APX Release Notes

Document #   **PUBS-CINS-005671**

Revision: **7**

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1. Introduction

This document describes software release notes for the following APX products:

- APX-15 V2 single antenna OEM board

- APX-15 V3 single antenna OEM board

- APX-18 dual antenna OEM board

- AVX210 single antenna enclosed system

- LVX dual antenna enclosed system

- APX-15EI single antenna OEM board stack with interface to external AIMU-M5

- APX-20 single antenna OEM board stack with interface to external AIMU_M6

The features described for each software release apply to all APX products unless explicitly noted.

Note that although the firmware version is typically common for all APX products there are unique files to load for each hardware platform.

2. APX Firmware 5.50-A

Refer to the user guides for details on the two new features summarized below.

- **Event Triggered Navigation Output**
    - o There are new NMEA and GSOF real-time output formats that are triggered by event inputs. These formats are identified as EN1 and EN2 in the NMEA output selection page and Event 'n' Navigation Info in the GSOF output selection page, where 'n' is 1 or 2.
    - o When an event pulse is received by APX its time is registered. Only for the event triggered navigation output this time can be adjusted, forward or backward, to account for misalignment of the event pulse and the time of interest in the sensor. This is set on the Receiver Configuration – General page in the Event 'n' Navigation Shift boxes for events 1 and 2.
    - o Using the adjusted time tag the APX computes an interpolated navigation record and formats the output stream. Because the navigation needs to be interpolated the latency on the output is greater than the EVT output.

- **GNSS Denied ('Indoor Only') Mode**
    - o APX firmware now supports Indoor Only mode which completely ignores GNSS, whether it is available or not, and simply logs IMU data.
    - o Data is logged using system time starting from 0, unless the NTP client is enabled and there is a source of network time, in which case the data is logged using that time.

3. APX Firmware 5.40-B

- **External IMU Navigation**
  - For systems that have external IMU support (APX-15EI and APX-20) it is now possible to select the external IMU for real time navigation processing. Both the internal and external IMU data will still be logged (if enabled) and a flag in the logged data will indicate to POSPac which IMU was used in real time so the data will be displayed correctly.
  - Please refer to the APX UAV Configuration Guide for details on how to configure and select the external IMU navigation.

- **Microdrones Autopilot Support**
  - APX firmware now supports microdrones autopilot input for computation of gimbal angles when APX is mounted on a gimbal mount.

- **Antenna Type Added**
  - Antenna type AT1675-540TS has been added to the Antenna Type selection list on the Antenna Configuration Web page.

- **DMI Direction Indication**
  - The DMI direction indication (forward/reverse) on the Web GUI has been corrected for negative DMI scale factors.

- **External IMU Enhancements**
  - Systems in the field may now upgrade the External IMU support model (none, -15EI or -20) through the application of an option code in the Web GUI. It is no longer necessary to use Winflash through a serial port.

- **IMU 82 Support**
  - This firmware adds support for IMU type 82 for APX-20 products. This IMU type is selectable from the configuration page along with the previous IMU type 71.

4. APX Firmware 5.40-A

- **External IMU Enhancements**
    - o Baud Rate - When the external IMU is enabled the baud rate on COM 2 is automatically set to 115200 and the controls for baud rate, parity, etc. are locked. These settings are required for external IMU communications.
    - o COM 2 Usage – The external IMU only requires the input side of COM 2 so now the output is available to the user, under the constraints of fixed baud rate, etc. If the external IMU is disabled via the Web GUI then COM 2 is freed up for user configurations.
    - o Diagnostics – Real time external IMU data is displayed on the INS Status page of the Web GUI. This allows verification that the external IMU is functional prior to launching a mission.
    - o Configuration Upgrade – An APX-15v3 system may now be upgraded in the field to external IMU APX-15EI or APX-20 through the application of a password through Winflash (connection via serial or USB required). Note that the appropriate hardware is required to complete the package.
- **Clone File Enhancement**
    - o Cloning now includes all IMU and dual antenna installation parameters which were missing in previous firmware versions. Clone file generation and installation is controlled from the Receiver Configuration-> Application Files-> Operation menu.
- **Gimbal startup corrected**
    - o APX and gimbal may now be started up in any order.

5. APX Firmware 5.32_EI

Note that this firmware is applicable only to the APX-15EI and APX-20 products.

- **Support for External IMUs**

  This firmware supports the logging of external IMU data for subsequent post processing in POSPac. These products consist of the APX GNSS-INS board plus an interface board which connects to a remote IMU. The remote IMU data is logged while the real-time navigation is performed using the INS on-board the APX.

6. APX Firmware 5.31

- **Gimbal Support for APX-15**

- **Support for new APX-18 Product**

- **Added SBAS/SBAS+**

- **Minor fixes and enhancements**

  - Correction to Mag status on INS Status page
  - Core GNSS updates
  - Correct antenna vector output when secondary antenna disconnected

7. APX-15v2 Firmware 5.21

- **Capability to enable/disable Ethernet power saving mode**

  A new button has been added to enable or disable the system from entering Ethernet power saving mode. In previous firmware versions the system would automatically enter Ethernet power saving mode if Ethernet was not active for a period of time, which meant APX had to be rebooted after a mission to access the logged files via Ethernet.

- **Fix GGA output inconsistency in SBAS mode**

  GGA output message was inconsistent in SBAS mode in previous releases. It is now corrected and consistent with our manual.

- **Increase stability when hot plugging USB**

  In previous firmware hot plugging a USB on APX-15 systems might restart the firmware. This issue is now fixed.

- **GNSS Enhancements**

  Numerous low level enhancements to GNSS operations.

8. APX-15v2 Firmware 5.15

Release date September 16, 2016

- **Batch file download**

  New feature to download multiple files without having to individually select and confirm each file. The procedure is to check mark all the files you want to download and then select "Download selected files". Note that the exact behaviour depends on the web browser being used and the browser security settings.

- **Magnetometer calibration on GUI**

  The web GUI (Receiver Status-> INS Status page) now indicates the status of magnetometer and when it was last calibrated. The mode (2D/3D) is also displayed.

- **DMI pulse count display**

  The DMI pulse count, distance and direction are now displayed in the web GUI (Receiver Status-> INS Status page) which is a valuable tool for testing and trouble shooting the interface. There is a known issue with negative scale factor not being accounted for in the direction display, however, the navigation solution isn't affected by this.

- **Expand magnetometer calibration range**

  Previously the magnetometer was only allowed to be calibrated if system was less than 50 meters from power on location. This limit is now removed and system can begin calibration beyond 50 meters, provided the dynamics required for calibration are met.

- **Relax accelerometer threshold that causes navigator reset**

  The accelerometer saturation threshold was 6g. Once saturation happened the system would restart 5 seconds after the occurrence. The acceleration limit has now been increased to 8g and the restart wait time has been reduced to 1 second. This primarily benefits fixed wing UAVs that are launched from catapults as it reduces the chance that the navigator will reset, and if it does reset the quick restart time means it is more likely the UAV is still in a straight trajectory which aids in alignment.

- **Calibration procedure improvement**

  This firmware introduces new augmentation to the calibration procedure. Now calibration can be achieved after rotating the system through two full revolutions.

9. APX-15v2 Firmware 5.14

Release date May 20, 2016

- **100 Hz Output**

  Implemented 100 Hz real-time NMEA output.

- **AutoLog File Creation Improved**

  Enabling the AutoLog feature is a convenient way to ensure mission data is always logged, but previously there could be confusion in the file names if one mission quickly followed another. The new implementation only offers the AutoLog functionality if "Always" or "Continuous" schedule modes are selected. The file names are then limited to:

  ####JJJx

  ##########YYYYMMDDHHMM

  SystJJJhmm YYMMDDhhmm

  System____YYYYMMDDHHmm

  SystYYYYMMDDHHmm

  With this configuration the AutoLog feature will always start a new file upon system restart, ensuring that missions are uniquely identified.

- **GNSS Enhancements**

  Numerous low level enhancements to GNSS operations.