



SPIS-SCIENCE project

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retour sur innovation

Outline

- Overview of the activity
 - Scope
 - Objectives
- Work to be carried out
 - Scientific missions modeling
 - Enhancement of numerical capability of SPIS
 - SPIS development management
 - Maintenance
- Risk analysis
- Schedule

Overview of the activity

- Scope
 - Long-term scientific program of ESA has planned missions dealing with plasma measurements (Solar Orbiter, EJSM/Laplace, Cross Scale)
 - Relatively low energy (few eV) plasma measurements
 - Electrostatic cleanliness becomes very important
- Objectives
 - Provide a computational tool able to predict quantitatively
 - the charging of a S/C
 - the space charge in its environment
 - their consequences in low energy plasma measurements
 - Outputs for the user (= scientific community)
 - New version of SPIS software
 - Validation test cases related to the scientific mission conditions
 - One year maintenance

Work to be carried out

- Scientific missions modeling (Tasks 1 and 5)
 - User requirements (UR) (Task 1)
 - Inputs
 - List from SOW
 - Propositions based on the consortium background experience
 - Call for inputs to the relevant science community (SPINE, SWEN newsletter recipients, space industry, etc.)
 - Outputs:
 - Complete and not limited user requirements list
 - detailed requirements on phenomena modeling
 - Validation cases (Task 5)
 - Testing of the newly developed SPIS functionalities
 - Application to future missions and support by past or in-flight mission detailed analysis, TBD
 - Possible test cases (to be accepted by ESA)
 - Well documented context: Cluster (available data, existing calibration and SPIS simulations)
 - Solar Orbiter (wave and particle aspects): use of Stereo data
 - Rosetta (electrostatic probe aspects): use of Rosetta data
 - Planetary environment: EJSM: use of Galileo data

Work to be carried out

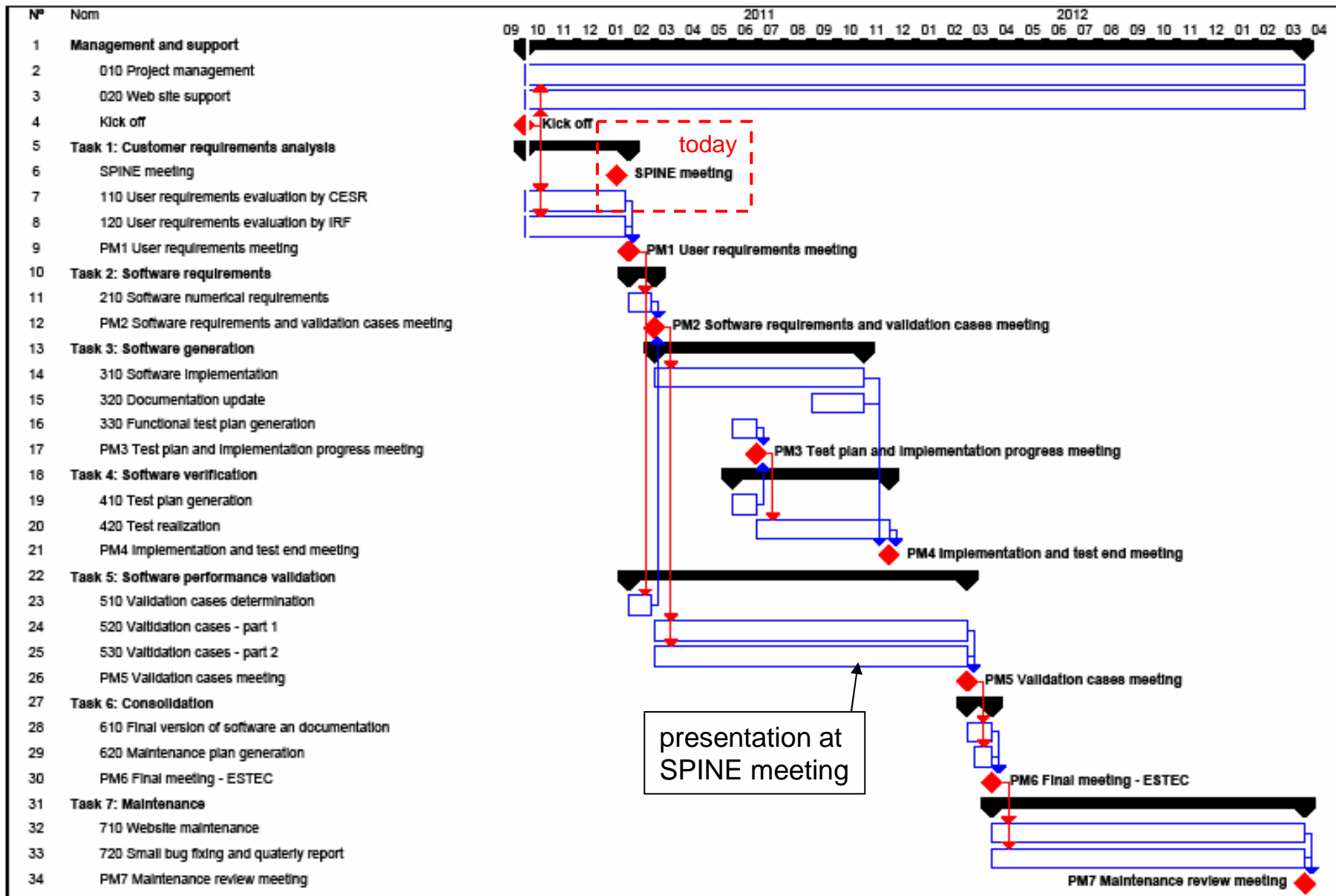
- Software requirements (Task 2)
 - Improvements of SPIS capabilities in term of
 - new physical phenomena modeling
 - precision of existing modules
 - more detailed input data
 - performance enhancement (memory use and execution time)
 - diagnostic of code robustness
 - The list of software requirements (SR) is not limited to SOW. It can be extended or modified with
 - UR list approved by ESA after Task 1
 - Strong interaction with the definition of validation test cases (Task 5)
 - During conversion from UR to SR
 - Evaluation of the feasibility of each UR with regards numerical constraints
 - Trade-off between UR
 - Final SR to be accepted by ESA

Work to be carried out

- SPIS development (Task 3, 4 and 6)
 - Software generation (Task 3)
 - implement new modules in SPIS
 - modify existing ones
 - documentation update
 - Software verification (Task 4)
 - Functional testing of the new or modified modules of SPIS
 - basic tests
 - module by module
 - End to end test
 - Consolidation (Task 6)
 - Document and software update following the validation phase (Task 5)
 - Release of a candidate version

Work to be carried out

- Maintenance (Task 7)
 - Taking account the feedbacks on the new version originating from the SPIS user community
 - It will include
 - bug report answer on the website
 - small bug fixing
 - on the basis of daily support tickets (5 day.man for UI and 5 day.man for NUM)
 - maintenance report to ESA
 - The maintenance activity begins once the software and documentation are released on the SPIS website
 - Its duration is 12 months from this date



Now = User requirement definition

- Objective 1: to be comprehensive enough in listing the possible requirements for the tool creation
 - Objective 2: to anticipate the next task
 - Validation of the code on future missions or past data
 - Get (enough) data for the validation phase on real missions.
- Consultation of the SPINE community for the requirement definition
- Continued SPINE CONTRIBUTIONS welcome !!