#### 1. Wheels Moving but GPS Not Changing

* **Problem:** This could mean the rover is slipping (e.g., on ice or sand), stuck against an obstacle, or the GPS system is malfunctioning. The wheels are spinning, but the rover isn’t progressing.
* **Safe Fail Feature:** Stop the rover to prevent motor wear or overheating, and notify the operator.

#### 2. Rover Stops Giving GPS Data

* **Problem:** The GPS module might have failed, lost signal (e.g., in a tunnel or dense forest), or disconnected. Without position data, navigation becomes unreliable.
* **Safe Fail Feature:** Stop the rover and wait for GPS restoration, or switch to a backup navigation method (e.g., IMU or odometry) if available.

#### 3. Battery Level Critically Low

* **Problem:** If the battery drops below a threshold (e.g., 10%), the rover might not have enough power to return to base or complete its tasks.
* **Safe Fail Feature:** Automatically return to a charging station or stop in a safe location.

#### 4. Obstacle in Path

* **Problem:** An obstacle (e.g., rock, wall) blocks the rover’s path, risking collision or damage.
* **Safe Fail Feature:** Stop immediately and attempt to reroute, or wait for operator input.

#### Communication Loss with Control Center

* **Problem:** If the rover loses its connection (e.g., Wi-Fi or radio), it can’t receive commands or send updates.
* **Safe Fail Feature:** Follow a pre-defined safe path (e.g., return to base) or stop and wait.

#### 6. Motor Failure

* **Problem:** A motor stops working, detected via current drop or encoder mismatch, impairing movement.
* **Safe Fail Feature:** Adjust movement using remaining motors or stop and signal for help.

### 7. Stuck Detection

* **Problem:** The rover gets trapped (e.g., in mud or against a rock) and can’t move.
* **Safe Fail Feature:** Detect when wheels are spinning but the rover isn’t progressing (via GPS or wheel encoders) and attempt to free itself or call for help.