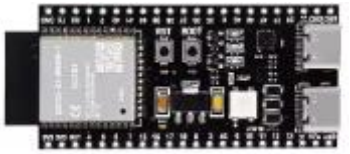
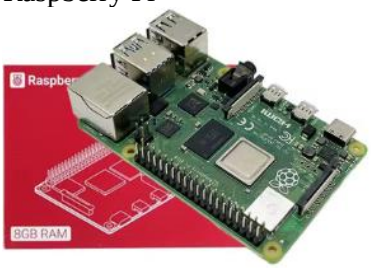
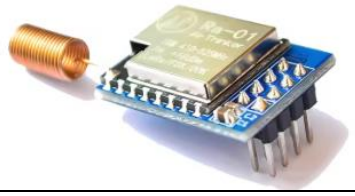
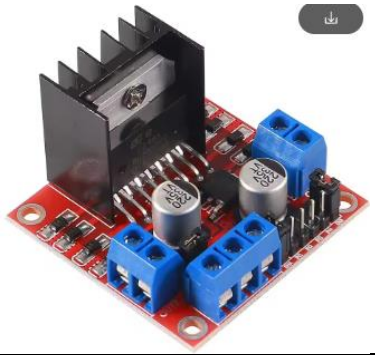
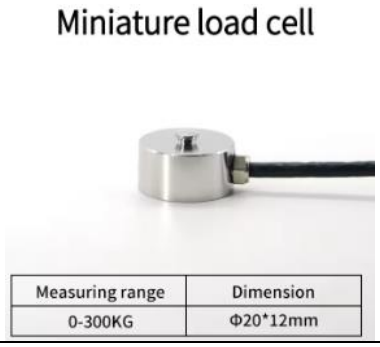
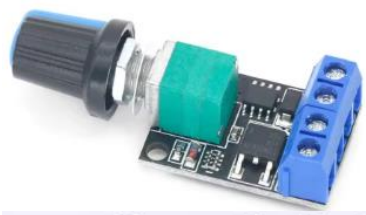
IoT COMPONENTS' COST

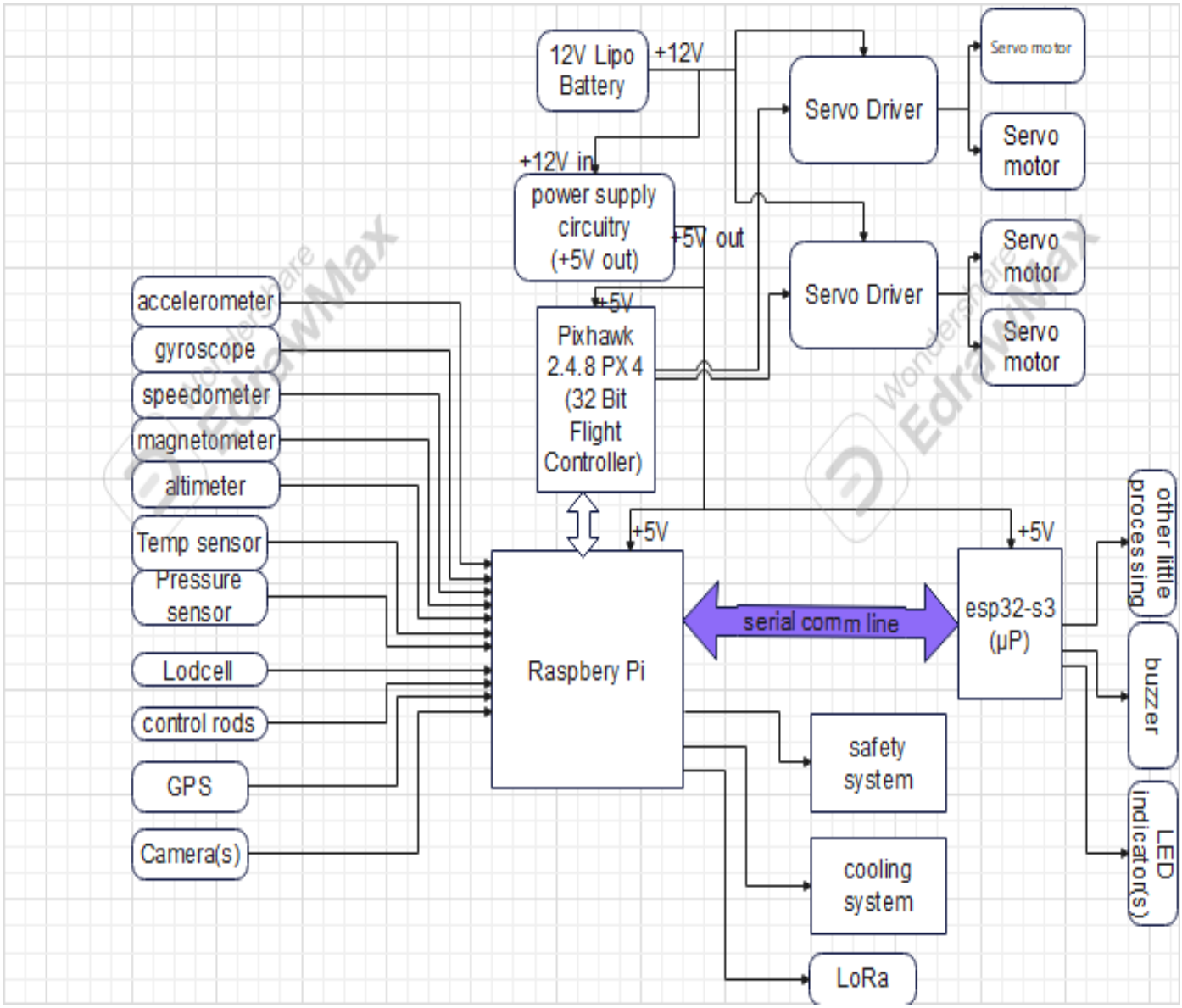
S/N	Component	Description	Cost (Tshs)	Max Cost (Tshs)	Available in Tanzania	Quantity	Transport Cost (Tshs)
1	Gyroscope 	Measures rotational motion around the rocket's axes (pitch, yaw, roll). Helps maintain stability by providing orientation data.	**50,000**	70,000	Yes	1	N/A
2	Accelerometer (Bosch BMI088) 	Measures linear acceleration of the rocket, providing data on changes in velocity and orientation.	**30,000**	30,000	Yes	1	N/A
3	Speedometer	Measures rocket's speed	**40,000**	40,000	No	1	20,000 approx
4	Magnetometer	Measures Earth's magnetic field to help determine rocket orientation relative to magnetic north. Critical for directional stability.	**50,000**	60,000	No	1	20,000 approx
5	Barometer/ Altimeter (MS5607-02BA03 LGA-B)	Measures atmospheric pressure to estimate **altitude** above the ground, useful for flight tracking and deployment of parachutes.	**70,000**	80,000	Yes	1	N/A
6	Type C thermocouple (Temperature Sensor)	Monitors component temperatures to prevent overheating. It measures up to 2315ºC	**95,000**	100,000	Yes	1	N/A
7	Pressure sensor (max. of atleast 550psi)						

8	GPS Module (e.g., NEO-6M) 	Provides real-time position and speed data. Essential for high-level navigation and telemetry.	**70,000**	70,000	Yes	1	N/A
9	ESP32-S3 	Microcontroller that processes sensor data and adjusts fin angles in real-time using control algorithms.	**40,000**	50,000	No	2	Cost Included
10	Raspberry Pi  	Advanced flight computer, capable of handling more complex computations and telemetry, ideal for data logging and image processing.	**400,000**	400,000	Yes	1	N/A
11	Flight Controller (Pixhawk 2.4.8 PX4 32 Bit Flight Controller Kit) 	Central flight computer that manages the rocket's trajectory, stabilizes flight, and adjusts control surfaces like fins based on sensor data. It has built in GPS, IMU(accelerometer, gyroscope and magnetometer), telemetry functionality, Arm®Cortex®-M7 microcontroller, all these in a single chip as a Pixhawk flight controller	**400,000**	400,000	No	1	Cost Included

12	Camera 	For recording picture inside and outside the rocket while launching	**@70,000 Total for 4: 300,000**	300,000	No	4	Cost Included
13	LoRa 	Long-range, low-power communication for telemetry between rocket and ground station.	**80,000**	100,000	No	1	30,000 (approx.)
14	Power Supply (LiPo Battery) And RC Voltage Display Buzzer 	Provides power to flight computer and sensors throughout flight.	**120,000**	150,000	No	1	70,000 (approx.)
15	Soldering Wire 	Required for assembling PCB and other components.	**20,000**	20,000	Yes	1	N/A

16	Servo (MG996R) 	Actuator responsible for tilting fins. Precise control over fin angles to stabilize the rocket.	**@50,000 Total for 4: 200,000**	240,000	Yes	4	N/A
17	Servo Driver 	Electronic circuit (external module) that has take power and distribute to the servo's efficiently and provide command signal from flight controller to the servo	**@35,000 Total for 2: 70,000**	70,000	Yes	1	N/A
18	Loadcell 	200 Kg load cell	**100,000**	120,000	No	1	Cost Included
19	Control Rods/Linkages	Connects servos/actuators to fins for mechanical movement.	**@5,000 Total for 4: 20,000**	20,000	Yes	4	N/A
20	Wire and Connectors, Resistors, PCBs, breadboard, LED, buzzer 	For connecting, assembling and prototyping all electronic components.	**100,000**	100,000	Yes	Multiple	N/A

21	Voltage Regulators  	Ensures the correct voltage for sensitive electronics (e.g., 5V) in power supply system.	**Total: 12,000**	12,000	Yes	4	N/A
TOTAL			**2,450,000**	**2,500,000**			**200,000**
APPROXIMATED TOTAL MAXIMUM COST INCLUDING SHIPPING AND TAX			**2,700,000**				


12V Lipo Battery
+12V
+12V in
power supply circuitry (+5V out)
+5V out
+5V
Pixhawk 2.4.8 PX4 (32 Bit Flight Controller)
Servo Driver
Servo Driver
Servo motor
Servo motor
Servo motor
Servo motor
accelerometer
gyroscope
speedometer
magnetometer
altimeter
Temp sensor
Pressure sensor
Lodcell
control rods
GPS
Camera(s)
Raspbery Pi
+5V
+5V
serial comm line
esp32-s3 (µP)
other little processing
buzzer
LED indicator(s)
safety system
cooling system
LoRa