

Mars Planet Thesis projects 2017

Preamble

Mars City (www.mars-city.org) is a project carried out by Mars Planet having as target the simulation of the future human exploration of Mars. Inside Mars City project there is a module devoted to the Mission Control of the future Mars City.

The development of the Mission Control system of Mars City requires the a complete simulation program in which it is foreseen the connection with Sensors& Actuators of all the Mars Habitat and with rovers and astronauts.

External sources (GPS, weather, astronomical observations,etc.) feeds the Mission Control system of Mars City.

1. Scope

The overall scope of the Mission Control system of Mars City is to provide an uniform communication protocol, a complete vision of the system's status, and an easy way of controlling the different devices included in the Mars City, including the EVA and IVA of the astronauts.

2. Mars City Mission Control Subsystems

The mission control of Mars City, includes the following subsystems:

- Configurations
- Planning
- Telemetry
- Commands
- Operations.

2.1 Configurations

The configurations are the place where all the system's meta-data should be placed. This subsystem is in charge of storing and delivering:

- Information about the devices and crew.
- Macros: pre-configured actions in plan.

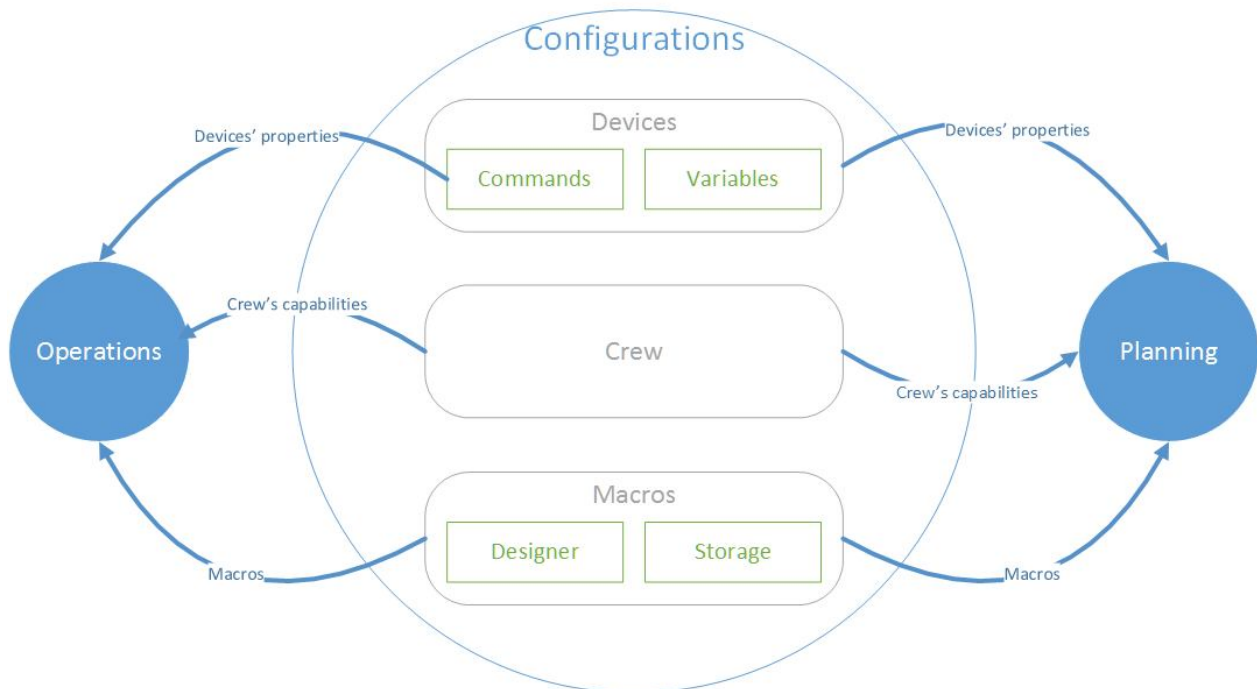


fig. 1: Mars -City configurations sub-system.

2.2 Planning Subsystem

The planning subsystem has in charge to define the scope and the expected results of the missions.

In this context the plans are series of steps which:

- are performed by entities
- have parameters,
- have an expected result.
- can be serial or concurrent.

Furthermore in the planning subsystem are foreseen assistants to help the user to build plans.

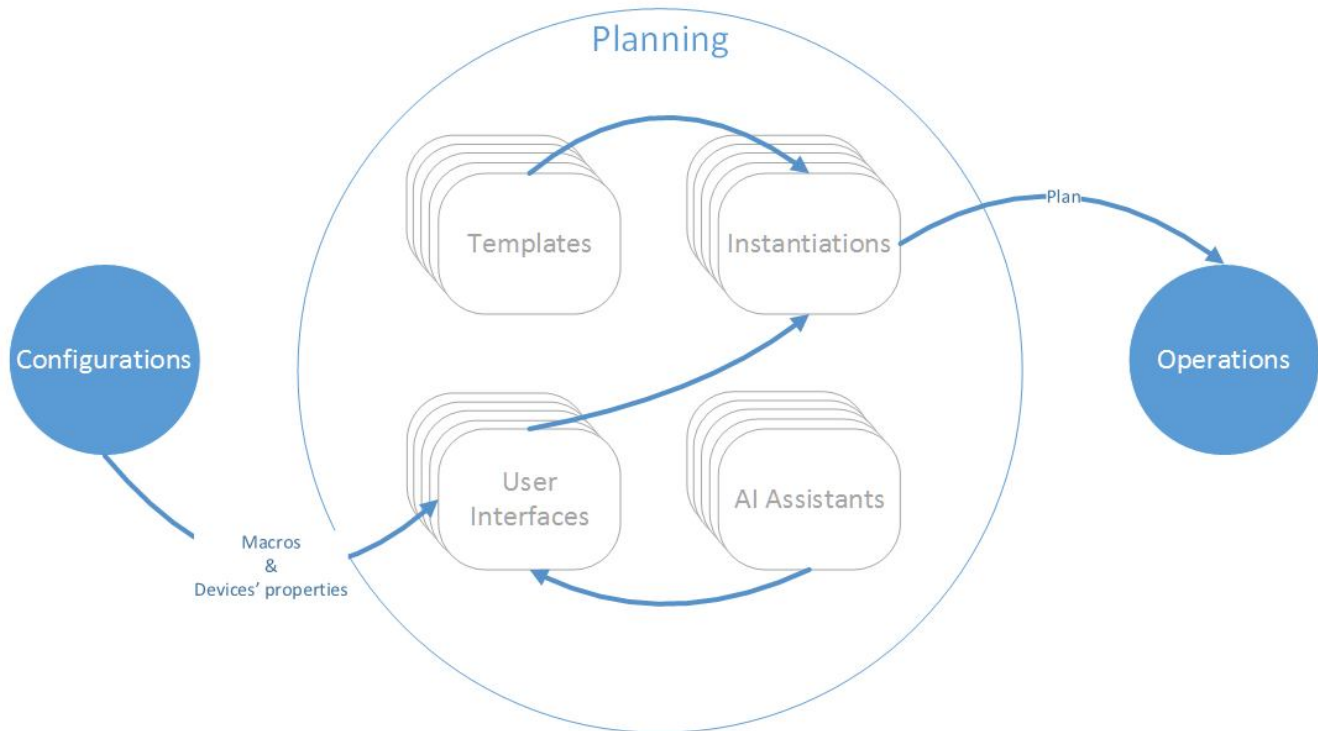


fig. 2: Mars -City planning subsystem.

3. Thesis proposal

To develop the mission control program of Mars City, Mars Planet is proposing two thesyes whose scope will be to:

3.1. Help refine design and implement Configurations Subsystem according to http://marscity.readthedocs.io/en/latest/MOCC/docs/MOCC_design.html#the-configurations-subsystem

and

http://marscity.readthedocs.io/en/latest/MOCC/docs/MOCC_implementation.html#configuration-s-subsystem .

This involves:

- * Service oriented architecture.
- * Database design
- * Possibly development of some small UI

3.2. Help refine design and implement Planning Subsystem according to

http://marscity.readthedocs.io/en/latest/MOCC/docs/MOCC_design.html#the-planning-

http://marscity.readthedocs.io/en/latest/MOCC/docs/MOCC_implementation.htm#planning-subsystem

This involves:

- * Service oriented architecture.
- * UI development.
- * Integration of third-party planning & scheduling engine.

3.2 is more wide project for which also two thesis could be developed by students better of the same university who would work also in collaboration.

3.1 must be developed before 3.1 or at the very least at the same time.

3. Type of candidates

The students should have skills in python programming....

4. Foreseen type of involvement

It is foreseen a commitment in terms of hours of software development of.....

5. Technical support and request of information

The students will be supported by the technical team of Mars Planet during the entire development of the projects.

Information about the thesis can be forwarded to : info@marsplanet.org

Reference links and documentation:

- <http://www.marsplanet.com>
- <https://www.mars-city.org>
- <http://marscity.readthedocs.io/en/latest/>
- https://github.com/mars-planet/mars_city
- <https://www.ims-gsoc.org>