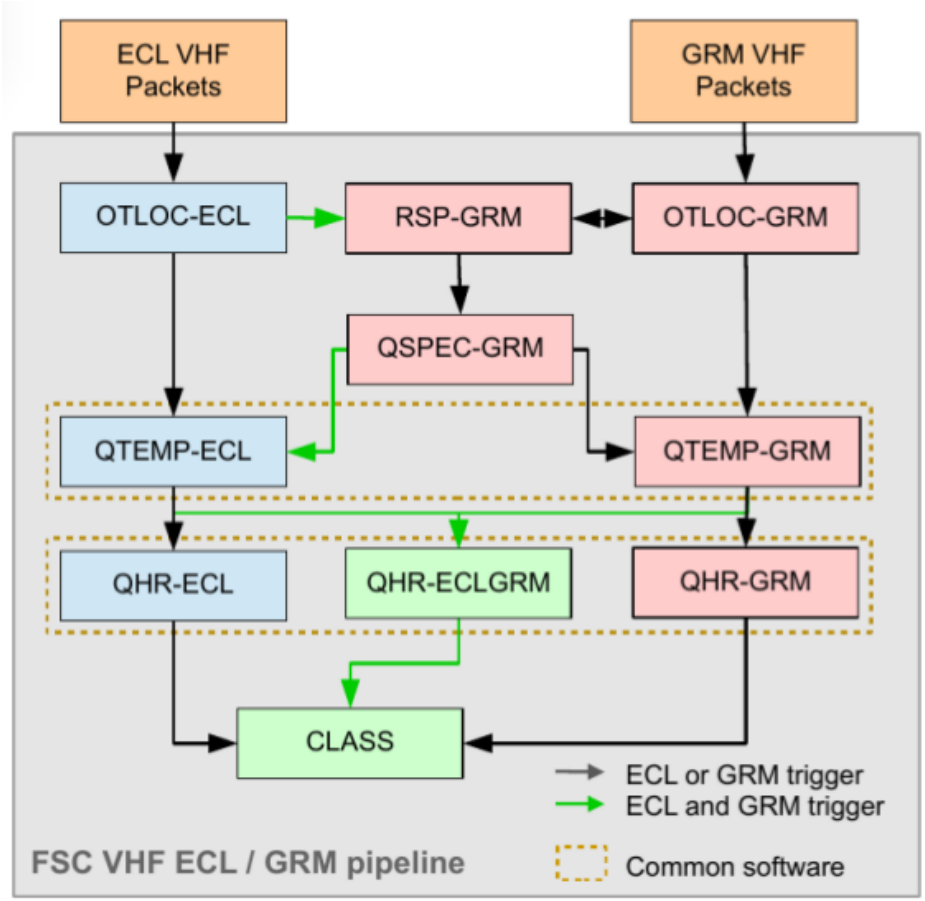
Summary



- ECLAIRs/GRM VHF pipeline: Workflow
- ECLAIRs/GRM VHF pipeline for dc-1: Issues & selected tasks
- ECLAIRs/GRM VHF pipeline for dc-1: Components
- Submitted for discussion: Task environment configuration
- ECLGRM: Agenda 2019 for dc-1

ECLAIRs/GRM VHF pipeline: workflow





OTLOC-[ECL, GRM]
Onboard Trigger and LOCalisation
Scient. Prod.: Trigger & position

RSP-GRM - ReSPonse generation
- Compute DRM of each GRD
SP: DRM each GRD for current GRB

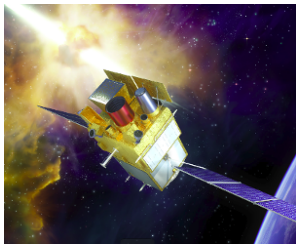
QSPEC-GRM - Quick SPECtrum
- For each GRD, use total count & bkg count spectra & DRM
SP: time-integrated spectrum, parameters and covariance matrix

QTEMP-[ECL, GRM]
Quick TEMPoral analysis
- Compute bkg time-dependent modeling & subtraction
- Analysis bkg-subtracted count LC
SP: Source count LC, Peak Flux, T90

QHR-[ECL, GRM, ECLGRM]
Quick Hardness Ratios
- Use previous task results
SP: Time integrated HR

CLASS: crude CLASSification of event
- Use previous Scientific Products
SP: GRB, other event ?

ECLAIRs/GRM VHF pipeline for dc-1: Issues



Provide a VHF pipeline with complete analysis of the count LC

- Quick bkg-subtracted count LC, count peak fluxes and T90, hardness ratios

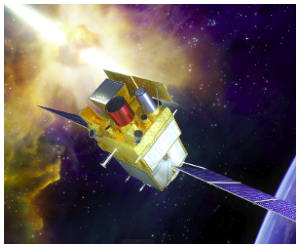
Input VHF data

- Use the IAP GRB DB to define:
  - Test cases for the software development
  - Larger samples for statistical analysis

- Use the IAP static simulator to generate ECLAIRs and GRM photon lists:
  - Also to optimize the definition of the HR energy bands (several possibilities)

- Use the CEA packet simulator to generate count LC with official sampling

ECLAIRs/GRM VHF pipeline : Tasks for dc-1

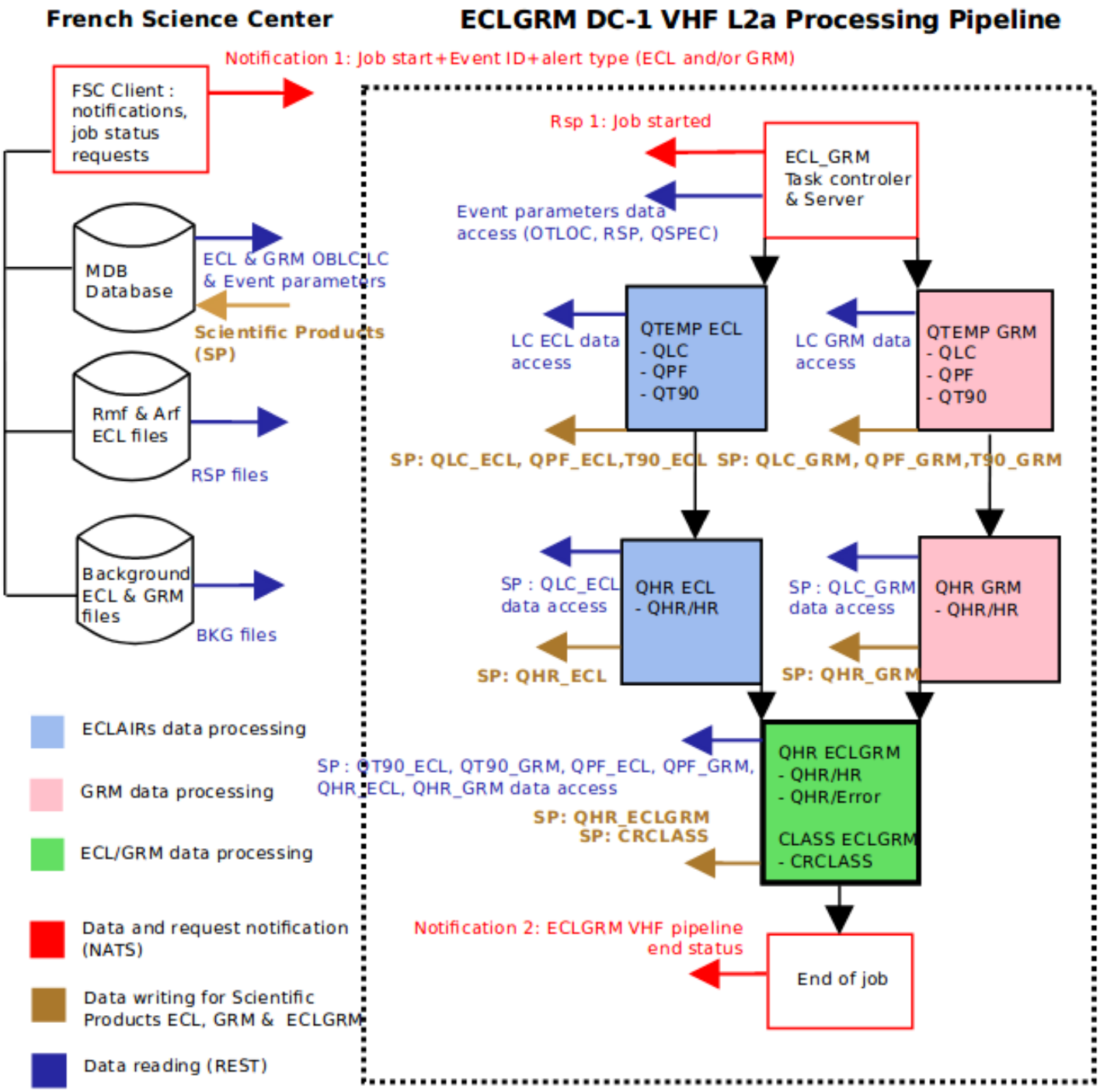


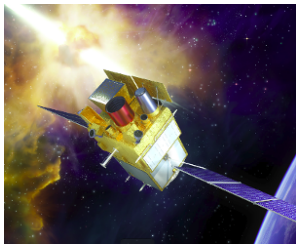
	TASK	SUB-TASK	SCIENTIFIC PRODUCTS *(and other products)*		RUNNING AT		DEVELOPERS		COMMON SOFTWARE?
					FSC	CSC	F	C	
VHF DATA ANALYSIS	OTLOC	ECL	TT_ECL	Trigger time - ECLAIRs (T0)	x		CEA		NO
			QCL_ECL	Quick confidence level - ECLAIRs					
			QPO_ECL	Quick position - ECLAIRs					
		GRM	TT_GRM	Detection time - GRM	x			IHEP	
			QCL_GRM	Quick confidence level - GRM					
			QPO_GRM	Quick source position - GRM					
	RSP	GRM	*GRM Detector Response Matrices including Earth/SC scattering effects*		x			IHEP	-
	QSPEC	GRM	QSP_GRM	Quick spectral parameters - GRM	x			IHEP	-
	QTEMP	ECL	OBLC_ECL	On-board count light curves - ECLAIRs	x		CEA		YES
			QLC_ECL	Quick light curves - ECLAIRs			LUPM		
			QPF_ECL	Quick peak flux - ECLAIRs					
			QT90_ECL	Quick duration - ECLAIRs			IAP		
		GRM	OBLC_GRM	On-board count light curves - GRM	x		CEA	(IHEP)	
			QLC_GRM	Quick light curves - GRM			LUPM		
			QPF_GRM	Quick peak flux - GRM					
			QT90_GRM	Quick duration - GRM			IAP		
	QHR	ECL	QHR_ECL	Quick hardness ratios - ECLAIRs	x		IAP		YES
		GRM	QHR_GRM	Quick hardness ratios - GRM	x		IAP	(IHEP)	
		ECLGRM	QHR_ECLGRM	Quick hardness ratios - ECLAIRs and GRM	x		IAP	(IHEP)	
	CLASS	ECL|GRM	CRCLASS	Crude classification	x		IRAP	(IHEP)	YES

Goals for the French dc-1: full analysis of the ECL and GRM count LC:

– Develop the **QTEMP**, **QHR** and **CLASS** tasks for ECL, GRM and ECLGRM
– OTLOC-ECL task will be implemented in 2020 (dc-2)

Wiki Gitlab: ECLGRM pipelines project for combined analysis ECLAIRs/GRM

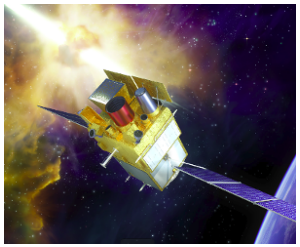


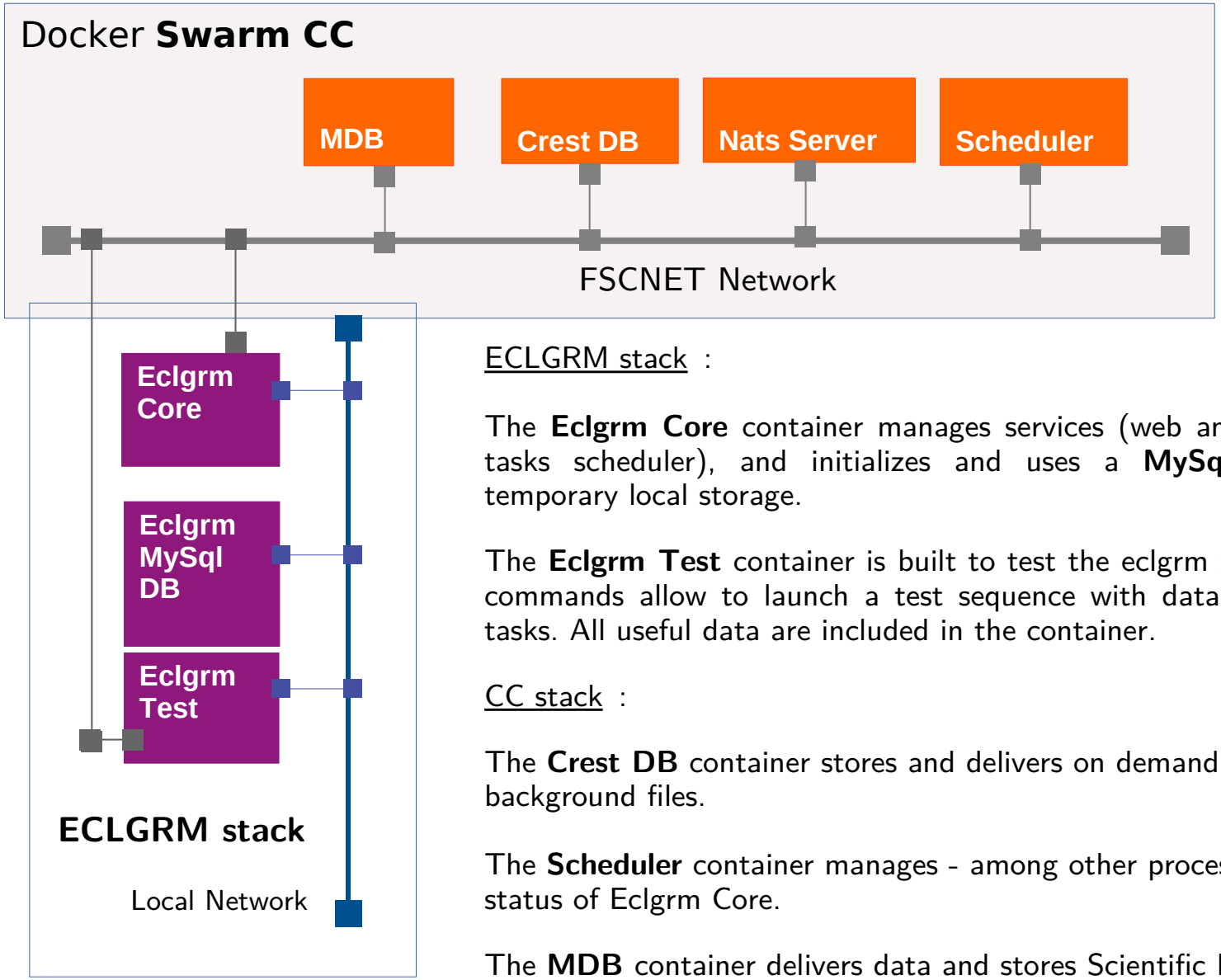


ECLAIRs/GRM VHF pipeline for dc-1:

Tasks and sub-tasks

ECLAIRs/GRM VHF pipeline for dc-1: Components





ECLGRM stack :

The **Eclgrm Core** container manages services (web and NATS client, local tasks scheduler), and initializes and uses a **MySql DB** container for temporary local storage.

The **Eclgrm Test** container is built to test the eclgrm services easily. HTTP commands allow to launch a test sequence with data alerts/retrieving and tasks. All useful data are included in the container.

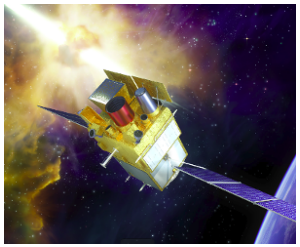
CC stack :

The **Crest DB** container stores and delivers on demand response and background files.

The **Scheduler** container manages - among other processes - start and status of Eclgrm Core.

The **MDB** container delivers data and stores Scientific Products

Task environment Configuration



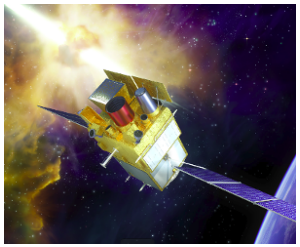
In our hierarchy, a pipeline - or process - includes:

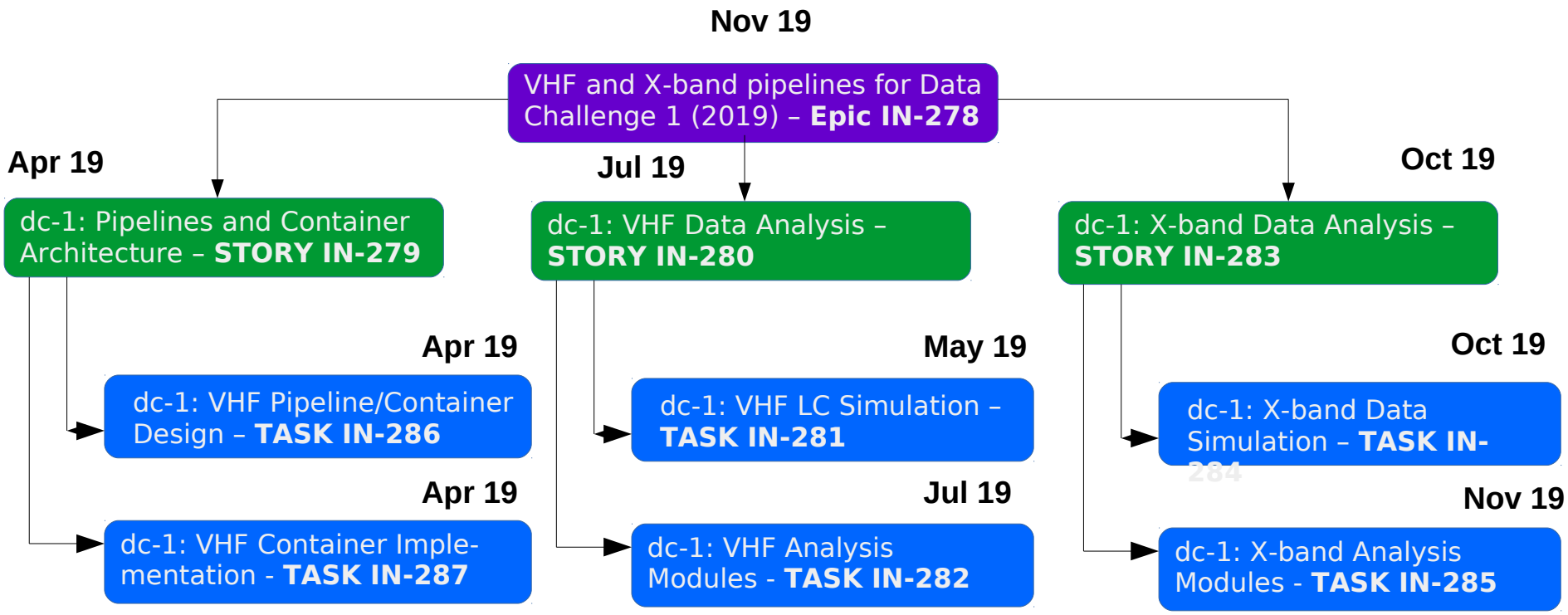
- at first level, some tasks
- at second level one or two instruments (ECLAIRs and/or GRM)
- at third level one or more scientific products (SP)

Tasks are described in associated .json files, containing:

- required libraries
- Intruments (with specific parameters?)
- required files for instruments, RSP & bkg files
- parameters for treatment & analysis, as time-dependant parameters
- dependencies between SP in input, and SP in output
- algorithm referencies for data treatment & analysis, and for SP calculation

Agenda 2019: epic, stories, tasks





JIRA : VHF and X-band pipelines for Data Challenge 1 (2019)

Document source : Development plan of the FSC ECLAIRs/GRM pipelines (CP) for dc-1

X-band ECLGRM pipeline: Data analysis and SP

	TASK	SUB-TASK	SCIENTIFIC PRODUCTS *(and other products)*		COMMON SOFTWARE?
X-BAND DATA ANALYSIS	LOC	ECL	PO_ECL	Source position - ECLAIRs	NO
		GRM	PO_GRM	Source position - GRM	
	TEMP	ECL	T90_ECL	Duration - ECLAIRs	YES
		GRM	T90_GRM	Duration - GRM	
		ECLGRM	*Joint analysis to define common time intervals for the spectral analysis*		
	RSP	GRM	*GRM Detector Response Matrices including Earth/SC scattering effects*		-
	SPEC	ECL	SP_ECL	Spectra in physical units - ECLAIRs	YES
		GRM	SP_GRM	Spectra in physical units - GRM	
		ECLGRM	SP_ECLGRM	Spectra in physical units - ECLAIRs and GRM	
	LC	ECL	LC_ECL	Light curves in physical units - ECLAIRs	YES
			PF_ECL	Peak fluxes - ECLAIRs	
		GRM	LC_GRM	Light curves in physical units - GRM	
			PF_GRM	Peak fluxes - GRM	
	FLUENCE	ECL	FLUENCE_ECL	Fluences - ECLAIRs	YES
		GRM	FLUENCE_GRM	Fluences - GRM	
		ECLGRM	FLUENCE_ECLGR	Fluences - ECLAIRs and GRM	
	HRL	ECL	HR_ECL	Hardness ratios - ECLAIRs	YES
			LAG_ECL	Time lags between light curves - ECLAIRs	
		GRM	HR_GRM	Hardness ratios - GRM	
			LAG_GRM	Time lags between light curves - GRM	
		ECLGRM	HR_ECLGRM	Hardness ratios - ECLAIRs and GRM	
			LAG_ECLGRM	Time lags between light curves - ECLAIRs and GRM	

X-band ECLGRM pipeline: Workflow