# Port and pads connections

|  |  |
| --- | --- |
| UART1 | Free |
| UART2 | Receiver signal (ESP32) |
| UART3 | MSP signal (ESP32) |
| UART4 | Telemetry |
| UART5 | Optical flow & Lidar sensors |
| UART6 | GPS |
| UART7 | ESC telemetry (built-in) |

# PINS

Connect all the components using the ports defined in the following diagram:

# 

# Configuration in iNav

Installing iNav using iNav configuration (<https://github.com/iNavFlight/inav-configurator/releases>).

Then flash the firmware to the flight controller. Finally connect the battery and check if all the sensors are recognized as follows:

A picture containing text, outdoor

Description automatically generated

Calibrate the accelerometer, compass, and optical flow sensors. This calibration step needs to be repeated the first time the firmware is installed on the FC or if the GPS (with compass) or the optical flow sensors are moved or changed.

Verify that all the sensors are configured as below:

Graphical user interface, text, application

Description automatically generated

## iNav operation

The key sensor for INAV is an accelerometer. Measured acceleration is translated from body-fixed frame to local NEU coordinates and integrated to yield velocities in North, East and Up directions. Velocity is further integrated to produce coordinates.

As accelerometer tend to drift, estimated velocities and coordinates tend to drift as well. This accumulated error is corrected from various reference sources - GPS, BARO, SONAR. Position estimator also maintains estimated position error for horizontal (X-Y) and vertical (Z) position.

When reference source is not available for some reason, estimated position error increases until it reaches a certain threshold. Beyond that threshold position is no longer updated and marked invalid until a valid reference source is available again. This allows, for example, to fly through short (measured in seconds) GPS outages.

Using multiple sensors for estimation allows to filter noisy data (e.g. from barometer), interpolate between rare readings (e.g. from GPS), and immediately react on fast motion changes (using accelerometers) in the same time.

# https://github.com/iNavFlight/inav/wiki/images/inertial_estimator_diagram.jpg