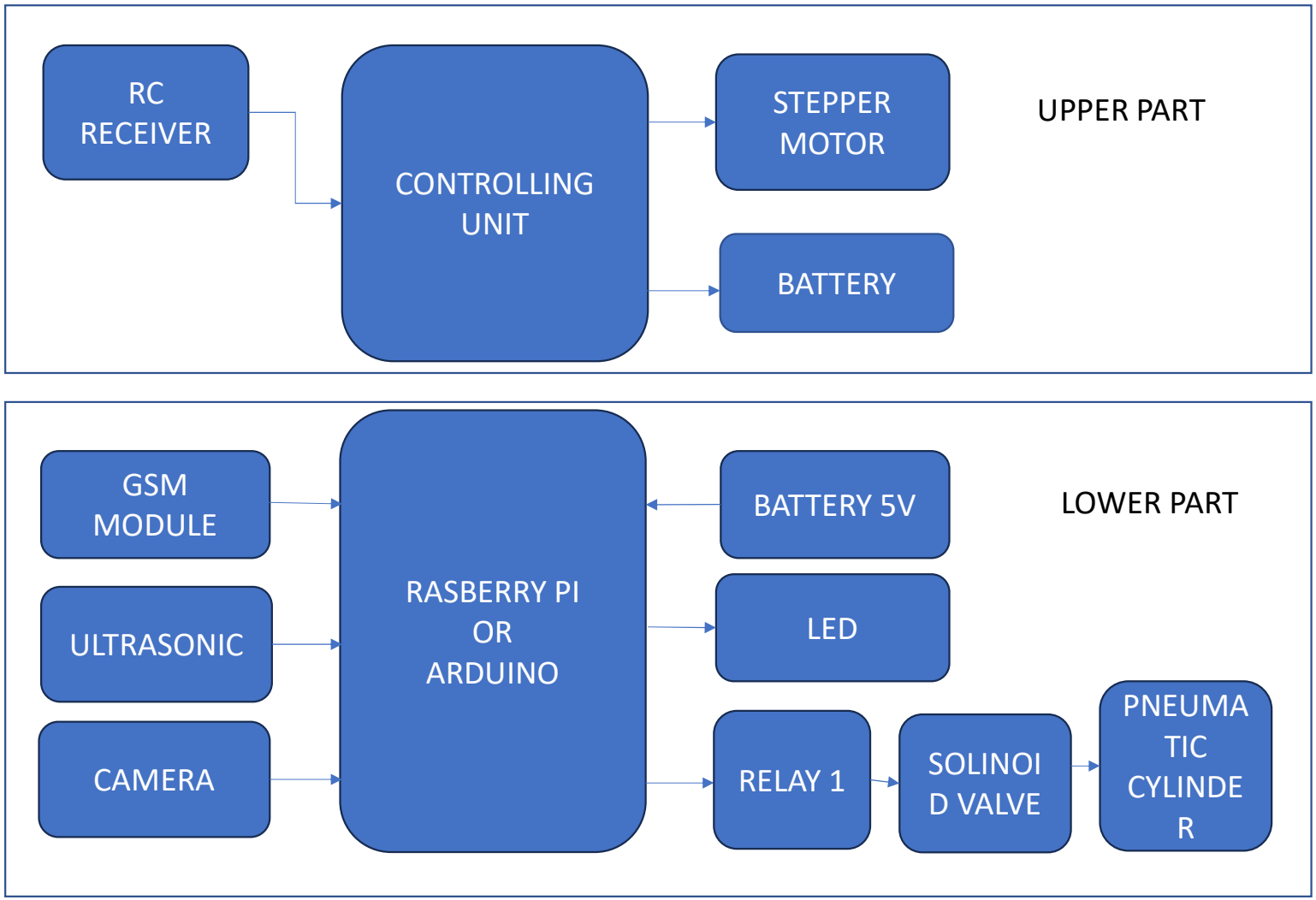
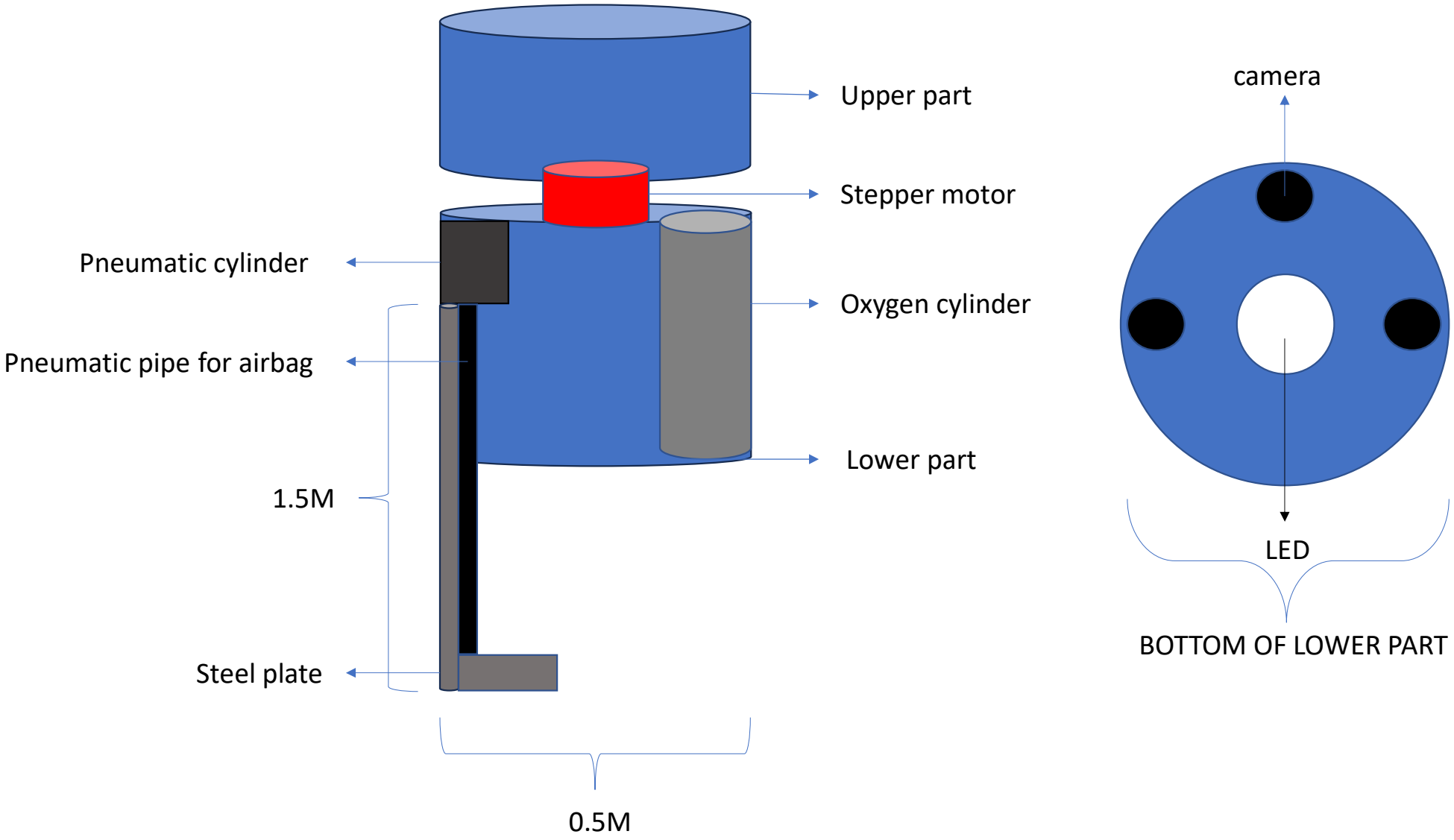
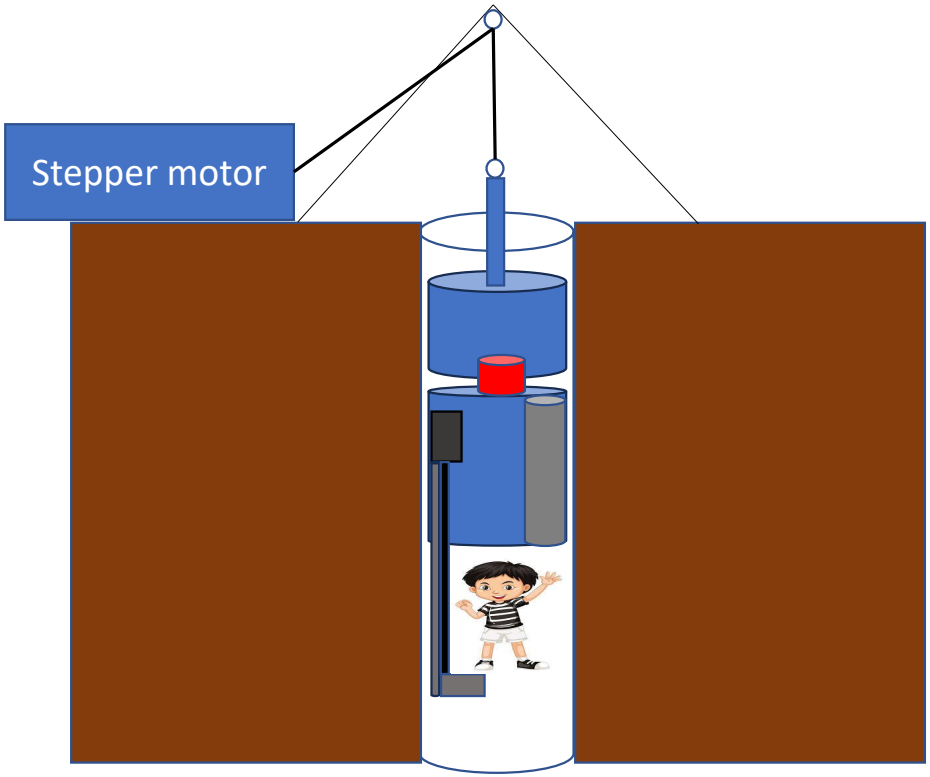
BORE-WELL RESCUE SYSTEM


RC RECEIVER
CONTROLLING UNIT
STEPPER MOTOR
BATTERY
UPPER PART
GSM MODULE
ULTRASONIC
CAMERA
RASBERRY PI OR ARDUINO
BATTERY 5V
LED
RELAY 1
SOLINOID VALVE
PNEUMATIC CYLINDER
LOWER PART


Upper part
Stepper motor
Pneumatic cylinder
Oxygen cylinder
Pneumatic pipe for airbag
Lower part
1.5M
Steel plate
0.5M
camera
LED
BOTTOM OF LOWER PART


Stepper motor

RC RECEIVER

An RC (Radio-Controlled) receiver is a component used in radio-controlled devices, such as drones, cars, helicopters, boats, and airplanes, to receive commands from an RC transmitter.

1. Basic Functionality

•**Signal Reception**: The receiver picks up signals transmitted by the RC controller or transmitter and interprets them as specific instructions (like moving a drone left or speeding up a car).

•**Channels**: RC receivers typically have multiple channels, each corresponding to different actions (e.g., throttle, steering, elevator, rudder).

•**Frequency**: Common RC frequencies include 27 MHz, 49 MHz, 72 MHz, and the more recent 2.4 GHz, which provides a more stable signal with less interference.

CONTROLLING UNIT

A *controlling unit* in the context of RC (Radio-Controlled) systems refers to the components that collectively manage and execute commands from the user to control an RC vehicle or device. It includes several integral parts, each with a distinct role in receiving, processing, and acting on signals from the RC transmitter.

1. Transmitter (TX)

•The handheld device the user manipulates to send commands.
•Uses radio signals to communicate with the receiver on a specified frequency, typically 2.4 GHz.
•The transmitter's control sticks, buttons, and switches translate user inputs into digital signals.

2. Receiver (RX)

•Mounted within the RC vehicle or aircraft, the receiver is tuned to detect and interpret signals from the transmitter.
•The receiver typically includes several channels, each connected to a different control function (like throttle, steering, etc.).
•Once a signal is received, it sends commands to other components, such as servos or the ESC.

3. Electronic Speed Controller (ESC)

•Regulates the power sent to the motors, controlling speed and direction based on the throttle signal.
•In vehicles with electric motors, it acts as the bridge between the battery and motor, adjusting voltage output to control speed.
•In drones and helicopters, multiple ESCs are used to control each rotor's speed, enabling precise control of lift and direction.

4. Servo Motors

•Convert electrical signals from the receiver into precise mechanical movement for control surfaces (such as steering wheels, rudders, or ailerons).

•In RC cars, servos handle steering; in RC planes and helicopters, they control pitch, yaw, and roll by moving control surfaces.

5. Battery and Power Distribution

•Supplies power to the receiver, servos, ESC, and other components.

•The Battery Eliminator Circuit (BEC), often integrated into the ESC, regulates the battery voltage to prevent components from being overloaded.

6. Flight Control Board (for Drones and Aircraft)

•A central unit with a microcontroller that processes commands and sensor data, adjusting motor outputs to maintain stable flight.

•Works with the ESCs to control rotor speeds based on commands from the receiver and sensor feedback.

•Includes gyros and accelerometers to help the craft maintain balance and orientation.

STEPPER MOTOR

A **stepper motor** is an electromechanical device that converts electrical pulses into precise mechanical movements. Unlike traditional motors, stepper motors rotate in discrete steps, allowing for accurate positioning without the need for feedback systems like encoders.

Structure: Stepper motors typically have multiple coils in a sequence around a rotor. Energizing these coils in a specific order causes the rotor to "step" from one position to the next.

1.Types: Common types include *permanent magnet*, *variable reluctance*, and *hybrid stepper motors*, with hybrid motors being most widely used due to their precision and torque capabilities.

2.Operation Modes:

1. *Full-Step*: The motor moves in complete steps for each pulse.
2. *Half-Step*: Alternates between full steps and smaller "half" steps, offering smoother motion.
3. *Micro-Stepping*: Provides fine control by dividing each step into even smaller increments, resulting in smoother and more precise positioning.

GSM MODULE

A **GSM module** (Global System for Mobile Communications module) is a specialized electronic component that allows devices to connect to cellular networks for voice, SMS, and data transmission. It enables devices to communicate over 2G, 3G, and sometimes 4G networks, depending on the module's capabilities. GSM modules are widely used in IoT (Internet of Things) devices, remote monitoring systems, and various wireless communication applications.

Key Components of a GSM Module:

1.SIM Card Slot: Holds the SIM card for network registration and service access.

2.Antenna: Facilitates signal reception and transmission with the cellular network.

3.Communication Interface: Interfaces such as UART, SPI, or I2C enable connection with microcontrollers or computers.

4.Power Supply Circuit: Maintains a stable power input for continuous operation.

SOLENOID VALVE

A solenoid valve is an electromechanical device used to control the flow of liquids or gases in a system. It consists of a coil, a plunger (or armature), and a valve body. When an electrical current passes through the coil, it creates a magnetic field that moves the plunger, opening or closing the valve.

PNEUMATIC CYLINDER

A pneumatic cylinder is a device that converts compressed air into mechanical energy, producing linear motion. It's commonly used in various applications, including automation, robotics, and manufacturing processes.

Components:

1. **Cylinder Body**: The main structure that houses the internal components.
2. **Piston**: Moves back and forth inside the cylinder, driven by the pressure of compressed air.
3. **Piston Rod**: Attached to the piston, it extends out of the cylinder to perform work.
4. **End Caps**: Seal the cylinder at both ends, allowing air to enter and exit.
5. **Seals and Gaskets**: Prevent air leakage and ensure smooth operation.

RASPBERRY Pi

The Raspberry Pi is a small, affordable single-board computer that's popular for a wide range of applications, from education and hobby projects to professional use in embedded systems.

Features:

- **Processor**: Typically features ARM-based CPUs.
- **Memory**: Varies by model, with options ranging from 2GB to 8GB of RAM.
- **Connectivity**: Includes USB ports, HDMI output, Ethernet, and Wi-Fi on certain models.
- **GPIO Pins**: General-purpose input/output pins for interfacing with sensors, motors, and other electronics.
- **Storage**: Uses microSD cards for storage, and some models support USB drives.

ARDUINO

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It consists of a microcontroller board and an integrated development environment (IDE) for programming. Here's an overview of its features, common boards, and typical applications:

Features:

•**Microcontroller**: Arduino boards typically use AVR microcontrollers (like the ATmega328) or ARM-based processors.

•**Input/Output Pins**: Digital and analog pins for connecting sensors, actuators, and other components.

•**USB Connectivity**: For programming the board and providing power.

•**Open Source**: Both hardware and software are open source, allowing for community contributions and modifications.

Popular Arduino Boards:

1.Arduino Uno: The most popular board, great for beginners; features 14 digital I/O pins, 6 analog inputs, and a USB connection.

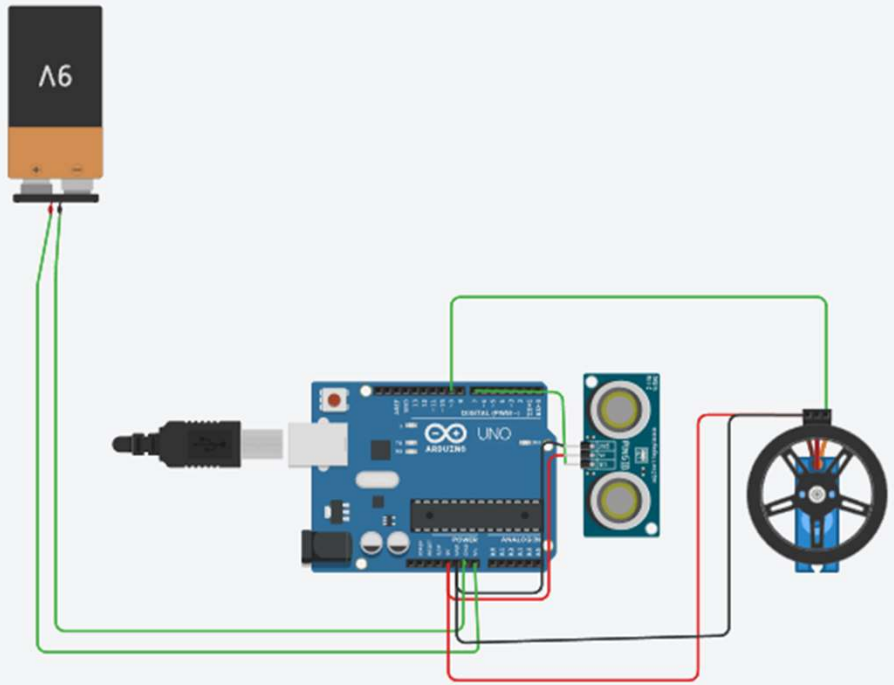
2.Arduino Mega: Offers more I/O pins and memory, ideal for complex projects and applications requiring many connections.

3.Arduino Nano: A compact board for small projects, with similar functionality to the Uno but in a smaller form factor.

1.Arduino Leonardo: Can emulate a USB device (like a keyboard or mouse), making it versatile for specific applications.

Common Applications:

- **Prototyping**: Rapid development of electronics projects and prototypes.
- **Robotics**: Used in building robots for various tasks, including autonomous navigation.
- **Home Automation**: Control lighting, temperature, and other home systems.
- **Wearable Technology**: Used in creating smart clothing and fitness trackers.
- **Art and Interactive Installations**: Integrates with sensors and outputs for creative projects.


9V
UNO
ARDUINO