# Fallback Operating Modes - Atmospheric Filtration Drone Swarm

Fallback modes allow drones to continue safe and partial operations during communication loss, sensor failure, or partial damage. These protocols are critical for autonomous resilience in harsh or unpredictable environments.

## 1. Localized Auto-Loop Mode

- Activated on DAO disconnect timeout > 2 mins
- Drone switches to GPS-anchored loop around last coordinates
- Maintains basic filtration, alt hold, and obstacle avoidance
- Attempts reconnection every 30 sec until successful

## 2. Sensor Fail-Soft Mode

- If one or more sensors malfunction (PM/VOC/CO2):
- Drone reduces speed, enables expanded error margins
- Estimates environment based on last 5-minute averages
- Posts sensor-failure flag on reconnection

## 3. Last-Known Return Path Mode

- If GPS signal is lost or corrupted:
- Drone attempts to retrace last known flight vector in reverse
- If no RTB fix after 3 retries, initiates soft landing + beacon ping
- Waits for mobile crew pickup

## 4. Redundancy Reboot Chain

- Power-cycle onboard systems in order: sensors > comms > nav
- Reboot triggered by 2 successive loop failures
- Logged locally + mirrored to DAO on reconnection