



15540 Woodinville-Redmond Rd NE
Building A, Suite 800
Woodinville, WA 98072

FREEFLYSYSTEMS.COM

Date Released: January 16, 2017

Subject: App and Firmware Release Notes: Synapse Version 4.0.4, ALTA App 1.6

Affected ALTAs: ALTA 6 and ALTA 8

Require Action: Optional

Time of Compliance: Optional

INTRODUCTION

This Service Bulletin (SB) announces the availability of Synapse Version 4.0.4 and ALTA App Version 1.6. Synapse Version 4.0.4 is recommended for all operators and includes new features.

BACKGROUND

Synapse Version 4.0.4 contains the following changes from Synapse Version 3.8.2:

- **New Feature - Orbit Mode**

- This new feature allows the pilot to circle around a user-specified point semi-autonomously
- The feature is mapped to a new 3-position switch. To use the feature:
 - Obtain GPS signal and position lock
 - Switch mode switch into Position Mode
 - Fly over the top of the target point, and toggle Orbit 3-position switch to 0 and back to 1. The Status LED will blink white to indicate the target point has been recorded.
 - Fly to the desired radius, and toggle the Orbit 3-position switch to 2.
 - The machine will automatically yaw towards the target point.
 - Use cyclic roll left or right to circle around the Target point
 - Use cyclic pitch forward to decrease the radius. Cyclic pitch backwards to increase the radius.
 - While in orbit mode, throttle commands remain active and allow the pilot to vary the altitude of the orbit
 - Cancel Orbit mode by setting the 3-position switch to 1 or by inputting a yaw command. Orbit mode will also be cancelled automatically if the user flies directly above the center point in order to prevent the machine from spinning about itself abruptly.

- **New Position Mode control style - Kinematic Mode**

- This new mode affects the feel of the machine in Position Mode. The new control algorithm is intended to make the ALTA behave more like Manual Mode controls while still benefitting the user with GPS assist.
- To enable this mode, open the *ALTA App -> Configurations -> Position Mode -> Kinematic*
- This mode is disabled by default, and the original Position Mode controls will remain active unless selected by the pilot

- **Remove height and range restrictions**

- FW 4.0.4 gives the user the option to override ceiling and range limits in Position Mode.
- Use best judgement and follow local airspace regulations before disabling ceiling and range limits.



15540 Woodinville-Redmond Rd NE
Building A, Suite 800
Woodinville, WA 98072

FREEFLYSYSTEMS.COM

- **Use Boom LEDs for ALTA Warnings**
 - The boom LEDs located in the motor mounts convey critical warnings to the pilot in FW 4.0.4
 - When a critical warning occurs, the boom LEDs will flash alternating between front and rear booms in the user-specified color. If the user has set all boom LEDs “OFF” during flight, all boom LEDs will flash red if an alarm occurs.
 - Relevant alarms that will be conveyed by Boom LEDs are:
 - Battery Low
 - Battery Flat
 - Radio LOS
 - Machine Fail
- **Faster Autoland**
 - The descent rate of Autoland has been increased in order to improve the likelihood of reaching the ground safely if Autoland is triggered at high altitude
 - The descent rate of Autoland varies as a function of altitude (faster at high altitudes, slower as the ALTA approaches the ground)
 - >45m elevation: descent rate = 8 m/s
 - 15 to 35m elevation: descent rate = 3 m/s
 - <15m elevation: descent rate = user specified in ALTA App (0.8 m/s by default)
- **Improvements in compass performance for Position Mode controls**
 - By default, the Position Mode control algorithm relies on the flight controller’s compass heading. The performance of the compass is susceptible to possible degradation when flying near large ferrous objects, improper calibration, improper declination, or yawing the machine continuously.
 - Several improvements were made to the interpretation and handling of compass data
 - As a safety improvement, the flight controller will continuously monitor compass performance and automatically implement a compass-less control algorithm in Position Mode if compass degradation is observed.
 - Tolerances for compass calibrations have been adjusted.
 - Compass good/bad signal filtering has been added to prevent borderline cases from being accepted as “good” and thus allowing the user to enter Position Mode
 - Note: Freefly recommends turning off the compass by default in order to prevent degraded flight control feel in Position Mode associated with degraded compass readings.
 - To turn off the compass, open the *ALTA App* -> *Configurations* -> *More* -> *Compass* -> *Use Compass = OFF*
 - If continuing to use the compass, remember to perform manual compass calibrations regularly.
- **Increased Flight Pack Voltage Allowed**
 - The maximum flight pack voltage has been increased to 26.1 Vdc (4.35 V/cell)
 - This is meant to account for normal variation between packs and allows pilots to “top off” packs without causing a Synapse boot error due to voltage being outside specified ranges
- **Updated Data Logging**



15540 Woodinville-Redmond Rd NE
Building A, Suite 800
Woodinville, WA 98072

FREEFLYSYSTEMS.COM

- Z-axis vibration has been added to the data log. Reviewing this parameter can be useful if you are experiencing shaky camera footage while operating in Height Mode as it may indicate the machine is overtuned, and vibrations are reaching the camera sensor.
- A summary .csv file has been added to the root directory of the microSD card. This allows easy review of summarized flight data from each flight.
- **Improved tolerance to motor failure on ALTA8**
 - The control algorithm tuning parameters are automatically adjusted to improve usability if there is an individual motor failure that is detected during flight.

ALTA App Version 1.6 contains the following changes from ALTA App Version 1.5:

- **Hotfix flight firmware**
 - In the event a serious safety-related bug is discovered, new flight firmware can be delivered to customers through the ALTA app immediately using the new Hotfix capability

OPERATIONAL CHANGES

Synapse Version 4.0.4 includes several operational changes:

- By default, motor orientation LEDs will be used to convey critical flight warnings.
- By default, the Autoland descent rate profile has been modified.
- New feature Orbit Mode has been added.
- New Kinematic Mode has been added.

METHOD OF COMPLIANCE

Synapse Version 4.0.4 is packaged in ALTA App version 1.6. Download the update to your mobile device using either Android Play for Android devices or the App Store for iOS devices.

To update firmware, follow the steps in the Aircraft Flight Manual in the section Firmware Update Process.

After updating, reversion to Synapse Version 3.8.2 is possible with the App.

KNOWN ISSUES

There are no known operational issues with Synapse Version 4.0.4. As with previous versions, Position Mode performance can be susceptible to degraded compass readings; Freefly recommends using the App to set the use of the compass OFF by default.

For Service Information Contact:
Freefly Customer Support
Email: support@freeflysystems.com
Phone: +1 (425) 485-5500
Hours of Operation: M-F 8am-6pm PST