

FLIGHT FOLLOWING SYSTEM REDESIGN

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Introduction

Outside radar range, small planes flying in remote locations must be tracked by other means. Emergency relief, humanitarian development and missionary organizations need to follow such flights, for safety and management. The Automatic Flight Following System (AFFS) owned by JAARS has been safety tested and used extensively for this purpose, but has been replaced in many cases by new options. Thus, the FTMS team has been working with stakeholder Cary Cupka on redesigning AFFS for more advanced technology modes to increase its value in the field. This includes replacing internal components of the existing AFFS with a new single board computer (A62), upgraded custom display, and HF transceiver (LimeSDR). In addition, the Ground Monitoring Unit (GMU) will have its own LimeSDR and a computer display connected to the UDOO (GMU platform). Currently the team is developing code for the aircraft (FLIGHTsoft) and the GMU (GROUNDsoft), as well as configuring the link between the two LimeSDR units.

Clients

Avionics consultant, Cary Cupka, represents organizations involved in Emergency relief, Humanitarian development & Missionary support, who need to fly small planes safely into remote locations. Carman Frith serves as an avionics specialist for JAARS.

This Year's Work

This past year, the FTMS team worked on three component areas of the system: FLIGHTsoft, GROUNDsoft and the HF communication transceivers. One team member took responsibility for each component to focus on developments in that area. FLIGHTsoft code formats any messages the pilot sends along with GPS and other flight critical data from the Aircraft Control Unit (ACU). GROUNDsoft code [Fig. 1] receives and displays any messages from the pilot, and automatically logs aircraft location with other status indicators at the Ground Monitoring Unit (GMU). This Flight Following System [Fig. 2] also depends on a wireless HF communication link between the ACU and GMU which is now implemented by two LimeSDRs transceivers. The LimeSDRs talk to each other successfully, but configuration of these transceivers with the rest of the Flight Following System is under development.

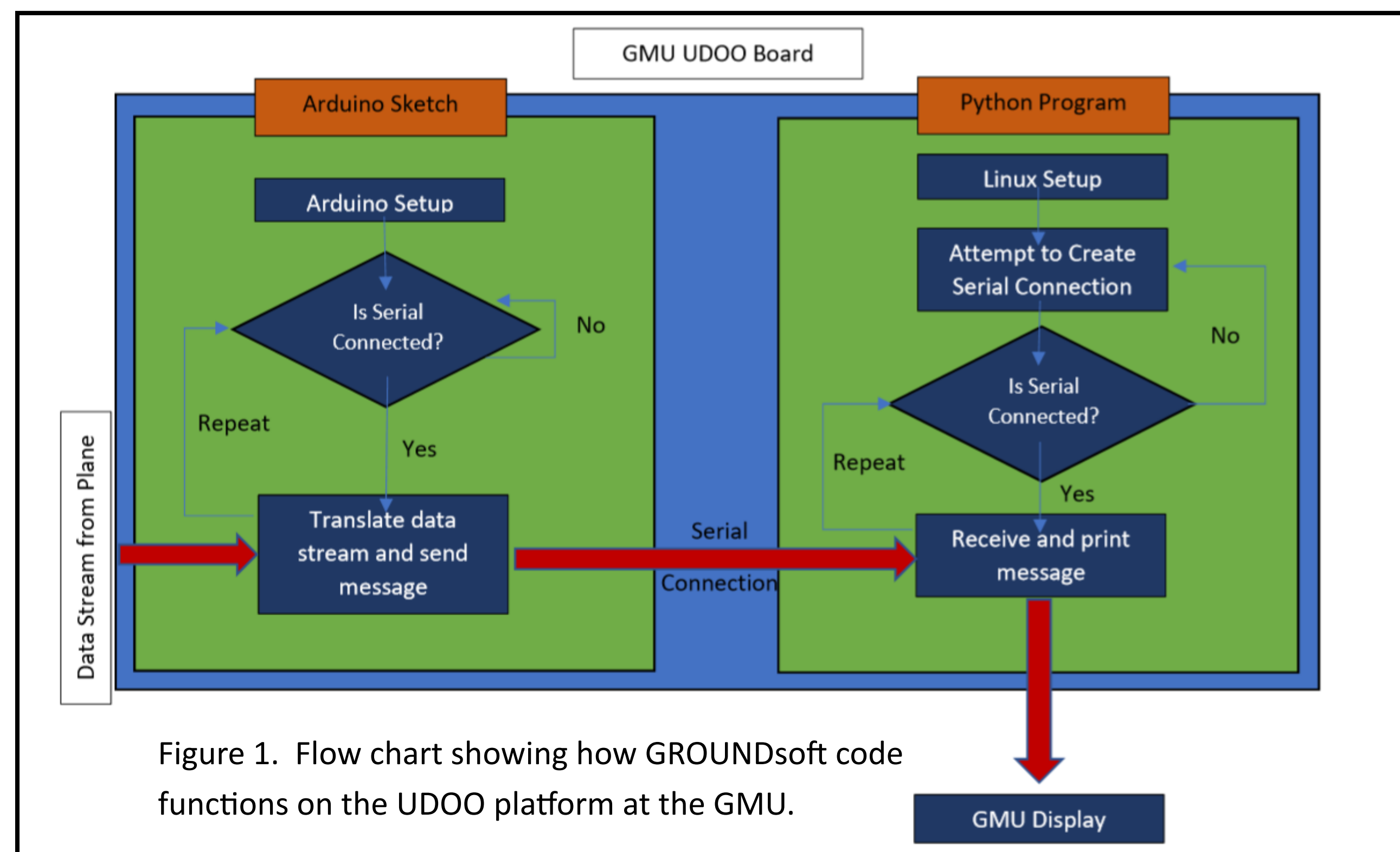


Figure 1. Flow chart showing how GROUNDsoft code functions on the UDOO platform at the GMU.

Future Work

Next year, the FTMS team will focus on getting the two LimeSDRs to communicate flight critical information (with a priority on GPS location) from the ACU to the GMU. In addition, we will continue developing FLIGHTsoft and GROUNDsoft code to achieve the desired functionality. These developments will prepare us for field testing of the overall Flight Following system.

Flight Tracking and Messaging System (FTMS)

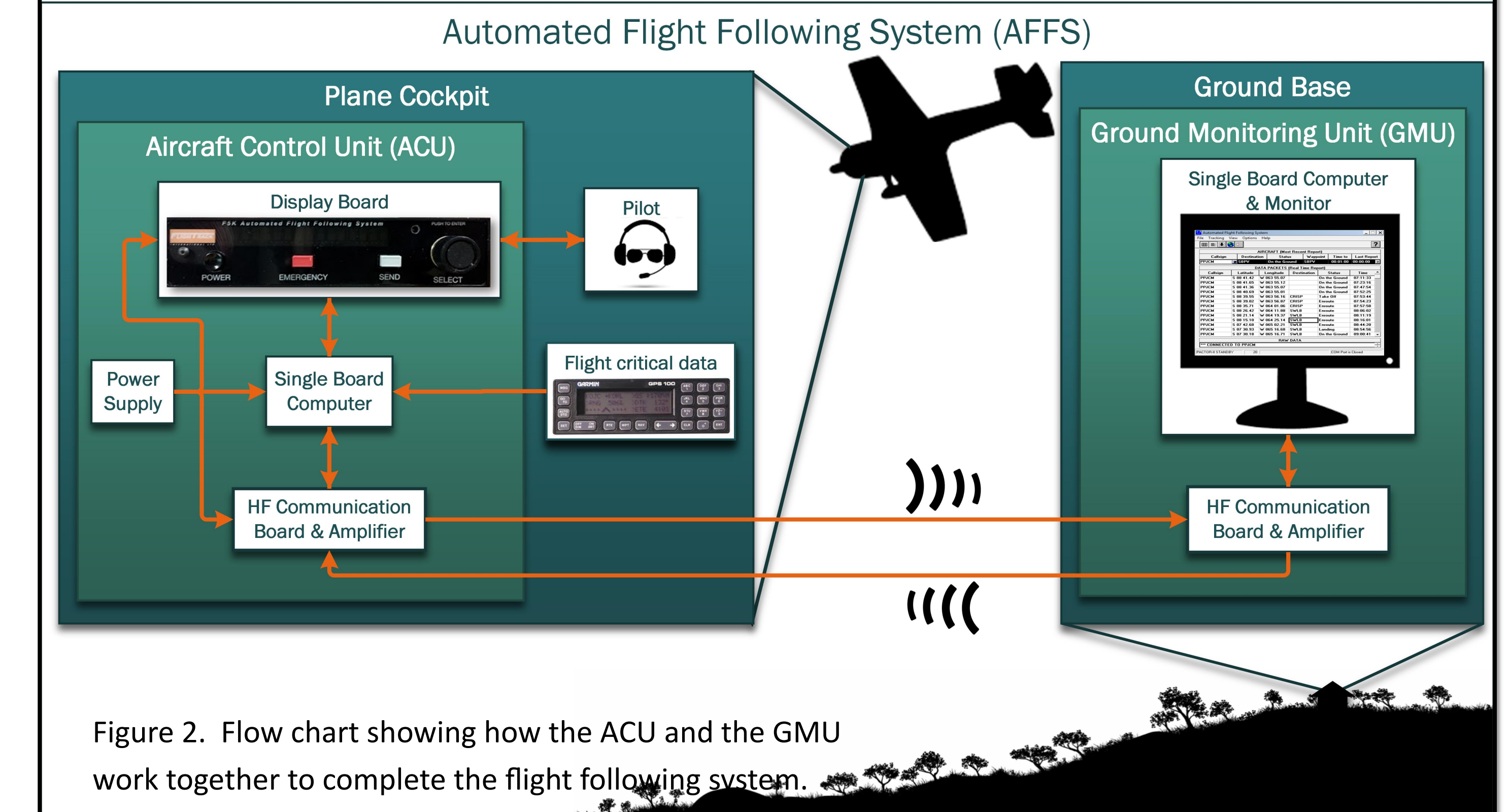


Figure 2. Flow chart showing how the ACU and the GMU work together to complete the flight following system.

Conclusions

The FTMS team has made progress on upgrading a flight following system. Last year a wired connection between the ACU and GMU demonstrated successful display of GPS coordinates. This year the team acquired and tested LimeSDR transceivers for a wireless link, developed C-code for the aircraft and ground units in preparation for field testing next year.

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