UWB software current state

Current issues on STM32 code:

* After starting up, requires a reset to get UWB data.
* Lack of Buzzer feedback upon obstacle detection.

Current issue on Vision60 ros2 nodes:

* Serial Node might need some fixing as it will crash when STM32 is disconnected.
* Verification Node has issue processing obstacle avoidance.
* All 3 nodes on vision60 does not automatically start upon boot up.

Do not turn on Verification node as it is quite dangerous. If stuck in loop, the only way to stop it is to press Emergency stop.

How to operate:

* Turn on robot power.
* Wait around 1 minute 30 secs before the Follow Mode can be turned on.   
  This is due to delayed power delivery by the vision60 to the UWB Modules.  
  After waiting, the Vision60 will send “reset” to STM32 and STM32 will go through a software reset. After this then it is ready for the Follow Mode.
* Upon turning on, you will hear some beep which is normal as the UWB is trying to get reading of the user’s anchor.
* When the distance of all 3 UWB tag from user’s tag is received the beeping will stop and it will start to follow the user.

Nodes that are crucial to get the Follow Mode working:

* Serial Node
* Movement Node

Nodes that are not necessary yet:

* Verification Node

Serial Node:

The Serial Node is responsible for both getting & sending the serial data from the STM32 & to STM32 . This node works like a normal serial monitor.

Movement Node:

The Movement Node is responsible for publishing movement commands to Vision60 topics based on commands it gets from STM32.

Verification Node:

This node initially was meant to check for soft-stop, estop and obstacle detection. The soft-stop and estop data can be obtained through the heartbeat topic.   
  
However, for obstacle detection, you will probably have to play around with the data that are being send to depth camera topic as my current knowledge is limited & my time is short.   
  
What I did was to check for “forward” command from STM32 and verify with the X Velocity of the vision60, if command == “forward” && “X Velocity” >= 1 then there is no obstacle. However, if command == “forward” && “X Velocity” <= 1 then it would start counting if this condition occurred 5 times, then it confirms that there is an obstacle. When it happens, this node will issue a “stop” command to STM32 and STM32 will stop issuing movement commands. It will then go into a while loop and starts to force the Vision60 to move forward to check if X Velocity is still less than 1. It will keep on checking until command == “forward” && “x Velocity” >= 1, when this condition is true. It will issue a “continue” command to STM32 and exit the while loop and proceed with normal operation.

What can be fixed as of now:

* Issue of having to reset.   
  What I would suggest is to tap into the 5V that is coming from the buck converter, this will be fed into one of the pins in STM32 and use as interrupt. So, when the 5V goes high, the STM32 will be able to auto reset once.
* During the initialization phase, the user might press the Follow Me Button, what I would suggest would be to keep it blinking if it is currently going through initialization phase.

Topics used:

I will be putting all inside a folder for easy access.   
Special thanks to Jing Wen for doing the STM32 software 😊