



Remote control the first part Meeting no. 7 Zabrze (Poland)

Prepared by Tomasz Kądziołka
ZS10 Poland



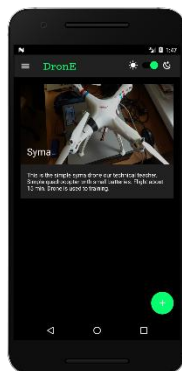
Our goals

- Create own wireless connection between a drone and a user
- Show a modularity of drone's components
- Better discover the relations and interfaces on the APM
- Make the drones even more accessible



How do we want to do that?

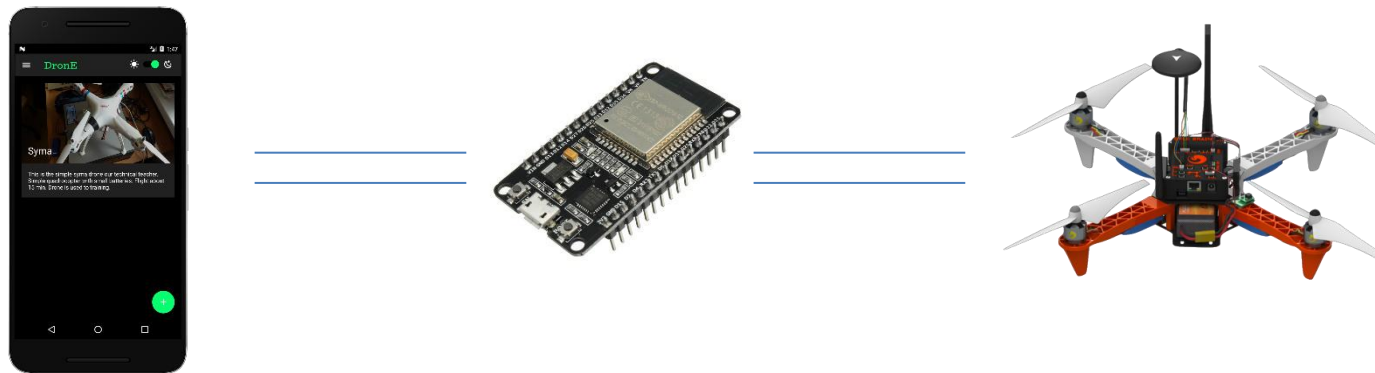
- We need something that will connect a smartphone to an APM





How do we want to do that?

- We need something that will connect a smartphone to an APM



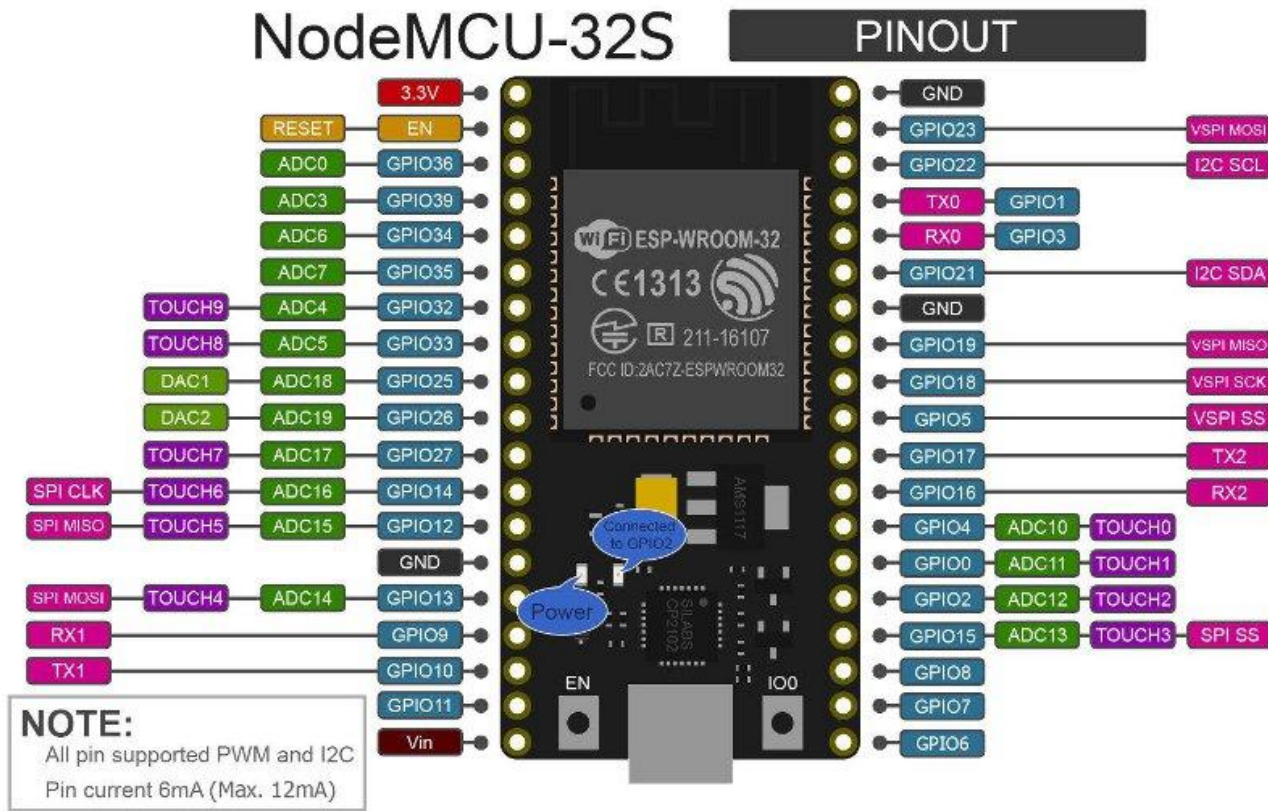


ESP32 DEVELOPMENT BOARD

- ESP32 is already integrated antenna and RF balun, power amplifier, low-noise amplifiers, filters, and power management module.
- This board is used with 2.4 GHz dual-mode **Wi-Fi** and **Bluetooth** chips by TSMC 40nm **low power** technology,
- power and RF properties best, which is safe, reliable, and scalable to a variety of applications.

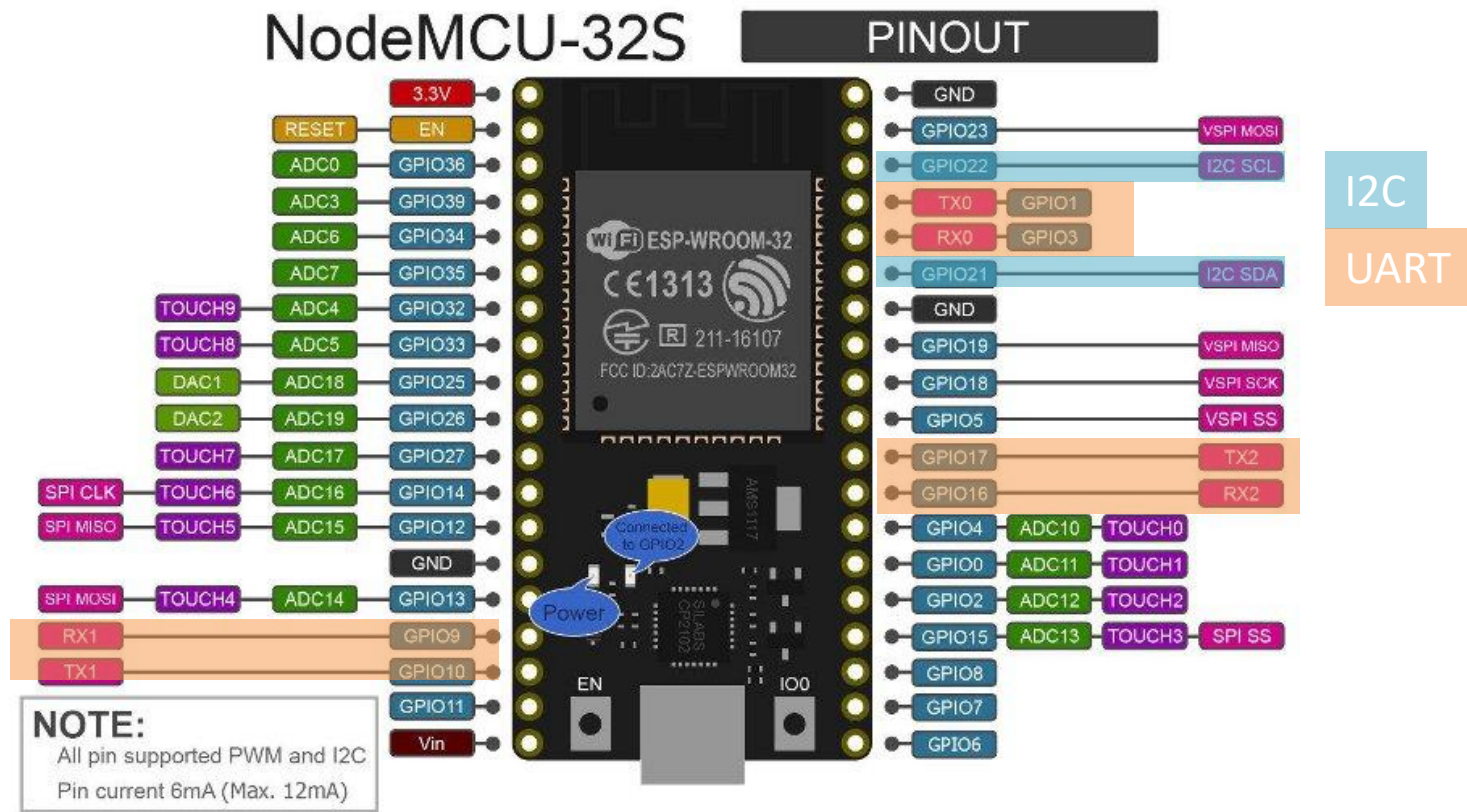


Preview





Preview





Features

- Powered by an USB
- Small
- Low power
- 3x UART and 2x I2C (2x I2S)
- PWM Outputs
- Powerful
- Well documented



Steps

1. Make a connection between devices
2. Arm the drone
3. Select flight mode (Important because of the security)
4. Run the single motors
5. Test flight



Possibilities

- Mission Planner allows us to control and test every component of the drone so we can do that from the side of a phone.
- My role is to rewrite the actions from the Mission Planner to the code of a DronE app.



EKF Vibe **GPS: No GPS**

Scripts		Messages			Payload Control		
Quick	Akcje	PreFlight	Wskaźniki	Status	Servo	Logi telemetrii	DataFlash Logs
LOITER_U	Wykonaj akcję	Auto	Ustaw wysokość st	100	Change Speed		
0 (Home)	Ustaw WP	Manualny	Restart misji	100	Change Alt		
Auto	Ustaw tryb	RTL	Widok surowych da	100	Set Loiter Ra		
Retracted	Set Mount	Joystick	Arm/ Disarm		Wyczyść trasę		
			Resume Mission		Abort Landing		

Select Actions
Joystick



Joystick

Joystick Controller (XBOX 360 For Windows) Włącz Zapisz Loaded Config for ArduCopter2

	Oś kontrolera	Wyjście	Expo	Odwroćni	Manual Control
Przechylenie	None	Autodet ekcja	0	<input type="checkbox"/>	Elewony
Pochylenie	None	Autodet ekcja	0	<input type="checkbox"/>	
Przepustnica	None	Autodet ekcja	0	<input type="checkbox"/>	
Ster kierunku	None	Autodet ekcja	0	<input type="checkbox"/>	
CH 5	None	Autodet ekcja	0	<input type="checkbox"/>	
CH 6	None	Autodet ekcja	0	<input type="checkbox"/>	
CH 7	None	Autodet ekcja	0	<input type="checkbox"/>	
CH 8	None	Autodet ekcja	0	<input type="checkbox"/>	
Button 1	-1	Autodet ekcja	1500	ChangeMode	Settings
Button 2	-1	Autodet ekcja		ChangeMode	Settings
Button 3	-1	Autodet ekcja		ChangeMode	Settings
Button 4	-1	Autodet ekcja		ChangeMode	Settings
Button 5	-1	Autodet ekcja		ChangeMode	Settings
Button 6	-1	Autodet ekcja		ChangeMode	Settings
Button 7	-1	Autodet ekcja		ChangeMode	Settings
Button 8	-1	Autodet ekcja		ChangeMode	Settings
Button 9	-1	Autodet ekcja		ChangeMode	Settings
Button 10	-1	Autodet ekcja		ChangeMode	Settings



Connection

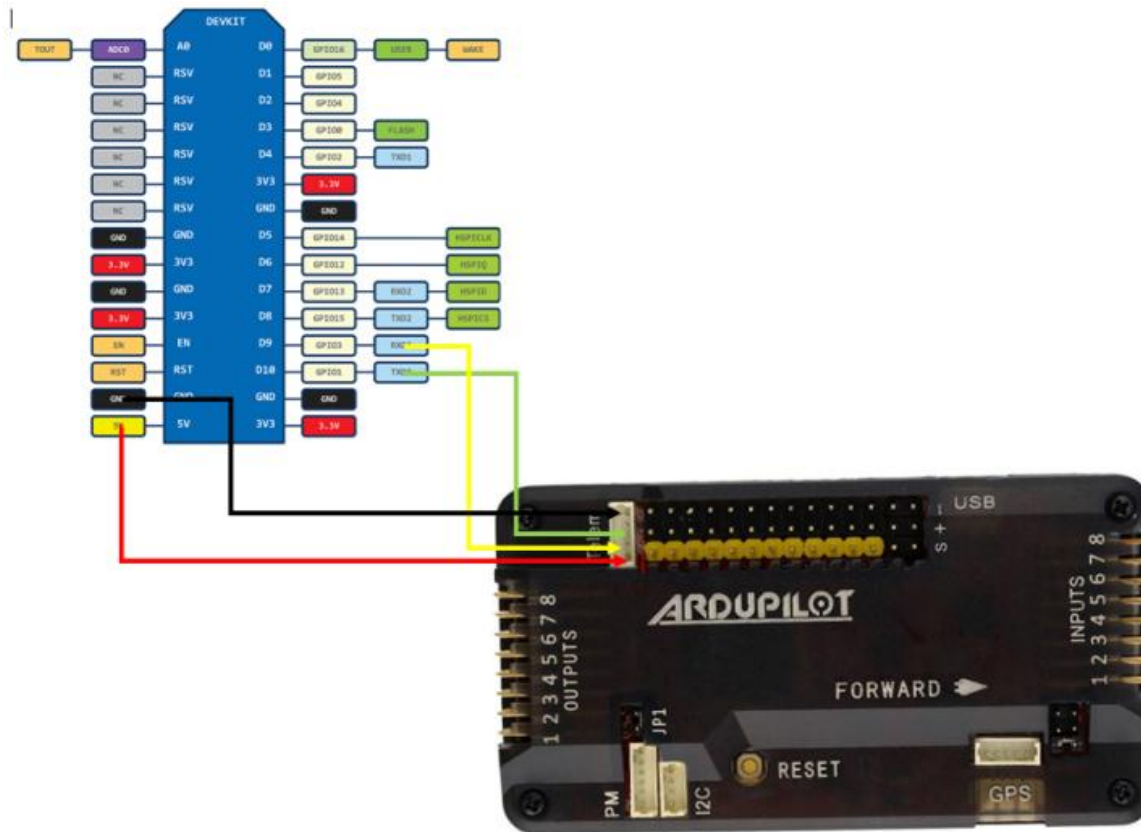
- The connection uses MAVLINK interface
- **MAVLink** or Micro Air Vehicle Link is a protocol for communicating with small unmanned vehicle. It is designed as a header-only message marshaling library. MAVLink was first released early 2009 by Lorenz Meier under LGPL license.

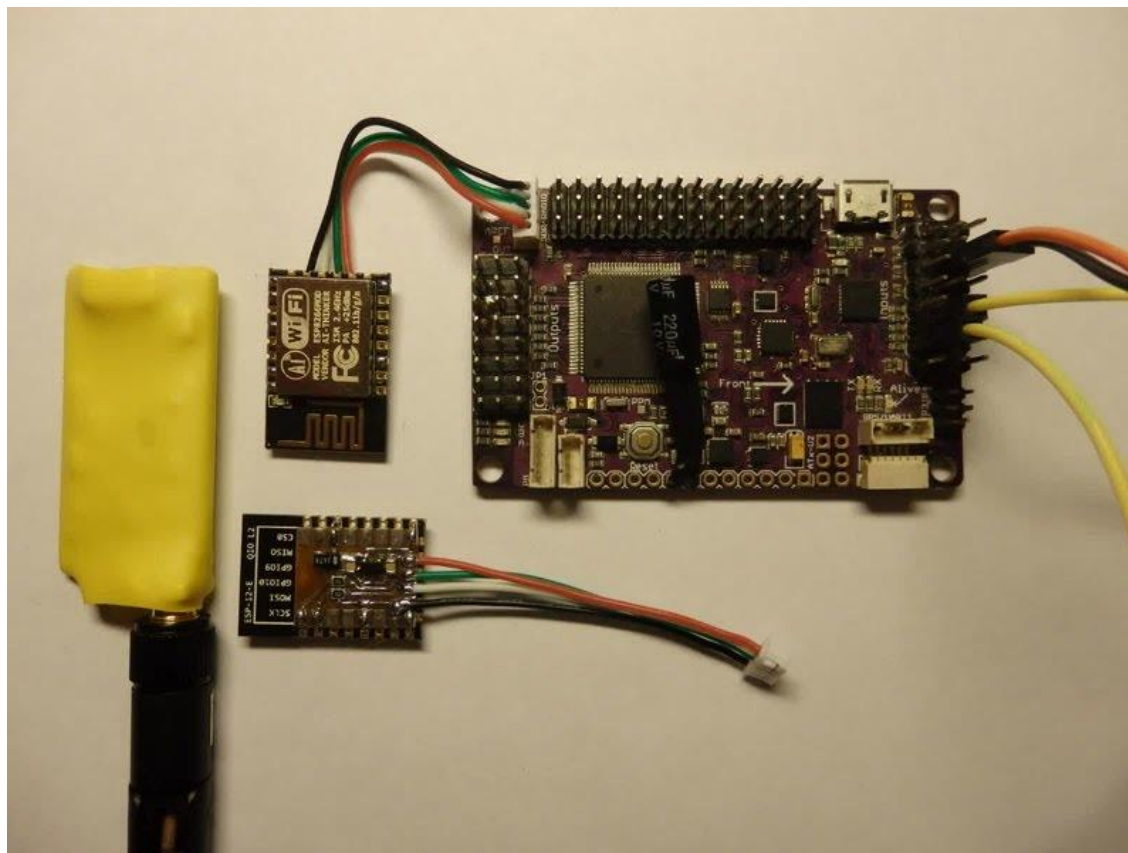


ESP2866

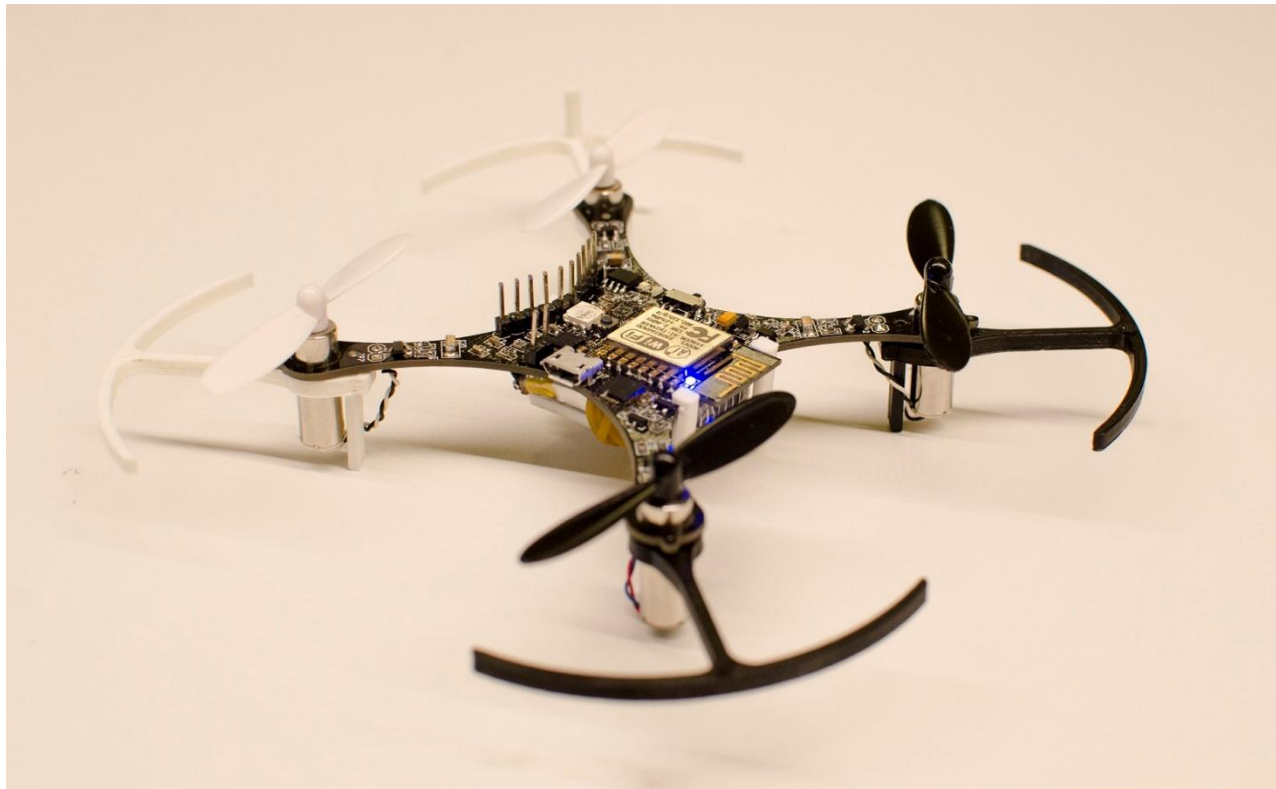
- On the internet you can find an older and cheaper version of esp32.
- Esp32 is made on the same base but with the additional uart interfaces, usb controller and bluetooth support

The people have already made it!











Tools and guides

- Programming ESP32 in an Arduino IDE - <https://www.dfrobot.com/blog-598.html>
- A visual programming environment - <https://www.visuino.com/>
- Visuino Tutorials - <https://www.youtube.com/playlist?list=PLymDIvwzJQlvPOzc3AdtzO6LXbnk-NFPT>
- Official forum - <https://www.esp32.com/>
- ESP32 scheme - http://pliki.propix.com.pl/images/nodemcu_esp-32s/nodemcu_32s_sch.png
- Useful software and tips - <https://github.com/Nicholas3388/LuaNode>
- <https://bbs.espressif.com/viewtopic.php?t=5298>



Integrated software





As always open source

- The source code and steps to follow will be shared on DronE github site.
- Code will be described in English so everyone will can access it.



Thank you for attention 😊



Tomasz Kądziołka



<http://tkadziolka.pl>

<https://github.com/tmaxxdd>



Sources

- <https://12voltgeek.com.au/product/esp32-development-board-wifiblueetooth-ultra-low-power-consumption-dual-cores-esp-32-esp-32s-board/>
- <http://allegro.pl/nodemcu-esp-32s-esp-wroom-32-wifi-blueetooth-esp32-i7111122948.html?snapshot=MjAxOC0wMy0xNFQyMTowMjoyMS4yODFaO2J1eWVyOzMyMTFIZWU3ZTU0ZGJmMTNmYzFkOTczYjg1Y2E3YmQ0NGI3ZGU1ZTZlOWYyOTA0OGZhYzlkYTFkNGZhNTJiNTE%3D>
- <https://www.wikiwand.com/en/MAVLink>



Used images

- <https://www.uasvision.com/wp-content/uploads/2015/05/Erle.png>
- <https://12voltgeek.com.au/wp-content/uploads/2017/01/1109512-6.jpg>
- https://a-proxy.alleimg.com/proxy?url=http%3A%2F%2Fplicki.propix.com.pl%2Fimages%2Fnodemcu_esp-32s%2Fesp_nodemcu-32s_pinout_800px.jpg&hash=9633939b3c80895feea26017264b35bbc3d2f75401fb1758365a930f7b4e42e7
- <https://www.wikiwand.com/en/MAVLink>
- https://sites.google.com/site/picsharekozin/_/rsrc/1456955423049/esp8266_mavlink/800.jpg