Requirements Document – ArduCAM with Telemetry

# Revision History

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| --- | --- | --- |
| **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

A group of rectangular objects with black text

Description automatically generated

# 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