

# Node Test: ESP32 IMU Node

## Node test set up and prerequisites:

The ability to run the node. We need an ESP32 and Arduino IDE 2.

## IMU

Test1 : IMU data check  
Tester : Rik van Velzen  
date : 03/11/2025

### Short description test:

- Check if there is coming data from the IMU.

### Input test:

- Settings for connection:  
Sensor\_id = 55  
address = 0x28  
Baudrate = 115200

### Expected result :

- The ESP32 receives data from the IMU and publishes it on the serial output.

### Result test:

- Data from IMU is received as visual output.

```
Gyroscope (rad/s): X: 0.015 Y: 0.009 Z: 6.115 | Linear Accel (m/s2): X: -0.160 Y: -0.220 Z: -0.290
Gyroscope (rad/s): X: 0.012 Y: -0.007 Z: 2.078 | Linear Accel (m/s2): X: -0.170 Y: -0.410 Z: -0.360
Gyroscope (rad/s): X: 0.022 Y: -0.009 Z: 0.632 | Linear Accel (m/s2): X: 0.280 Y: -0.680 Z: -0.350
Gyroscope (rad/s): X: 0.000 Y: -0.003 Z: -3.207 | Linear Accel (m/s2): X: 0.100 Y: 0.190 Z: -0.360
Gyroscope (rad/s): X: -0.014 Y: -0.009 Z: -5.058 | Linear Accel (m/s2): X: -0.150 Y: -0.240 Z: -0.340
Gyroscope (rad/s): X: -0.011 Y: 0.013 Z: -1.242 | Linear Accel (m/s2): X: -0.460 Y: -0.130 Z: -0.380
```

## Wireless

Test1 : Connection check  
Tester : Rik van Velzen  
date : 06/11/2025

### Short description test:

- We observe if the IMU ESP32 is connected to our ROS system (computer).

**Input test:**

- Settings for connection:  
 ssid = "IMU";  
 password = "IMUsensor1234";  
 host\_ip = "10.42.0.1";  
 host\_port = 5005;

**Expected result :**

- There is a wireless connection through which data can be sent.

**Result test:**

- Wireless connection is established.

```
...ets Jun  8 2016 00:22:57
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0030,len:4980
load:0x40078000,len:16612
load:0x40080400,len:3480
entry 0x400805b4
Connecting to Wi-Fi..... connected!
IP: 10.42.0.239
```

Test2 : Data sending check

Tester : Rik van Velzen

date : 06/11/2025

**Short description test:**

- Check if the IMU ESP32 is sending data to our ROS system (computer).

**Input test:**

- Settings for connection:  
 ssid = "IMU";  
 password = "IMUsensor1234";  
 host\_ip = "10.42.0.1";  
 host\_port = 5005;

**Expected result :**

- There is a wireless connection through which data can be sent.

### Result test:

- Wireless connection is established and data is received.

```
rik@IdeaPad-5-Pro:~/rmb_ws$ ros2 launch g425_assign3_pkg assign3_wireless.launch.xml
[INFO] [launch]: All log files can be found below /home/rik/.ros/log/2025-11-07-14-42-18-114689-IdeaPad-5-Pro-32934
[INFO] [launch]: Default logging verbosity is set to INFO
[INFO] [LifecycleNodeSubscriber-1]: process started with pid [32937]
[INFO] [ImuLifecycleNode-2]: process started with pid [32938]
[INFO] [LifecycleManager-3]: process started with pid [32939]
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.340526350] [imu.lifecycle_node]: Lifecycle node started in state: unconfigured
[INFO] [LifecycleNodeSubscriber-1] [INFO] [1762522938.342405640] [lifecycle_node_subscriber]: Lifecycle node subscriber started, waiting for messages...
[INFO] [LifecycleManager-3] [INFO] [1762522938.343562964] [lifecycle_manager]: Waiting for lifecycle node 'imu.lifecycle_node'...
[INFO] [LifecycleManager-3] [INFO] [1762522938.343640361] [lifecycle_manager]: Connected to lifecycle node 'imu.lifecycle_node'!
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.344023160] [imu.lifecycle_node]: Configuring IMU lifecycle node...
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.344053869] [imu.lifecycle_node]: Wireless connection selected.
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.344211619] [imu.lifecycle_node]: Listening for UDP packets on port 5005...
[INFO] [LifecycleManager-3] [INFO] [1762522938.347106572] [lifecycle_manager]: Transition 1 completed successfully.
[INFO] [LifecycleManager-3] [INFO] [1762522938.347316903] [lifecycle_manager]: State change of node 'imu.lifecycle_node': inactive
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.347384612] [imu.lifecycle_node]: Node activated, ready to receive and publish IMU data.
[INFO] [LifecycleManager-3] [INFO] [1762522938.347453744] [lifecycle_manager]: Transition 3 completed successfully.
[INFO] [LifecycleManager-3] [INFO] [1762522938.347558854] [lifecycle_manager]: State change of node 'imu.lifecycle_node': active
[INFO] [LifecycleManager-3]: process has finished cleanly [pid 32939]
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.544756975] [imu.lifecycle_node]: Received IMU data:
[INFO] [ImuLifecycleNode-2] Linear Acceleration: x=0.000, y=0.000, z=-0.330
[INFO] [ImuLifecycleNode-2] Angular Velocity: x=-0.001, y=0.002, z=0.001
[INFO] [ImuLifecycleNode-2] Time: sec=1762522938, nanosec=544752176
[INFO] [ImuLifecycleNode-2] [INFO] [1762522938.544816358] [imu.lifecycle_node]: Publish data to database subscriber...
```

### Wired

Test1 : Connection check  
Tester : Rik van Velzen  
date : 03/11/2025

#### Short description test:

- We observe if the IMU ESP32 is connected to our ROS system (computer).

#### Input test:

- Settings for connection:  
Baudrate = 115200  
Publisher: /imu\_data\_esp

#### Expected result :

- There is a wired connection through which data can be sent.

#### Result test:

- The wired connection is established.

```
rik@IdeaPad-5-Pro:~/rmb_ws$ ros2 run micro_ros_agent micro_ros_agent serial --dev /dev/ttyUSB0 -b 115200
[1762527690.807196] info      | TermiosAgentLinux.cpp | init
running...           | fd: 22
[1762527690.807451] info      | Root.cpp          | set_verbose_level    | lo
gger setup          | verbose_level: 4
```

Test2 : Data sending check

Tester : Rik van Velzen

date : 03/11/2025

Short description test:

- Check if the IMU ESP32 is sending data to our ROS system (computer).

Input test:

- Settings for connection:  
Baudrate = 115200  
Publisher: /imu\_data\_esp  
Timer\_period\_ms = 200

Expected result :

- There is a wireless connection through which data can be sent.

Result test:

- Wireless connection is established and data is received.

```

[LifecycleManager-4] [INFO] [1762527557.831352170] [lifecycle_manager]: State change of node'imu_lifecycle_node': inactive
[micro_ros_agent-1] [1762527558.759862] info    | Root.cpp      | create_client
                                         | create           | client_key: 0x7E9244AB, session_id: 0x
81
[micro_ros_agent-1] [1762527558.759908] info    | SessionManager.hpp | establish
_session          | session established | client_key: 0x7E9244AB, address: 0
[micro_ros_agent-1] [1762527558.779007] info    | ProxyClient.cpp | create_pa
rticipant        | participant created | client_key: 0x7E9244AB, participant_id
: 0x000(1)
[micro_ros_agent-1] [1762527558.792715] info    | ProxyClient.cpp | create_to
pic             | topic created     | client_key: 0x7E9244AB, topic_id: 0x00
0(2), participant_id: 0x000(1)
[micro_ros_agent-1] [1762527558.801719] info    | ProxyClient.cpp | create_pub
lisher          | publisher created | client_key: 0x7E9244AB, publisher_id:
0x000(3), participant_id: 0x000(1)
[micro_ros_agent-1] [1762527558.812047] info    | ProxyClient.cpp | create_da
tawriter         | datawriter created | client_key: 0x7E9244AB, datawriter_id:
0x000(5), publisher_id: 0x000(3)
[ImuLifecycleNode-3] [WARN] [1762527559.052787122] [imu_lifecycle_node]: Node is
not active. Ignoring incoming IMU data.
[LifecycleManager-4] [INFO] [1762527559.052812330] [lifecycle_manager]: IMU data
received → activate node
[ImuLifecycleNode-3] [INFO] [1762527559.052890439] [imu_lifecycle_node]: Node acti
vated, ready to receive and publish IMU data.
[LifecycleManager-4] [INFO] [1762527559.052945233] [lifecycle_manager]: Transition
n 3 completed successfully.
[LifecycleManager-4] [INFO] [1762527559.053029583] [lifecycle_manager]: State cha
nge of node'imu_lifecycle_node': active
[ImuLifecycleNode-3] [INFO] [1762527559.286745520] [imu_lifecycle_node]: Reveiced
IMU data:
[ImuLifecycleNode-3] Linear Acceleration: x=0.000, y=0.010, z=-0.340
[ImuLifecycleNode-3] Angular Velocity: x=-0.002, y=-0.002, z=-0.001
[ImuLifecycleNode-3] Time: sec=4, nanosec=144000000
[ImuLifecycleNode-3] [INFO] [1762527559.286777651] [imu_lifecycle_node]: Publish
data to database subscriber...

```

- esp32\_imu\_node is sending imu messages to the lifecyclenode.  
RQT\_graph:

