Pitlab & Zbig FPV System Version 2.60a

New functions and changes since version 2.50a

Pitlab&Zbig OSD

New functions and changes in v2.60a

- Added support for new Pitlab airspeed sensor. Sensor is connected to yellow OSD socket and is configured in similar way as previous EagleTree sensor.
- Bug fixed in year display in imperial units

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- Added support for new Pitlab airspeed sensor. Sensor is connected to yellow OSD socket and is configured in similar way as previous EagleTree sensor.
- Bug fixed in year display in imperial units
- Added full airspeed zeroing after manual store base. Note: during zeroing pitot tube must be covered to avoid direct wind blowing into tube.
- Airspeed calibration range extended to +32%
- Added temperature and pressure compensation for airspeed sensor.
- Added post flight statistics in imperial units
- If during flight connection to RC receiver breaks (OSD shows –RC) and there is runway selected for auto landing, after 5 minutes system selects first layout with ILS and performs full auto landing procedure.
- Added option for disabling telemetry in video signal (VBI period). When telemetry ID for OSD is set to FFFF value, OSD will left video signal unchanged for vertical blanking period, allowing other systems to superimpose its own telemetry into video stream.
- Added option **[x]AMSL** for layout field **Altitude (numeric)**. When checked, field will show average altitude above sea level (based on GPS), instead of altitude above starting point. Also field icon is slightly changed to mark this setting active.
- Added new options for horizon (central) field:
  - airplane-like visualization (Russian HUD)
  - new options for central point: hidden (none) and small circle (*)
- Added numeric distance/altitude to nearest BuddyFlight airplane. Configured by new layout field **Buddy alt/dist**, with option **[x] Move on radar** to change between static location, or move information on radar close to BuddyFlight sign. Note that BUddyFlight uses altitudes relative to starting point, so altitude difference is valid only when both airplanes started from this same AMSL.
- Improved algorithms for Fixed and dynamic throttle, for better altitude control. Dynamic throttle has additional option (**OSD menu Autopilot->Throttle mode->Stall margin**) for safety (anti-stall) overlap between throttle and elevator down. It may be used for airplanes with poor gliding abilities or with narrow stall margin when gliding without engine.
- Added function to change circling radius in Auto/circling mode (and also circling in mountain mode or circling above starting point of approach path during auto landing). Circling radius

may be changed between 50 meters and 900 meters in several steps, by deflecting rudder stick. Actual/new circling radius will be shown on OSD screen when stick was deflected. NOTE that for delta/flying wing it requires proper mapping of rudder channel for autopilot (in FPV_manager).

- Automatic disable of route visualization during last phase of auto landing (when airplane is on approach path) to clean screen from unnecessary items.
- Added functionality to avoid stall in AUTO mode when battery becomes empty. It automatically reduces **Throttle->pitch** mixer when battery becomes empty (proportionally to motor current) and prevent AP prom using excessive elevator UP when airplane glides with reduces power of engine. Note: this functionality works only with current sensor.
- Added functionality to show diversity input RC channel. In RSSI field there is new checkbox named **[x] diversity**. It replaces antenna icon with [A] or [B] mark according to active diversity input.
- Added new option **[x] Airplane position** for **back to home** field. This option shows airplane position relatively to base like in paper map (north up, base at the center). Airplane position is marked by arrow, which shows also airplane flight direction (course).
- Added new option in flight statistics: Watt-hours per kilometer (Wh/km), which optionally replaces existing mAh/km efficiency. This value informs how much energy (Watt-hours) is consumed to travel 1km distance (over ground), or what power (in Watts) is required for each 1km/h speed over ground. This statistics can be easily compered between airplanes with different battery voltage (mAh/km cannot be compared that way). This statistics is selectable in layout editor in FPV_manager.
- Added new information in telemetry:
  - Control (steering) signals (RC input in OFF/STAB mode and internal control signals in AUTO mode), which will help analyzing pilot or system behavior.
  - Statistics of most important GPS incoming data (latitude, longitude, course, speed), which will help analyzing GPS problems.
- Removed old GPS settings for 1Hz (4800/9600 bps) update rate.
- Added new option for altitude stabilization in dynamic throttle mode: OSD menu->Autopilot->Throttle mode->Stabilization. It allows to set stabilization force most suitable for airplane characteristics.

- Previous waypoint distance limit (99999 meters) now is extended to 600 kilometers

Bugs fixed

- Changed wrong help description for waypoints flight
- Easy setup was active when menu was activated from RC switch (although easy setup can be operated only from 3 button keyboard).
  Note this option is invisible when menu is opened from RC switch.
- Menu Course stabilization was enabled in Delta/flying wing, although it works only for airplanes with rudder. Now this option is hidden for delta/flying wing.
- Path travelled were calculated with approx -0.6% error (truncation error) and in some rare cases path travelled may be shown slightly less than twice maximum distance.

- In autopilot's altitude mode "Down if dist. <" when maximum altitude is set to "OFF" autopilot set RTH altitude to 100m. Now it keeps current flight altitude if it is above 100m or 100m if current altitude is less than 100m.
- When airplane loiters over base position in RTH mode, autopilot may change flight altitude (e.g. increase it) when airplane flies away from base point to distance over 200meters.
- If numeric altitude field is located on the right side of the screen and during landing with ILS runway has altitude set to "AMSL" (not "base") on screen may appear horizontal line

Known issues

No known issues

Pitlab&Zbig Autopilot

New functions and changes

- New RC input diversity functionality, which allows to connect two RC receivers simultaneously to autopilot to make system more robust. Functionality is described in details in separate pdf document: ***Diversity in Pitlab FPV System***
- Slow (low pass) filters for Aux 2..5 outputs. User can select 8 steps for signal filtering.
- Configurable Pitch and Roll output (Aux4 and Aux5) for simple servo gimbals.
- Improved algorithms for Fixed and dynamic throttle, for better altitude control. Dynamic throttle has additional option (**OSD menu Autopilot->Throttle mode->Stall margin**) for safety (anti-stall) overlap between throttle and elevator down. It may be used for airplanes with poor gliding abilities or with narrow stall margin when gliding without engine.
- For SBUS input system respects failsafe flag (forcing mode AUTO with throttle low) instead of current channel state configuration of receiver.
- Added new functionality for customization of altitude stabilization in dynamic throttle mode. It allows to set stabilization force most suitable for airplane characteristics.

Bugs fixed

- Changing altitude/course in AUTO/HOLD mode did not works properly for delta/flying wing configuration
- For ailerons on 1 RC channel AP did not works properly as Y-splitter.
- For SBUS RC input mode sometimes AP reports short "–RC" status.
- In parallel mode AP sometimes detects short, false PPM pulses.
- In parallel mode AP may detect false PPM pulses on inputs not connected to receiver.
- Removed diagnostics data on OSD screen in fixed throttle mode

Known issues

No known issues

Pitlab&Zbig GroundStations

New functions and changes

- Added option for 360/90 degree antenna trackers. There is new option (button) in menu settings to change between 180/180 degree (standard Pitlab antenna tracker) and 360/90

degree (third party antenna tracker with 360degree azimuth and 90 degree elevation servos). Options for tracker servo calibrations (azimuth, elevation) are modified to support new tracker type.

- Added new UART speeds for telemetry data: 115400bps and 230800bps, especially useful for pre-programmed Bluetooth modules.
- Added option for USART/Bluetooth diagnostics. It allows to check Bluetooth connection (response tor AT command) and proper data transmission / reception.
- Added option for automatic baud discovery for pre-programmed Bluetooth modules. Function is available by pressing header [Telemetry UART speed] on UART baud rate list.
- After startup ground station assumes that servos for tracking antenna are in parking position and starts moving from this position with proper (slow) speed. This same applied when button [UnParking] is pressed.

Bugs fixed

- When azimuth adjust was set to more than 90 degree it was restored after next power up as 90 degree.
- In exported log file (.csv) local time was stretched by approx. 1 sec per minute.

Known issues

No known issues

Pitlab&Zbig FPV_manager

New functions and changes

- New drop down lists for simpler option selection in layout designer (for horizon field properties).
- New field **Buddy alt/dist** in layout designer for distance/altitude to nearest BuddyFlight airplane. It has one option **[x] Move on radar** to change between fixed field location, or move information on radar close to BuddyFlight sign.
- New option for RSSI field **[x] Diversity** to show active RC input.
- New options in **Autopilot -> Radio RC** page:
  -Diversity RC settings
  -Configurable slow (low pass) filters for Aux outputs
  -Additional pitch/roll output (Aux4 and Aux5) for simple servo gimbals (stabilization). Stabilization factor can be changed from -100% (reversed) to +100% (normal), according to servo/gimbal characteristics.
- New option **Wh/km** in layout designer for field ***Track statistics.*** When selected, this option replaces existing mAh/km statistics with new Watt-hour per kilometer efficiency.
- Support for new telemetry data from log exported to .csv file

Bug fixed

- When route was longer than 100 kilometers, opening route dialog box causes application hang
- Saving and restoring layout from file sets this same name for all RC monitor channels

- Sometimes maps were not properly displayed, with “**Oops! something went wrong**” message.

Known issues

No known issues