

Requirements Document – ArduCAM with Telemetry

Revision History

| Date | Author | Changes |
|---------------|---------------|---------|
| June 26, 2024 | Rachel Pagdin | |

Project Objectives and Goals

To affordably transmit a useful image from a remote data logger to a web-based database.

Scope

In Scope

- Saving full-size colour images in JPEG format on an SD card on the MCU
- Transmitting a reduced-resolution grayscale image via Iridium satellite
- Reconstructing images from messages and saving to a web-based database

Out of Scope

- Transmitting colour or full-resolution images

User Requirements

Key User Groups/Personas/Actors

Human Users:

- User: Person accessing the images through the database
- Technician: Person trying to update/maintain the system

Auxiliary Systems:

- Database: system to store/provide access to reconstructed images

User Storiess

Functional Requirements

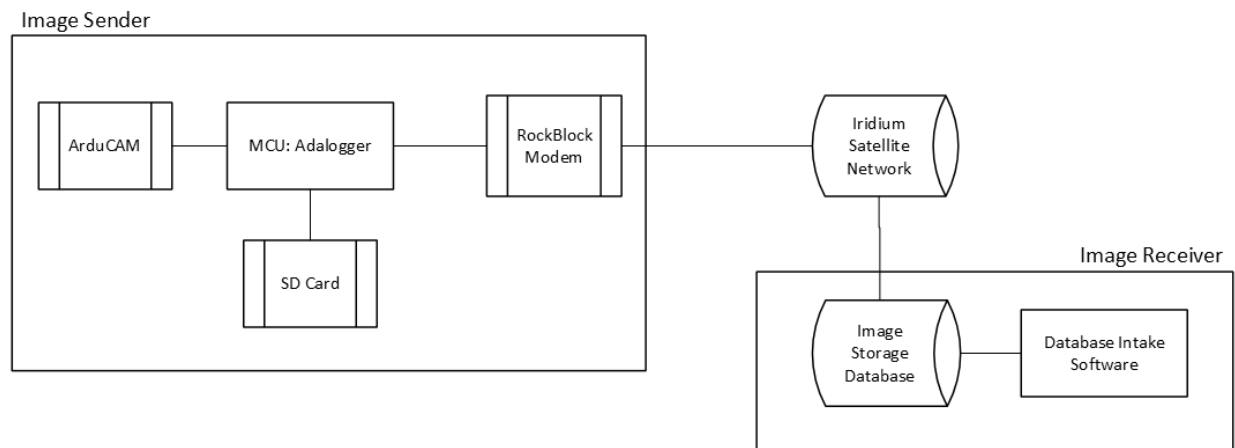
- Images are captured in colour by the camera and stored on the SD card at predefined interval.
- Images are captured in grayscale by the camera and transmitted over Iridium network at a predefined interval.
- Images are reconstructed in order and not scrambled.
- Reconstructed images are accessible through the database.
- The user can request an image to be transmitted via the Iridium satellite network.
- The technician can access the system to execute necessary updates and maintenance.

Nonfunctional Requirements

- Reconstructed images have minimal loss from transmitted data.
- The database is secure.
- Transmission over the satellite network does not exceed a set cost per image.
- Transmission over the satellite network does not exceed a set time per image.
- Reconstructed images are in a format acceptable to the database.
- The source code is understandable and well-documented to facilitate reproduction, updates, and further development.

Contextual Models

Architectural Model



Interaction Models

Use Cases

Use Case Elaboration Tables

Activity Diagrams with Swim Lanes

Assumptions, Constraints, and Dependencies

Assumptions

Project Success Metrics

- Enough of an image is transmitted that the object of the image is visible and identifiable.
- Images are transmitted within a reasonable period of time.
- All captured images are stored to the SD card and not corrupted.

Requirements Validation

Validity

Consistency

Completeness

Realism

Verifiability

System Architecture

Architectural Pattern Selection and Conceptual View Elaboration

Architectural Pattern Rationale

Application Architecture

Structural Models

UML Class Associations

Detailed Class Diagrams

Generalization Hierarchy

Aggregation Hierarchy

Behavioural Models

Sequence Diagrams

Statechart Diagrams

References/Resources