1.0 OVERVIEW

1.1 Summary

1.1.1 Version 2.0.3 introduces coordinated updates to the Black Widow Aircraft Firmware and the Teal Settings application. This release was prioritized based on field feedback and operational testing that identified video stability degradation and connectivity challenges in contested and high-interference environments. Updates include enablement of Anti-Jammer configuration capabilities through Doodle Sense license activation, along with improvements to electronic image stabilization, object detection performance, zoom clarity, and overall video reliability. Additional fixes improve system performance, reduce resource usage, and enhance connectivity during sustained field operations.

1.2 Operational Drivers

1.2.1 Operational use and customer feedback identified video jitter and edge vibration during certain flight and payload conditions, where airframe-induced vibrations were transmitted through the gimbal to the camera. These conditions degraded video stability and interpretability during mission execution. Version 2.0.3 implements targeted Electronic Image Stabilization (EIS) tuning improvements to reduce vibration-induced jitter and deliver a more stable video stream across supported mission profiles.

1.2.2 Video dropouts, loss of video feed, and motion artifacts observed under separate operational conditions are addressed through independent video reliability and processing improvements sections of this document.

1.3 Operational Value

1.3.1 This release improves mission effectiveness by increasing video reliability, reducing operator workload caused by unstable imagery, and enhancing situational awareness during flight. Enabling Anti-Jammer configuration with Doodle Sense improves survivability and continuity of operations in environments subject to GPS and communications interference.

1.4 Audience Applicability

1.4.1 These updates primarily benefit operators conducting missions in contested or electromagnetically congested environments, as well as system administrators responsible for configuring aircraft behavior and maintaining operational readiness.

2.0 IMPROVED FEATURES

2.1 Aircraft Firmware Improvements

2.1.1 Electronic Image Stabilization Enhancements

Teal Drones, Inc. | info@tealdrones.com | www.tealdrones.com
2800 S West Temple - Suite 2, South Salt Lake, UT 84115

a) Operational use and flight testing identified video jitter and edge vibration during certain flight conditions, where airframe-induced vibrations were transmitted through the gimbal to the camera, resulting in unstable imagery.

b) Electronic image stabilization tuning has been improved to reduce edge vibration and jitter, producing smoother and more stable video during flight.

c) Improved stabilization enhances video interpretability, reduces operator fatigue, and supports more reliable visual assessment and downstream analytics during mission execution.

2.1.2 Object Detection Improvements

a) Field use and testing identified missed detections under certain operational conditions, resulting in false negatives or a lack of detection for supported object classes.

b) Object detection confidence has been improved, increasing detection accuracy for supported objects such as personnel and vehicles and reducing false negatives.

c) Improved detection accuracy makes it easier for operators to verify observed objects in real time and supports aided object recognition and tracking workflows.

2.1.3 Full Camera Concurrency

a) Previous system constraints prevented all onboard cameras and sensors from operating simultaneously, limiting sensor availability during certain mission profiles.

b) All six onboard cameras and sensors now operate concurrently and are accessible by supported applications.

c) Full camera concurrency expands sensor availability, improves situational awareness, and enables multi-sensor workflows without requiring configuration tradeoffs during flight.

2.1.4 Enhanced Zoom Quality

a) Previous zoom operation limited resolution to maintain system stability, reducing image clarity at maximum zoom levels.

b) Camera stability improvements now allow full-resolution zoom operation, with enhanced exposure and image quality tuning.

c) Provides up to 2x clearer imagery at maximum zoom.

d) Improved zoom clarity enhances object recognition at range,

Teal Drones, Inc. | info@tealdrones.com | www.tealdrones.com
2800 S West Temple - Suite 2, South Salt Lake, UT 84115

supports more confident identification, and reduces the need for repositioning to achieve usable imagery.

2.1.5 Motion Artifact Reduction

a) Motion-related visual artifacts were most frequently observed during dynamic flight conditions, particularly when close-range objects moved rapidly across the field of view.

b) This release significantly reduces motion-induced artifacts during dynamic scenes, resulting in a more stable and visually consistent video stream.

c) Reduced motion artifacts improve object identification accuracy, preserve visual continuity during movement, and support reliable detection and tracking of dynamic objects.

2.2 Teal Settings/System Configuration Updates

2.2.1 Anti-Jammer and Doodle Sense License Activation

a) The Doodle Sense license is now activated on both the aircraft and the WEB Ground Control Station (GCS), enabling anti-jammer and spectrum-management capabilities that were previously provisioned but inactive. No new or additional licensing fees are required.

b) The Anti-Jammer configuration interface is now enabled within Teal Settings as a result of the license activation, providing operator access to the associated tools.

c) Operators can configure operating band, bandwidth, and channel selection parameters through the enabled interface.

d) Automatic channel switching is now available for operational use when electronic interference or jamming conditions are detected.

e) Activation of the Doodle Sense license enables full use of existing anti-jammer capabilities, improving system resilience in congested or contested electromagnetic environments and supporting continuity of command, control, and data links during mission execution.

f) Refer to the applicable Operator Manual section for configuration details: https://tealdrones.com/support/operator-manuals/

3.0 FIXES AND RELIABILITY

3.1 Video Dropout Fix

3.1.1 Addresses conditions that could result in loss of video feed under high system load.

Teal Drones, Inc. | info@tealdrones.com | www.tealdrones.com
2800 S West Temple - Suite 2, South Salt Lake, UT 84115

3.1.2 Improves video availability and reliability during complex missions with multiple active subsystems.

3.2 Video Core Optimization

3.2.1 Video Core resource consumption has been reduced by approximately 25%, which enables additional applications and concurrent camera operation without degrading system performance.

3.2.2 Improved resource efficiency enhances overall system stability and enables expanded multi-sensor and application usage during flight.

3.3 JSON API Stability Fix

3.3.1 Resolves a Video Core crash condition triggered by empty JSON responses in an edge-case scenario.

3.3.2 Improves system robustness and reduces the likelihood of video processing interruptions when using API-based integrations.

3.4 Radio Re-Enable Fix

3.4.1 Addresses an issue where the radio did not consistently re-enable after being disabled via the controller.

3.4.2 Radio functionality now reliably restores when re-enabled via the controller.

3.4.3 Ensures predictable communications behavior when transitioning between operational modes, including stealth configurations.

3.5 Photo Capture Correction

3.5.1 Resolves an issue that intermittently prevented image capture and generated “Camera Not Ready” alerts.

3.5.2 Image capture now occurs immediately upon command, with on-screen confirmation of the saved filename. Multiple images can be captured consecutively.

3.5.3 Improves the reliability of still image capture and provides clear operator feedback during mission documentation tasks.

3.6 UAS Tool / Connection Fix

3.6.1 Addresses a configuration issue that prevented aircraft from appearing in UAS Tool following firmware updates.

3.6.2 Aircraft now consistently display in UAS Tool when paired and connected via Teal Settings.

3.6.3 Improves system visibility and reduces setup and troubleshooting time for

Teal Drones, Inc. | info@tealdrones.com | www.tealdrones.com
2800 S West Temple - Suite 2, South Salt Lake, UT 84115

operators and system administrators.

4.0 IDENTIFIED ISSUES

The following items describe known software behaviors identified during validation and operational use of this release. None of the issues listed below affects aircraft airworthiness or flight safety.

4.1 False Positive Object Detections

4.1.1 The system may intermittently classify non-human or non-vehicle objects as people or vehicles. Increased false positives may cause confusion among operators and reduce confidence in automated detections.

- False positives are being tracked, and overall performance is under active monitoring to inform future improvements.

4.2 Packet Capture (PCAP) Storage Limitation

4.2.1 In rare cases, the packet capture service may restrict available onboard storage. If the limited storage space is filled, it may cause the operating system to become unstable.

- A corrective fix is planned for the next release to restore access to the full available storage capacity.

4.3 Teal Settings – Pairing Lost After Network Configuration Changes

4.3.1 Changing network configuration settings may cause the system to lose pairing with the aircraft. Operators may be required to re-pair the aircraft, resulting in minor operational delays.

- A fix is planned for the next release.

4.4 Extreme RSSI Values Displayed

4.4.1 Displayed RSSI values may appear unrealistically high or low and do not accurately reflect actual signal strength.

- This is a user interface display issue only and does not impact system performance.

4.5 EO TIFF Image Capture Produces Invalid Files

4.5.1 Electro-optical (EO) images captured in TIFF format may not be saved correctly, resulting in invalid files. Limits the ability to capture high-quality still imagery in TIFF format.

- A fix is expected in the next release.

Teal Drones, Inc. | info@tealdrones.com | www.tealdrones.com
2800 S West Temple - Suite 2, South Salt Lake, UT 84115

4.6 Sensor Calibration Cannot Be Canceled (UAS Tool)

4.6.1 Once initiated, sensor calibration processes cannot be canceled by the operator.

- May require operators to wait for calibration completion before proceeding with other tasks.

4.7 Teal Settings – Network Configuration Load Requires Second Attempt

4.7.1 Loading a new network configuration may fail on the first attempt but succeed on a subsequent attempt.

- Minor inconvenience for operators during configuration changes.

4.8 Teal Settings – Battery Telemetry May Not Display Properly

4.8.1 On rare occasions, battery telemetry may not be displayed correctly in Teal Settings. It still displays correctly in the UAS Tool. No impact when operating through the UAS Tool.

- A fix is planned for the next release.

4.9 Gimbal Up Slider Limit (UAS Tool)

4.9.1 The Gimbal Up slider in the UAS Tool does not command the gimbal to the full +90° position, maximum upward gimbal articulation.

5.0 REVISION HISTORY

Date	Section	Owner	Technical Review	Notes
12/15/2025	All sections – Initial Release	Jim Cory, Senior Director, Product Line Management	Christina Raetz, Technical Writer	Initial issue

Teal Drones, Inc. | info@tealdrones.com | www.tealdrones.com
2800 S West Temple - Suite 2, South Salt Lake, UT 84115