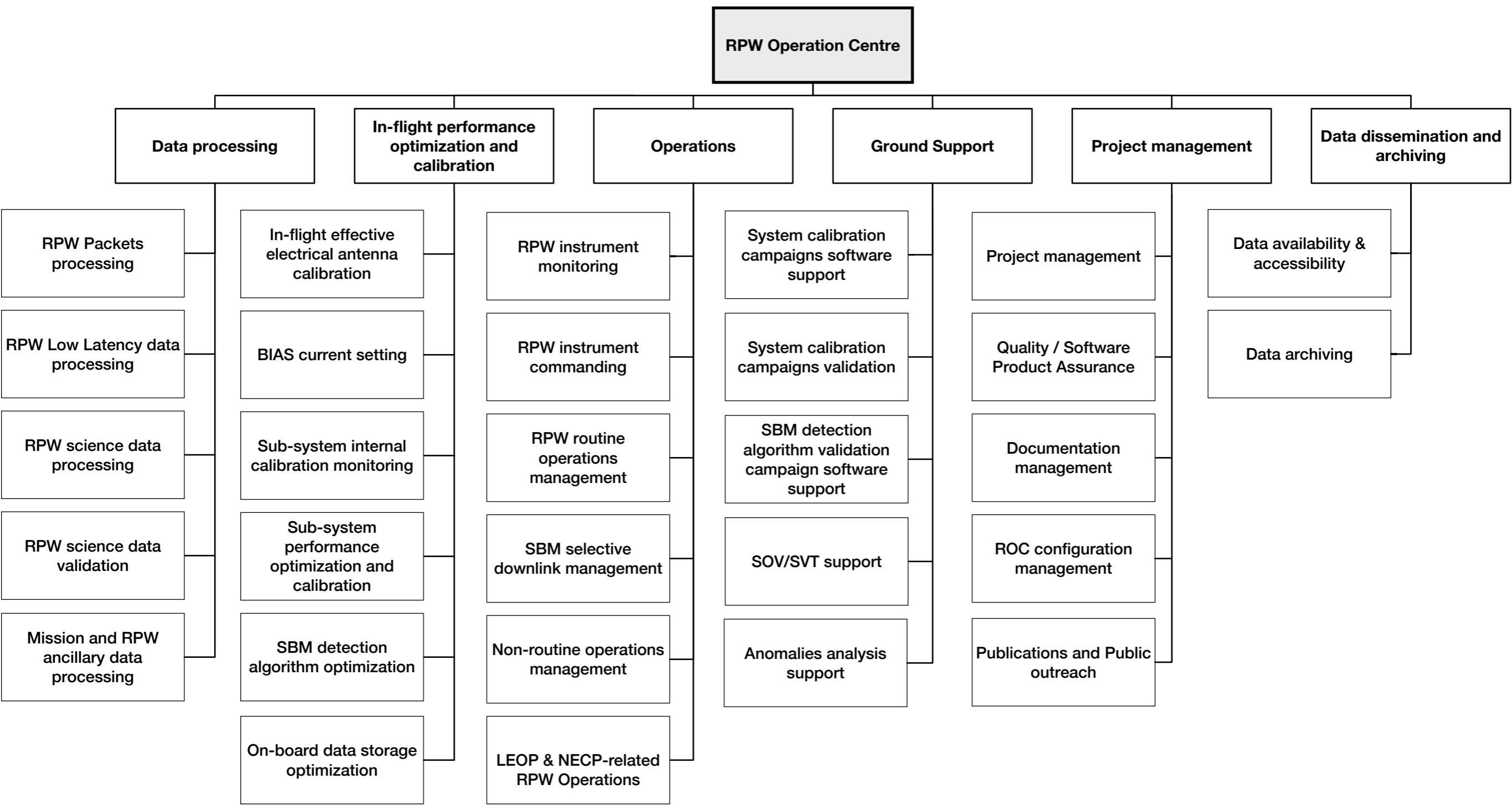# ROC project management plan

X.Bonnin

Outlines

1. Top-level requirements, function and main milestones

2. Configuration, information and documentation

3. Quality assurance

4. Risk management

5. Requirements management and traceability

6. Anomaly monitoring management

Project requirements and applicable documents

- Formal requirements defined in EID-A in terms of instrument ground segment design and main capabilities

- Translated in terms of concept and implementation plan in the ROC CIRD document [ROC-GEN-SYS-PLN-00002-LES]

- Full list of applicable documents for technical specification (i.e., interfaces with SOC/MOC) are available in the SOC Public Wiki*

- Science performance requirements need to be written to prepare in-flight validation

* **https://issues.cosmos.esa.int/solarorbiterwiki/display/SOSP/SOC+Documents**

Project function tree

RPW Operation Centre

Data processing	In-flight performance optimization and calibration	Operations	Ground Support	Project management	Data dissemination and archiving
RPW Packets processing	In-flight effective electrical antenna calibration	RPW instrument monitoring	System calibration campaigns software support	Project management	Data availability & accessibility
RPW Low Latency data processing	BIAS current setting	RPW instrument commanding	System calibration campaigns validation	Quality / Software Product Assurance	Data archiving
RPW science data processing	Sub-system internal calibration monitoring	RPW routine operations management	SBM detection algorithm validation campaign software support	Documentation management	
RPW science data validation	Sub-system performance optimization and calibration	SBM selective downlink management	SOV/SVT support	ROC configuration management	
Mission and RPW ancillary data processing	SBM detection algorithm optimization	Non-routine operations management	Anomalies analysis support	Publications and Public outreach	
	On-board data storage optimization	LEOP & NECP-related RPW Operations			

Main milestones overview

- ROC activities planning is constrained by the following milestones at RPW and Solar Orbiter levels:

  - EM2/PFM system ground calibration campaigns driven by the CNES AIT/AIV team

  - RPW LLVM delivery schedule

  - SOC/MOC Instrument Team (IT) interface validation tests

  - System Validation Test (SVT) campaign

  - System Operation Validation (SOV) campaign

  - In-flight operations schedule, including LEOP/NECP operations (prepared with CNES)

- Reviews

  - No formal review of the instrument ground segments by ESA

  - Key points planned during the development of the ROC

RPW engineering activity description	ROC involvement	Schedule / deadline
RPW DPU flight software SBM1/SBM2 detection algorithms ground validation campaign		
RPW DPU SBM1 detection algorithm validation campaign	Develop, run and maintain software to support the validation of the SBM1 detection algorithm by the RPW Flight Software team. Especially, this software must be able to simulate the detection and produce input files for the RPW DPU software.	Sept. 2015-June 2016
RPW DPU SBM2 detection algorithm validation campaign	Develop, run and maintain software to support the validation of the SBM2 detection algorithm by the RPW Flight Software team. Especially, this software must be able to simulate the detection and produce input files for the RPW DPU software.	Sept., 2015-June 2016
RPW system ground calibration campaigns		
RPW EM2 blank calibration campaign at CNES (Toulouse, France)	Develop, run and maintain a SGSE to support RPW teams in the analysis of the data produced during the EM2 calibration campaign. This SGSE will have to be deployed at the CNES site in Toulouse, as part of the RPW CNES GSE.	April-Sept. 2016
RPW PFM thermal calibration campaign at LESIA (Meudon, France)	Run and maintain the SGSE to support RPW teams in the analysis of the data produced during the PFM calibration campaign.	Nov. 2016 to Jan. 2017
RPW PFM delta-calibration campaign at CNES (Toulouse, France)	Run and maintain the SGSE to support RPW teams in the analysis of the data produced during the PFM delta-calibration campaign.	May-June 2017

Main milestones overview
Low Latency engineering activities

Low Latency Virtual Machine (LLVM) delivery schedule		
"Hello World" LLVM version delivery	To provide to the SOC a first "Hello world" version of the LLVM for RPW, that processes fake RPW LL packet data.	January, 31 2016
LL Data Description Document (DDD) delivery	To provide to the SOC the LL Data Description Document (DDD) for RPW.	February 29, 2016
LL Testcard delivery	To provide to the SOC the LL Testcard files for RPW.	March 31, 2016
LLVM processing version delivery	To provide to the SOC a second version of the LLVM that includes real RPW LL packet data processing.	June 30, 2016
LLVM processing + tests version delivery	To provide to the SOC a full version of the LLVM that includes real RPW LL packet data processing and self-testing processes.	August 31, 2016

- SOC interfaces

SOC – IT interface tests		
Compatibility tests	The Compatibility Tests will consist of data exchange and manual check of the formats of the data products.	April – Oct. 2016
Integration tests	Integration Tests will consist on data exchange and running specific Sub-System(s) in order to read and execute some involved parts of the Sub-Systems and in order to be able to evaluate the output.	March – July 2017
Validation tests	The Validation Test Cases will be part of particular System Tests which will involve running the entire System or relevant part of it involving all the data product exchange needed for given Interface Test.	April 2018

- MOC interfaces ? (Not before L-12m, IT will be contacted one by one)

System Validation Test engineering activities		
SVT-0: devoted to unit-level commanding	First set of flight procedures for RPW to be run during the SVT-0	Launch – 18 months
SVT-1: to validate closed loop behaviour	RPW User Manual complete. All the inputs required for Near Earth Commissioning Phase and Cruise Phase (timeline and procedures). Instrument Teams to provide inputs and	Launch – 9 months
	support iterations as necessary. All inputs required to test on the PFM to validate as far as possible instrument database and procedures. Instrument Teams to provide all test inputs. These inputs are expected to be delivered 3 months before the SVT-1. Instrument Team with decision authority to support test at test site. Up to two instruments tested in parallel.	
SVT-2: at the launch site, to perform last minute validation	Retest of any problems found with Instruments during SVT-1	Launch – 4 months

- SVT-1 —> now April 2019 (cf. S.Lodiot mail) — IGST on april 2018 with RPW run

Main milestones overview
System Operations Validation

System Operation Validation engineering activities		
SOV-0: Data Distribution interface Test	Test the data distribution interfaces between the MOC and the ROC.	Launch – 10 months
SOV-1: MOC/SOC interface Test	Will involve instrument inputs.	Launch – 9 months
SOV-2: Cruise Operations End-to-end Test	Will involve In Situ (IS) instruments, and some limited Remote Sensing (RS) participation	Launch – 6 months
SOV-3: OBSM End-to-End Test	Will involve all instruments	Launch – 6 months

- CP end-to-end (E2E) test, initially planned on April 2018 (might be replaced by a "0th E2E test, cf. C.Watson)

Main milestones overview
ROC Reviews and key points

Key points / Reviews	Purpose	Scheduled date/time
Preliminary Design Key point (PDKP)	Preliminary design key point of the ROC organization and design organized by CNES	2017/01/16
End of Design Key point (EDKP)	End of design key point of the ROC organized by CNES	Fall 2017
Validation Reviews	Internal review in preparation to the ROC validation campaign. This campaign will have to start with a Test Readiness Review (TRR) and to finish with an Test internal Review Board (TRB)	Launch – 12 months (TBC)
Acceptance Review (AR)	RPW ground segment acceptance review.	Launch – 3 months (TBC)

- No formal AR by ESA, to be replaced by a acceptance review by CNES

Configuration, information, documentation Meetings overview

- ROC team participates to meetings

  - At mission level (SOWG, MADAWG, SWT)

  - At RPW level (consortium)

  - at ROC level for SOC/MOC engineering activities (Low Latency WG)

  - at ROC level for engineering dev. (management, technical dev., "sprint" meetings, RCS telecon)

  - at ROC for level for operations (ops telecon, SBM telecon during flight)

Configuration, information, documentation Collaboration/development tools

- **Page RPW LESIA** —> general information and public outreach (http://rpw.lesia.obspm.fr/)

- **Confluence ROC** —> Project Wiki (https://confluence-lesia.obspm.fr/display/ROC/ROC)

- **JIRA** —> Project issue tracker (https://jira-lesia.obspm.fr)

Configuration, information, documentation Collaboration/development tools

- Mailing-lists @sympa.obspm.fr:

  - **roc.tech** —> ROC engineering team at LESIA

  - **roc.rcs** —> PI + ROC project manager (PM) + Lead CoI teams in charge of calibration software

  - **roc.lesia** —> ROC team (engineering + science) at LESIA

  - **roc.ops** —> working group for operations (ROC operations teams + CNES)

  - **roc.ops-sci** —> working group for science operations (PI + ROC PM+ Lead CoI)

  - **roc.teams** —> All people involved in the ROC activities

  - **roc.support** —> "hotline" for the ROC tools and service

Configuration, information, documentation
Documentation management

- Documentation source files (latex, .docx) archived on a dedicated "RocDocs" Git repository

- Migration of ROC documentation from Baghera to COTRANET in progress

- First use of COTRANET to tag and generate the EDKP data package

- Documentation verification/approval/applicable workflows to be defined

Quality assurance

- No formal quality requirement on the ROC organization and design at ESA level (i.e., ROC OK if interface OK)

- ROC software assurance product manager: Stéphane Papais (NEXEYA) - 0.1 ETP

- ROC Software Product Assurance Plan [ROC-GEN-MGT-QAD-00033-LES] written by S.Papais in agreement with X.Bonnin the ROC developers at LESIA. Baseline applicable document [RNC-CNES-Q-ST-80-100]

- Since June 2017, CNES support in terms of development (Desi Raulin) and QA/PA (Sandra Steere)

- Publication of a document related to the software quality requirements for laboratories working with CNES (DNO-DA-AQ-2017-0016646)

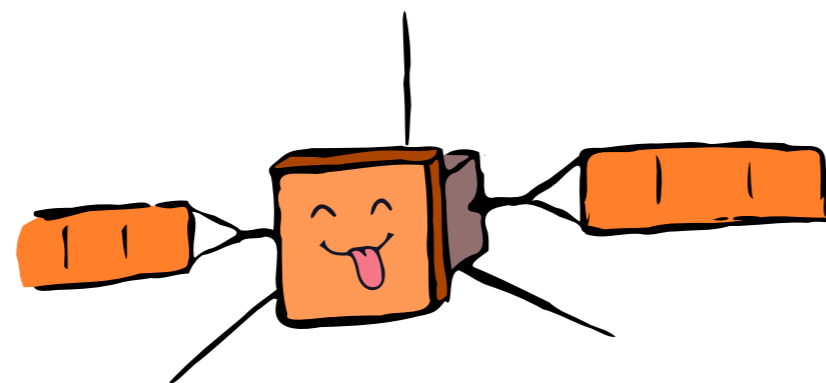- Document being analyzed by S.Papais and X.Bonnin

Risk management

- Main risk at project level

  - Personnel reduction —> delay in delivery, non-functional centre—> hiring!

  - Lack of experience —> delay in delivery, non-functional centre, exceeding budget—> training, feedbacks from experimented teams, QA/PA support

- Main risk at engineering level

  - Hardware failure/obsolete —> non-functional centre —> backup instances

  - Software failure/obsolete —> non-functional centre —> sustainable technology, validation campaign

- Financial risk

  - Over estimated budget —> over-sized capabilities —> anticipate/mitigate other risks

Requirements management and traceability

- Requirements management

 - Implementation requirements in CIRD (built from EID-A top-level requirements) + traceability matrix

  - Specification requirements defined in the ROC Software System Specification (RSSS) + issued in Gitlab

  - System design in RSSDD + issued in Gitlab

  - System validation plan in SVP + issued in Gitlab

- Compliance matrices for the traceability of specification and design need to be written

Anomaly monitoring management

- At project level, managed with JIRA with specific projets:

  - **ROC-ADMIN** —> ROC administration

  - **ROC-REVIEWS** —> ROC reviews and key points

  - **ROC-OPERATIONS** —> instrument Operations

  - **ROC-DATAPROD** —> RPW data products

  - **ROC-GITLAB** —> Issues from Gitlab

  - **ROC-TESTSOL** —> ROC ground tests activities (ROC-SGSE)

  - Reported into ROC Confluence dashboard: https://confluence-lesia.obspm.fr/display/ROC/ROC+dashboard+summary+list)

- At mission level (SOC/MOC/IT) TBD — for now by emails.

To be continued…

EDKP ROC
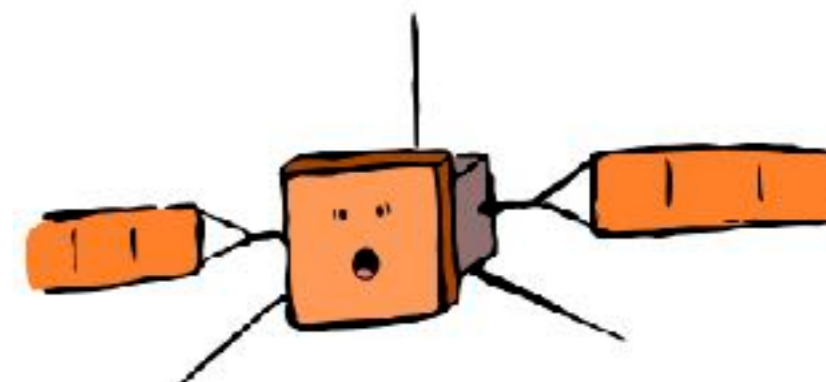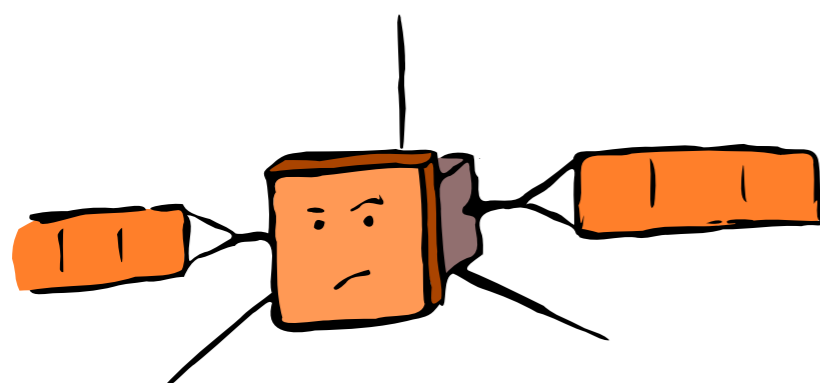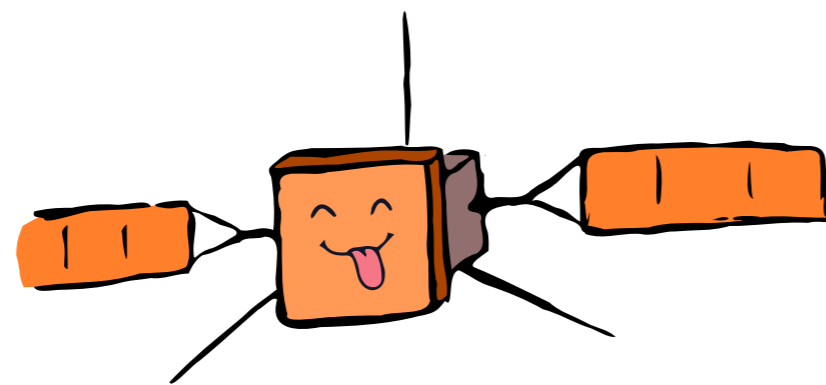
Extra slides

2. Management du projet: Documentation - plan de gestion

- Plan de gestion de la documentation définie dans le Project Management Plan (PMP) ROC [ROC-GEN-MGT-PLN-00013-LES].

- Conventions héritées de RPW (templates, workflows, type-doc)

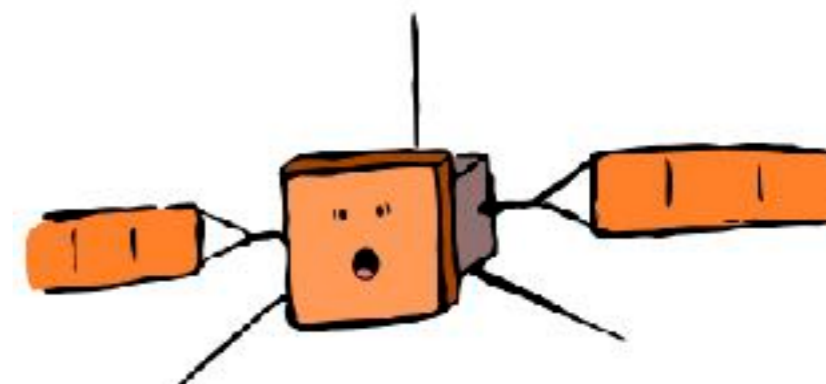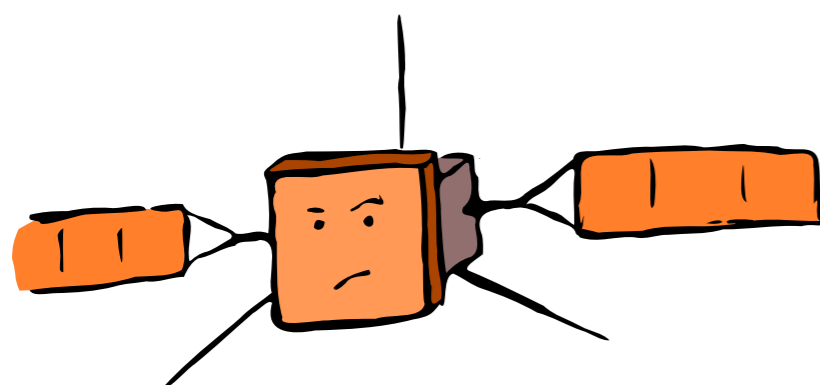| Rubriques Arbre OT pour le projet ROC					
Objet			**Type**		
1	GEN	General	1.1	MGT	Management
1	GEN	General	1.2	SYS	System
1	GEN	General	1.3	SCI	Science
1	GEN	General	1.4	QAP	Quality Assurance Produit
1	GEN	General	1.5	DPK	Datapackage
1	GEN	General	1.6	OTH	Other
2	PRO	Processing	2.1	CAL	Calibration
2	PRO	Processing	2.2	DAT	Data all levels
2	PRO	Processing	2.3	SFT	Software all levels
2	PRO	Processing	2.4	PIP	Pipeline
2	PRO	Processing	2.5	OTH	Other
3	OPS	Operations	3.1	SBM	Selected Burst Mode
3	OPS	Operations	3.2	SYS	System
3	OPS	Operations	3.3	ANA	Analysis
3	OPS	Operations	3.4	COM	Commissionning
3	OPS	Operations	3.5	LLD	Low Latency Data
3	OPS	Operations	3.6	OTH	Other
4	TST	Tests	4.1	GSE	Ground Support Equip.
4	TST	Tests	4.2	SBM	Selected Burst Mode
4	TST	Tests	4.3	OTH	Other

[ROC-GEN-MGT-PLN-00013-LES]

2. Management du projet: Documentation - management
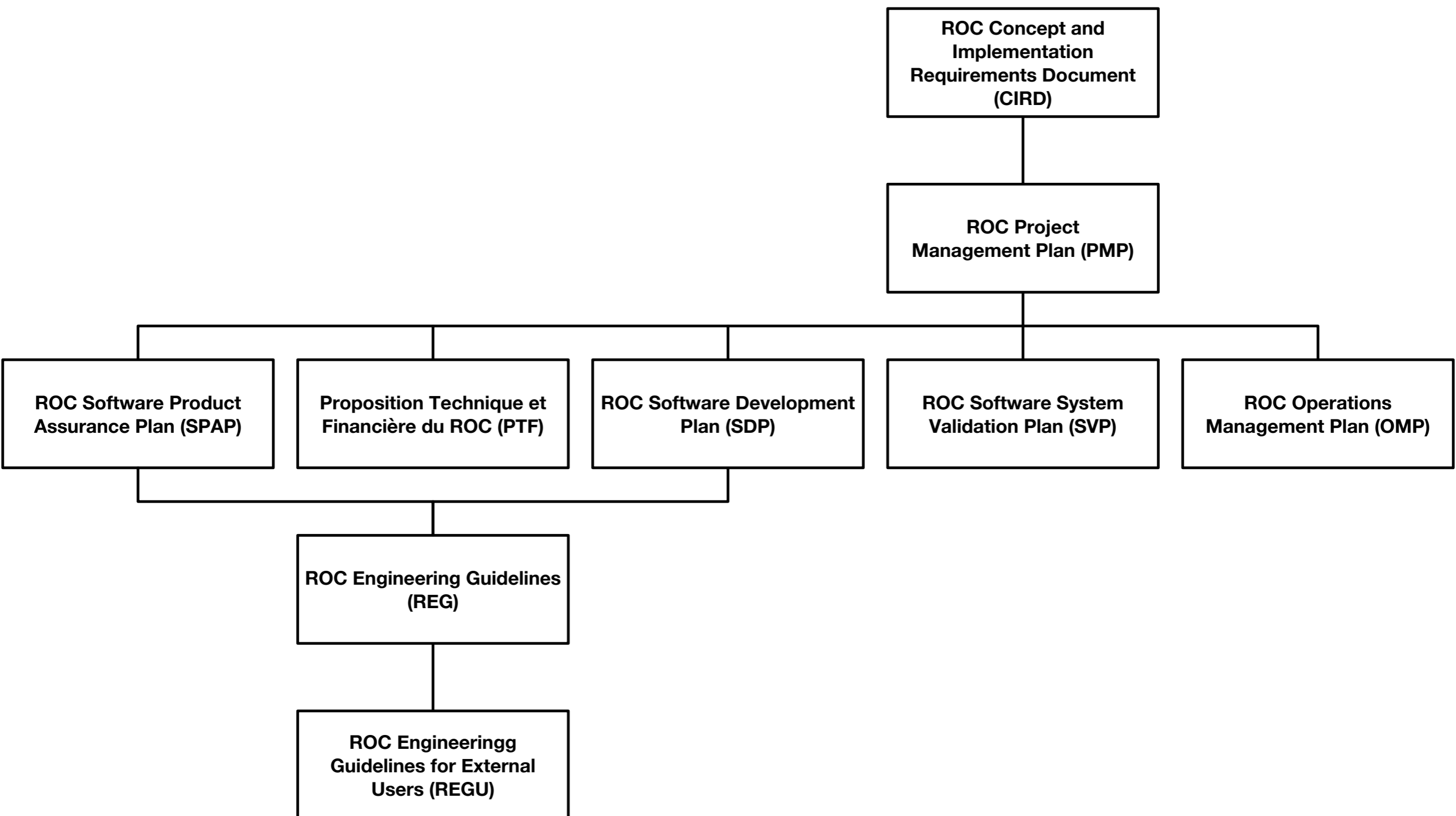
2. Management du projet: Documentation - Technique (mission)

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                    ┌─────────────────────────┐
                    │   ROC Concept and       │
                    │   Implementation        │
                    │   Requirements Document │
                    │   (CIRD)                │
                    └─────────────────────────┘
                         │
            ┌────────────┴────────────┐
   ┌────────────────────┐   ┌────────────────────┐
   │ ROC Software System│   │ RPW Data Products  │
   │ Specification (RSSS)│  │ (RDP)              │
   └────────────────────┘   └────────────────────┘
```

| ROC Mission Database Description Document (MDBDD) | ROC Software System Design Document (RSSDD) | RPW Low Latency Virtual Machine Design Document (LLVMDD) | RPW Data Archive Description Document (DADD) | RPW Data Access Layer Description Document (DALDD) | RPW Calibration Software Interface Control Document (RCSICD) | Bias operations Interface Control Document (BOICD) |

+ ROC User Manuel and ROC Reference Guide

[ROC-GEN-MGT-PLN-00013-LES]

Management du projet: Documentation - Technique (GSE)

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┌─────────────────────────────┐
│      ROC Concept and        │
│      Implementation         │
│  Requirements Document      │
└─────────────────────────────┘

┌──────────────────────┐   ┌──────────────────────┐
│  RPW Calibration Data│   │ Data format and      │
│  Visualization User  │   │ metadata definition  │
│  Requirements        │   │ for the ROC-SGSE     │
└──────────────────────┘   └──────────────────────┘

┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐
│ ROC Test Database│  │ ROC SGSE Software│  │ RPW Calibration  │
│ Description      │  │ Design Document  │  │ Software         │
│ Document         │  │                  │  │ Interface Control│
│                  │  │                  │  │ Document         │
└──────────────────┘  └──────────────────┘  └──────────────────┘
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[ROC-GEN-MGT-PLN-00013-LES]