Software architecture for the automatization of the ground segment of the OUFTI-1 CubeSat
Alain Collette, HELMO-Gramme (Liège)
Amandine Denis, University of Liège; Stefan Dombrowski, Belgian Amateur Radio Society (UBA)

OUFTI-1 project
• First CubeSat in Belgium
• CubeSat: a standard for nanosatellites
• Three innovative payloads:
  • D-STAR
  • Experimental EPS
  • New solar cells

Mission Control Center

Problem addressed
The ground segment is divided into:
• Mission Control Center (MCC, mainly consisting of software)
• Ground Station (GS, mainly consisting of hardware, such as transceivers and antennas)

Mission database
- History of all the TC sent and TM received

Mission information database
- Information about all aspects of the mission

Mission control software (MCS)
- Main server
- Linked with the ground station
- Control the databases

Ground station software
- Control the hardware
- Check the reception of telecommands (TC)
- Confirm the reception of telemetries (TM)

Technologies used
• Command of the satellite with a script system
• Secure Sockets Layer (SSL) connection between the graphical interface and the scheduler
• Structured Query Language (SQL) used to access the databases
• TCP/IP connection between the graphical interface and the MCS
• Implementation of a login / password system

Graphical interface
- Display of data
- Command of the satellite manually or with the script system

Scheduler
- Synchronised with the satellite time
- Responsible for the script system

Manual TC or Script sent at the right time