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Project Management for the OpenOrbiter Operating Software Team

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OpenOrbiter is producing a 1-U CubeSat spacecraft to facilitate the construction of low-cost spacecraft by others in the future. The Operating Software team is in charge of designing and creating the software that controls most of the CubeSat’s operations such as image capturing, storage management, and temperature sensing. The project management deliverables that we have worked on as a team are the Project Definition, Work Breakdown Structure, and the Project Schedule. The Project Definition defines exactly what our project team will be developing including, but not limited to, what the team is in charge of developing, what its not in charge of developing, and completion criteria. The Work Breakdown Structure is a logical breakdown and representation of the “work” required by our team members of the project. The Project Schedule uses a timeline format to display the work tasks to be performed, their relationships, estimated durations, and assigned resources. These project-management deliverables are based on prior work by the Operating Software Team.1,4,5

**Purpose:** Produce fully functioning operating software that will run the core services needed by the satellite. Operating software is a mission critical priority.

**Goals & Objectives:** The goal of the operating software is program the satellite with the necessary functions required for orbit, image collection, and data collection.

**Success Criteria:** The operating software should keep the satellite fully functioning with the successful core services (actuator interfaces, GPS sensing, temperature sensing, battery voltage sensing, ground communication, on-board communication, configuration files, and heuristic scheduling) and image capture system.

**Project Context:** The operating software is integrated with the satellite (or Roof SAT testing platform) and captures images which need to be transferred to the ground station in order to be processed.

**Project Dependencies:** The operating software development is dependent on a team of volunteer workers. The image capture system is dependent on the ground station being able to communicate with the satellite and process the images; and if it fails, it renders the images useless.

**Scope Specifications:** The systems that the operating software is in control of are the actuator interfaces, GPS, temperature, and battery voltage sensing; ground and on-board communication; configuration files; heuristic scheduling; integration with the satellite and Roof SAT; image capturing; and storage management.

**Out-of-Scope Specifications:** Integration testing with the satellite and Roof SAT is handled by the testing team. Task determination, position determination, and image processing are all handled by the ground station team.

**Assumptions:** It can be assumed that the operating software will not handle any of the image processing; the satellite’s and Roof SAT’s half of the integration will be fully functional, and the ground station will be able to communicate with the operating software in order to accept the data to determine tasks and determine the satellite’s position.

**Constraints:** The constraints of the operating software team are the limited budget, limited number of volunteers, and the limited number of man hours that the volunteers are able to contribute.

**Stakeholders:** The stakeholders of this project include the University of North Dakota (specifically the Computer Science Department), all of the professors and students who have volunteered their time towards the development of the operating software, the other project teams of Open Orbi- ter expecting a successful build and launch, NASA (who would launch the satellite into space) and all third party contributors of resources and/ or money donations.

**References**