

Quick guide for UAV collision avoidance: lateral, above and below



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Introduction

The objective of this quick guide is to explain how to implement full drone collision avoidance using Terabee sensors in Pixhawk platforms with Ardupilot autopilot (copter).

Our solutions can be configured to provide 360° lateral collision protection as well as obstacle detection above and below the drone. This can be particularly useful for drone navigation indoors or in confined spaces such as in tunnels, sewage systems or under bridges.

In order to implement automated collision avoidance with our sensors, they need to use the Ardupilot stack. Please refer to Ardupilot Wiki for updates and more detailed information: <https://ardupilot.org/copter/docs/common-simple-object-avoidance.html>

Using Evo Tower and individual sensors for collision avoidance

TeraRanger Tower Evo 60m enables peripheral collision detection using the collision avoidance law from Ardupilot. The following link shows how to connect this sensor to Pixhawk:

<https://www.terabee.com/connection-to-pixhawk-autopilots-teraranger-tower-evo/>



Evo Tower

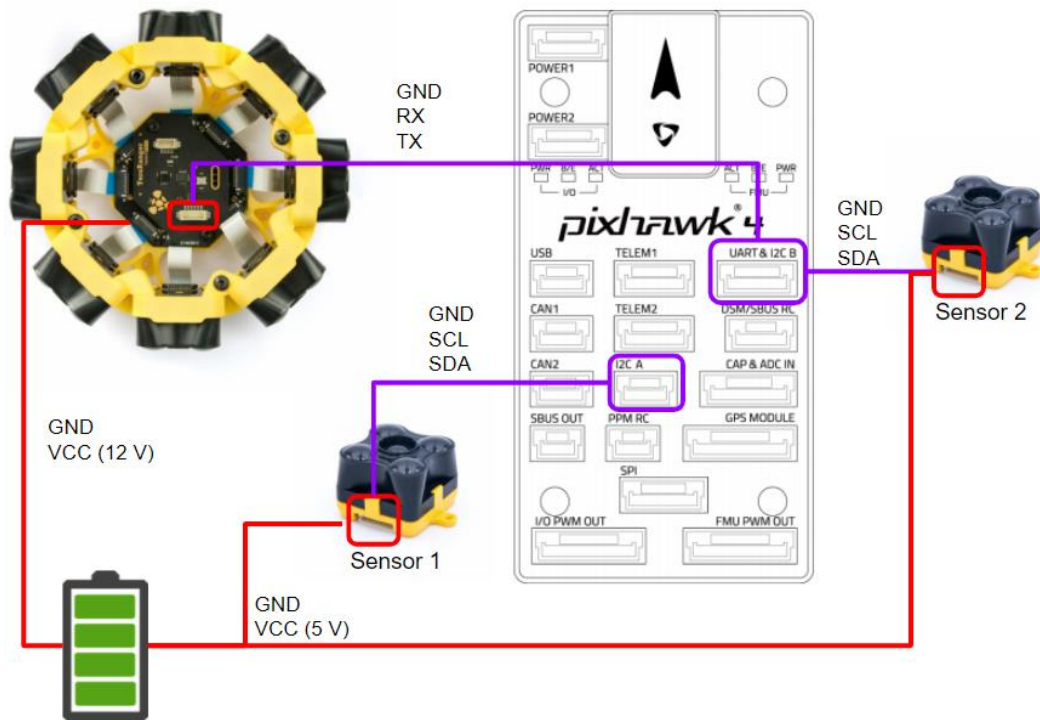
The altimeter and ceiling detect is achieved thanks to our Evo sensor family (Evo 60m, 40m, 15m, 3m) with the I2C/UART backboard. The following link shows how to connect these sensors to Pixhawk: <https://www.youtube.com/watch?v=rV8i9hRYtyQ&t=165s>



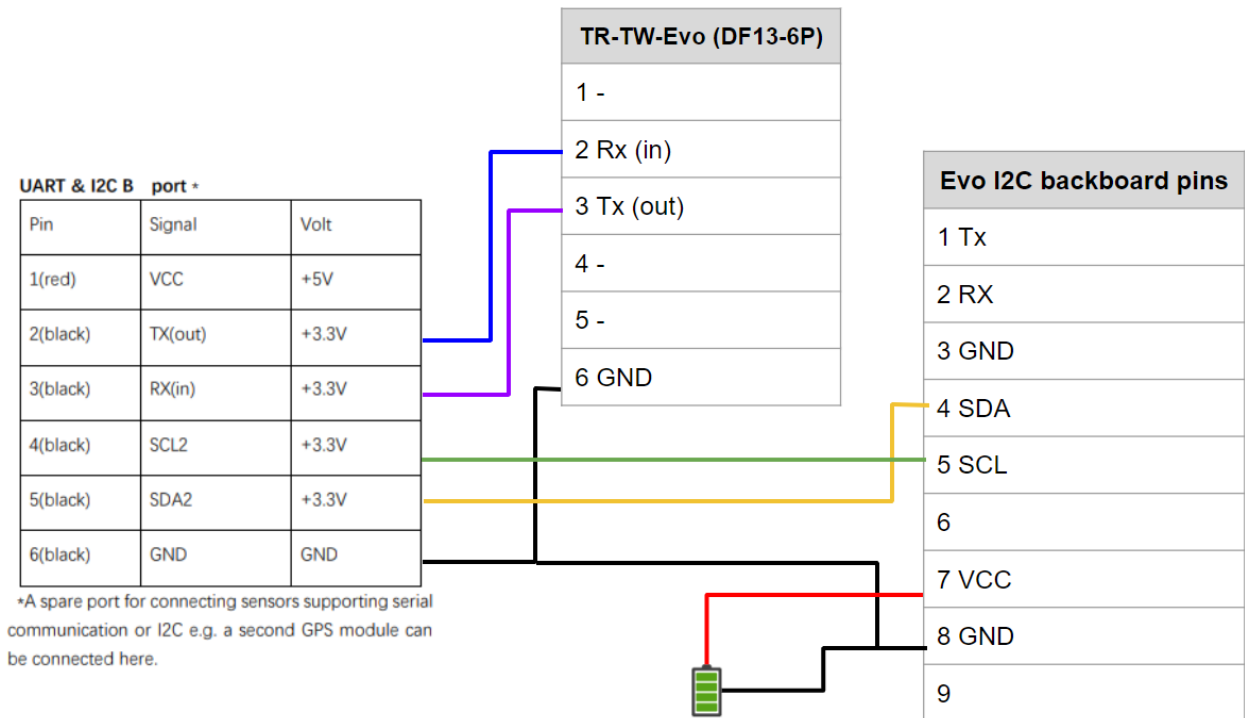
You can find the Evo Tower [here](#). You can find the individual sensors here: [Evo 60M](#), [Evo 15M](#), [Evo 40M](#),

Schematics

This schematic figure shows the wiring needed between Terabee sensors and the Pixhawk platform (we have taken as example Pixhawk 4)



The following images show the Pin-to-pin connection between Terabee sensors and Pixhawk 4.

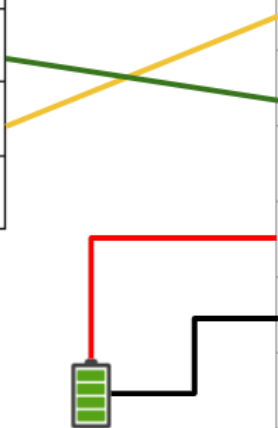


I2C A port

Pin	Signal	Volt
1(red)	VCC	+5V
2(black)	SCL4	+3.3V
3(black)	SDA4	+3.3V
4(black)	GND	GND

Evo I2C backboard pins

1 Tx
2 RX
3 GND
4 SDA
5 SCL
6
7 VCC
8 GND
9



Parameters

The following parameters enable the collision avoidance for Single Object Avoidance law from Ardupilot, <https://ardupilot.org/copter/docs/common-simple-object-avoidance.html> For more information related to other control laws from Ardupilot, please refer to the Wiki pages from Ardupilot.

Ardupilot Parameters	Tower Evo
PRX_ORIENT	0
PRX_TYPE	6
SERIAL(X)_BAUD	921
SERIAL(X)_PROTOCOL	11

Ardupilot Parameters	Evo 60m (1)
RNGFND1_ADDR	49
RNGFND1_MAX_CM	6000
RNGFND1_MIN_CM	50
RNGFND1_ORIENT	25 (Looking Down / Altimeter)
RNGFND1_TYPE	14

Ardupilot Parameters	Evo 60m (2)
RNGFND2_ADDR	50 (Follow Procedure for Changing I2C address)
RNGFND2_MAX_CM	6000
RNGFND2_MIN_CM	50
RNGFND2_ORIENT	24 (Looking Up / Ceiling detection)
RNGFND2_TYPE	14

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