Drone Mission Planning Software

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Overview

- Problem Definition
- Specific Component Design
  - Communications Design
  - Drone Design
  - Graphical User Interface Design
- Timeline
- Questions/Concerns

Problem Definition

The goal of this project is to design and develop a graphical user interface (GUI) for drone mission planning.

Requirements:

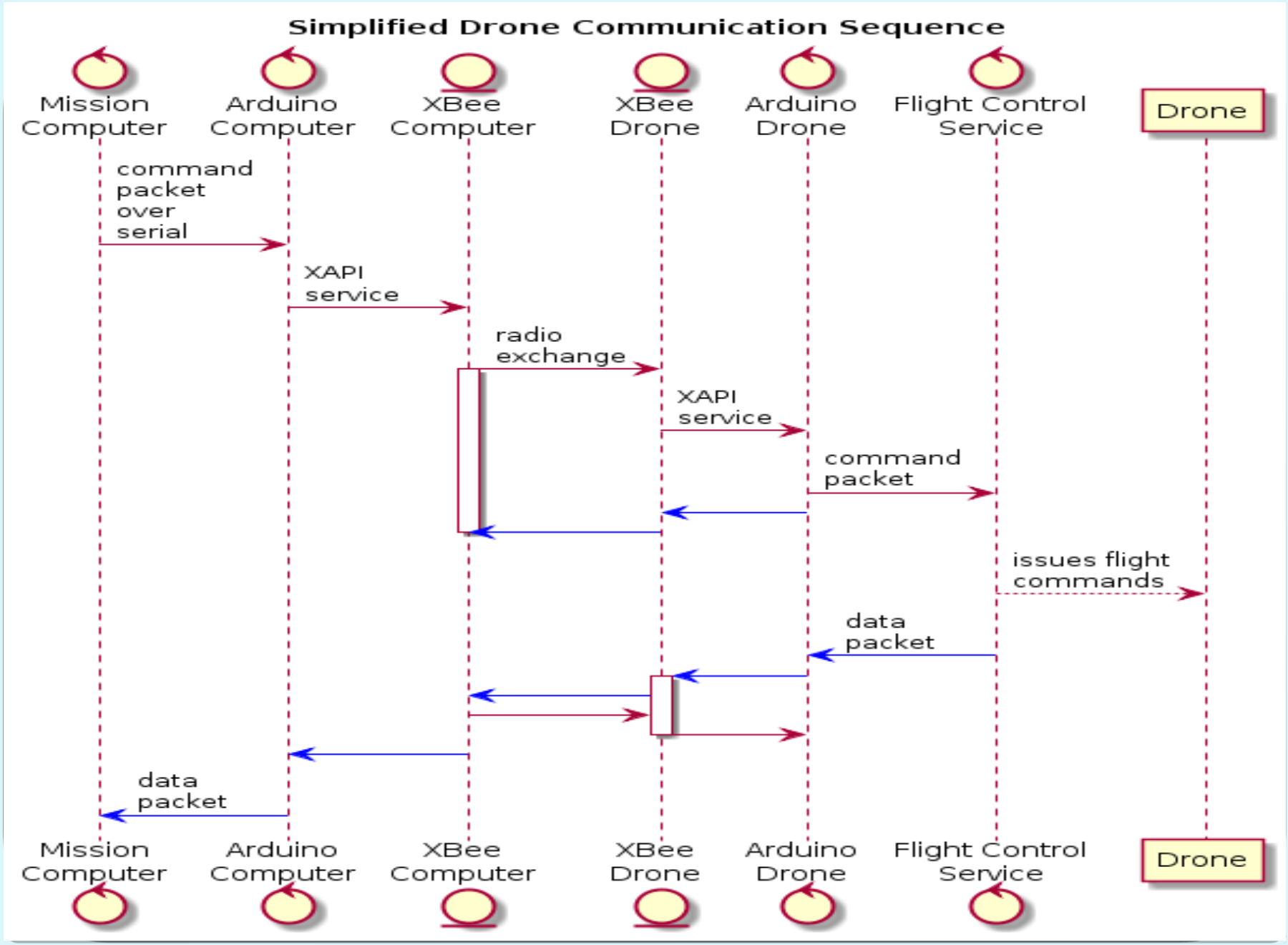
- A user-friendly interface
- Allow 3-dimensional mission planning
- Upload the flight plan using XAPI and XBee
- Allow manual override
- Implement drone hardware for flight control

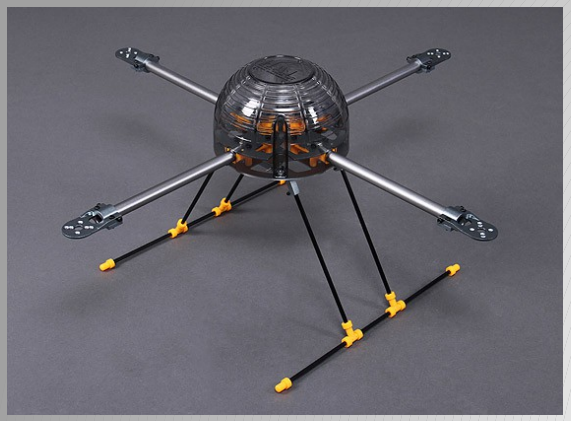
Communication Design

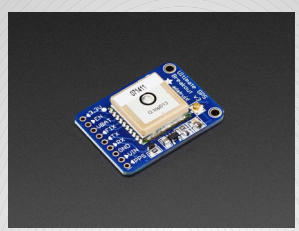
The communication system for this project must allow for commands to be sent from a computer to a drone.

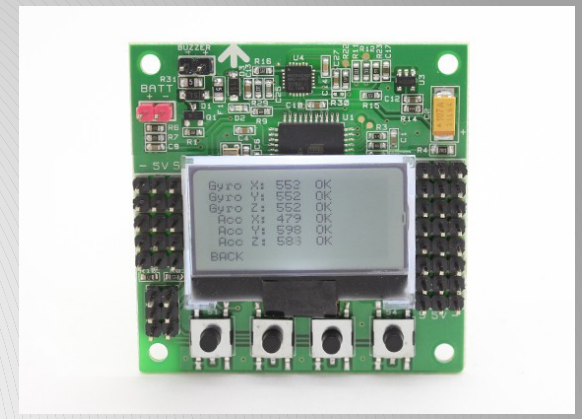
Requirements:

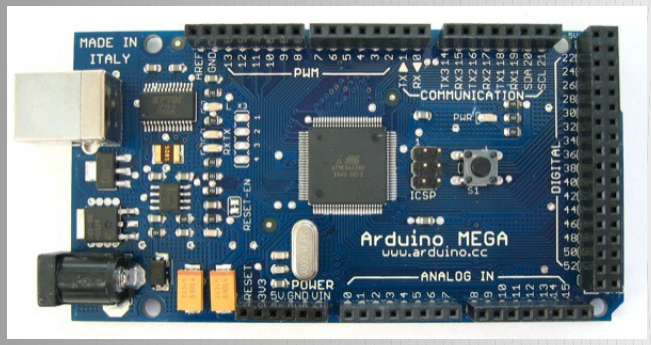
- XAPI and XBee hardware
- Specific TUN packets:
  - Manual drone instructions (altitude, direction, takeoff, etc..)
  - Settings
  - Acknowledgement of packet received
  - Heartbeat/status updates
  - Override (manual, land)
  - Flight plan protocol
    - Initialize for upload
    - Get instructions
    - Echo instructions
    - Terminate upload

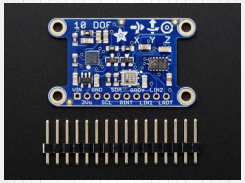

Simplified Drone Communication Sequence
Mission Computer
Arduino Computer
XBee Computer
XBee Drone
Arduino Drone
Flight Control Service
Drone
command packet over serial
XAPI service
radio exchange
XAPI service
command packet
issues flight commands
data packet
data packet
Mission Computer
Arduino Computer
XBee Computer
XBee Drone
Arduino Drone
Flight Control Service
Drone

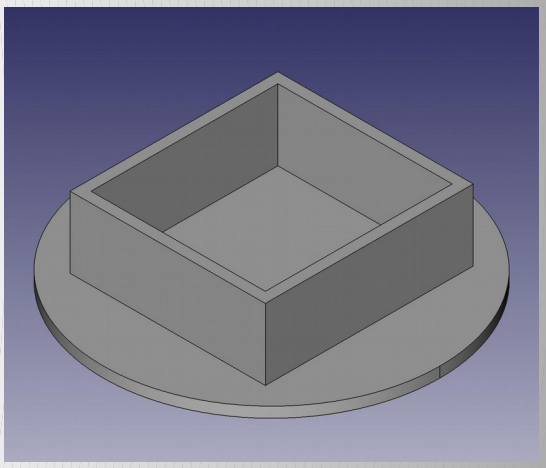




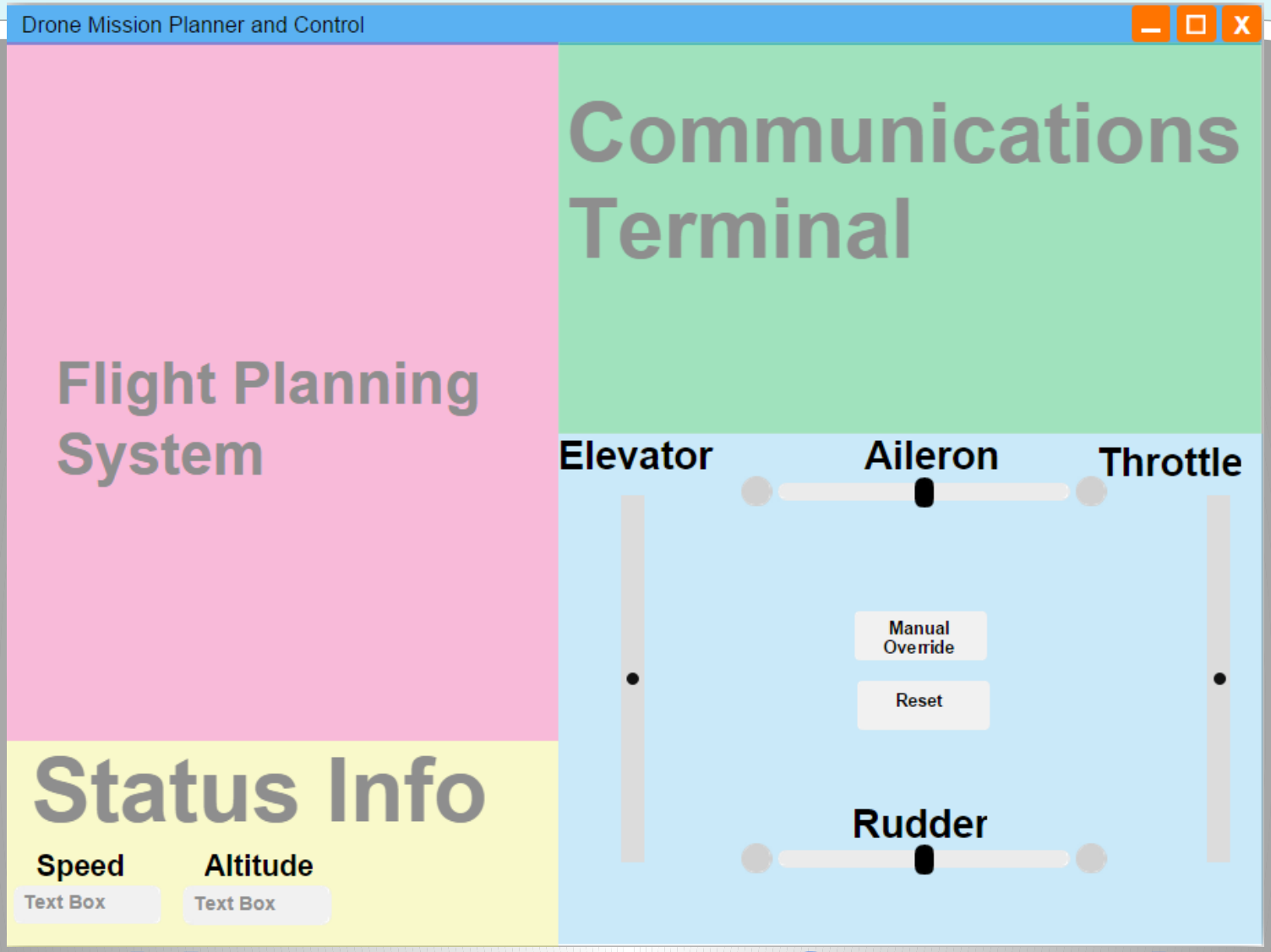








Drone Design



Graphical User Interface Design

Timeline

1. Re-design drone for reliable flight
2. Finish implementing communications between two Arduino boards over XBee using XAPI
3. Finish designing all needed packet types for drone control, status, ACK, and override.
4. Implement service on Arduino to send commands to flight computer
5. Final GUI design, implement communications system, design mission planning sub-system

Questions or concerns?

Thank You