Gaia Sentinel

Standard Operating Procedure (SOP)

Module Name: Gaia Sentinel – Drone Attachment Node
Version: 1.0
Prepared By: Gaia Sentinel Development Team

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1. Purpose

This SOP defines the operational procedures for the Gaia Sentinel Drone Attachment Node.

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2. System Overview

The Drone Attachment Node is a lightweight surveillance and motion-detection module mounted onto a drone platform.

Components include:

- ESP32-CAM
- PIR Motion Sensor
- Li-ion Battery
- 3D Printed Enclosure
- Python Application Integration

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3. Functional Objectives

1. Detect motion using PIR sensor.
2. Capture images or stream video.
3. Send data to Python ground application.
4. Operate independently via Li-ion battery.

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4. Hardware Architecture

4.1 Controller

- ESP32-CAM

4.2 Sensors

- PIR Motion Sensor

4.3 Power

- Rechargeable Li-ion battery
- Protection and charging circuit

4.4 Enclosure

- Lightweight 3D printed casing
- Drone mounting support

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5. Software Architecture

- WiFi communication
- HTTP or WebSocket streaming
- Python app receiver for:
  - Video display
  - Event logging
  - Media storage

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6. Deployment Procedure

1. Install components in enclosure.
2. Mount on drone securely.
3. Upload firmware.
4. Configure WiFi and Python server IP.
5. Test motion detection and streaming.

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7. Maintenance

- Check battery before flight.
- Clean camera lens.
- Inspect enclosure.

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8. Conclusion

The Drone Attachment Node expands Gaia Sentinel into aerial monitoring and smart surveillance.
