The goal of this project is to receive the GPS signal from an avionic unit using a GPS module connected to a Bluetooth ethernet dongle on the Sagetech MX Transponder. The received GPS data is then sent to an iOS application for displaying the aircraft's location on a map. The iOS application also enables configuring the installation message for the MX platform through the Bluetooth and ethernet connection.

### Bluetooth (BT) Module
- The BT module serves as a central intermediary in a two-way connection between the iOS application and the transponder.
- The BT module connects to the transponder via Ethernet, facilitating data exchange in packages of bytes.
- The BT module enables wireless communication by establishing a Bluetooth connection with the iOS application.

### Interfacing between the Application and the MX Transponder
- The BT module receives/sends messages from/to the transponder in packages of bytes via Ethernet.
- The BT module organizes data from bytes from the iOS application into a package and sends to the transponder via Ethernet.
- The BT module receives/sends messages from/to the iOS application in bytes via Bluetooth connection.
- The BT module breaks a package of bytes from the transponder into bytes and sends to the iOS application via Bluetooth connection.

### GPS
- The MX Transponder obtains data via receiving coded messages from the ethernet cable. It receives status and installation messages. Among others, one such message is the GPS message.
- Began by using a Ublox GPS sensor, which is capable of procuring positioning data like latitude, longitude, and altitude, in addition to velocity, heading, and orientation.
- Testing used “manufactured” data to ensure all readings were acceptable to the MX Transponder. It is this data that is currently sent to the Transponder.

### Google Map for Displaying Aircraft Location
- One of our main goals in the project is to display the GPS location of the aircraft on our application.
- The map is implemented using Vue3-google-map API.
- It can show the location of the aircraft based on a set of longitude and latitude coordinates provided.
- It can change its location of display in response to the dynamically changing longitude and latitude coordinates.

### Message Handling and Bluetooth Interaction
- The iOS application can connect to the Bluetooth module, interact by sending and receiving data.
- The iOS application encodes the information entered by the user and sends it to Bluetooth module in the format of bytes.
- The message in bytes received by the Bluetooth module will be integrated and decoded in the iOS application.

### Results
- We are able to have the MX Transponder communicate with the Application via the Bluetooth ethernet dongle correctly.
- The application is capable of configuring installation message to the MX Transponder.
- The MX Transponder is capable of reporting back to the application to check if the message sent is correct.
- Data encoding and decoding work properly between devices by using the Sagetech SDK.

### Future Work
- Getting the GPS Module to work to get us real GPS data that changes dynamically depending on the change of aircraft location.

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**STUDENTS:** Howard Her, Sai Jayanth Kalisi, Truong Hoang Pham, Jiaxin Xie

**ADVISERS:** David Day, Riley Barnes, Jim Ritcey

**SPONSOR:** Sagetech Avionics