

# UxV/35 ESC Design Note

The UxV/35 ESC systems are designed to be as plug and play as possible. Power and correct signaling are automatically and correctly routed simply by assembly. Since all of the components just plug together, initial assembly is very rapid and the MTTR is quite short.

Many different types of UAVs can be directly assembled with the components. Features are designed for fully enclosed UAVs as well as external frame UAVs.

This document shows the detail of most ESC components and how they fit together. Below are some of the many platforms that the the UxV/35 ESC approach works with.



KoukouV Dropper  
in Flight



UxV/35 Sturnus Staged for Flight



Sturnus  
Post Drop



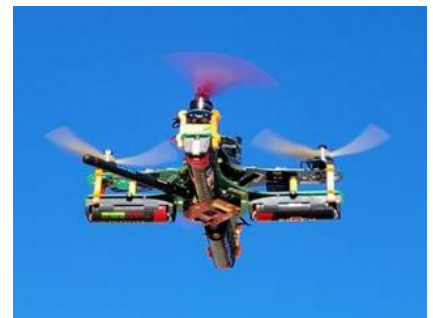
15in  
KoukouV  
in Flight



3<sup>rd</sup> Party Drone with UxV/35 Stack



15in KoukouV Shadow



18650 Battery base with ESC Wing



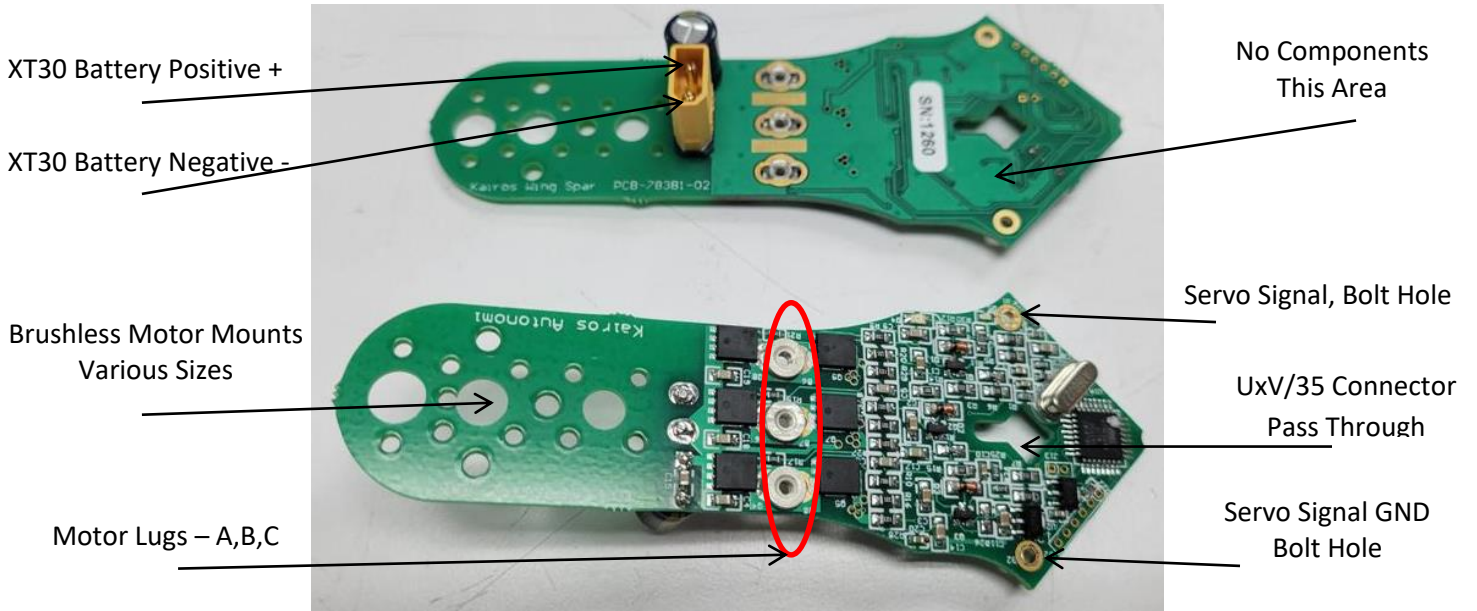
UxV/35 based UAV Swarm



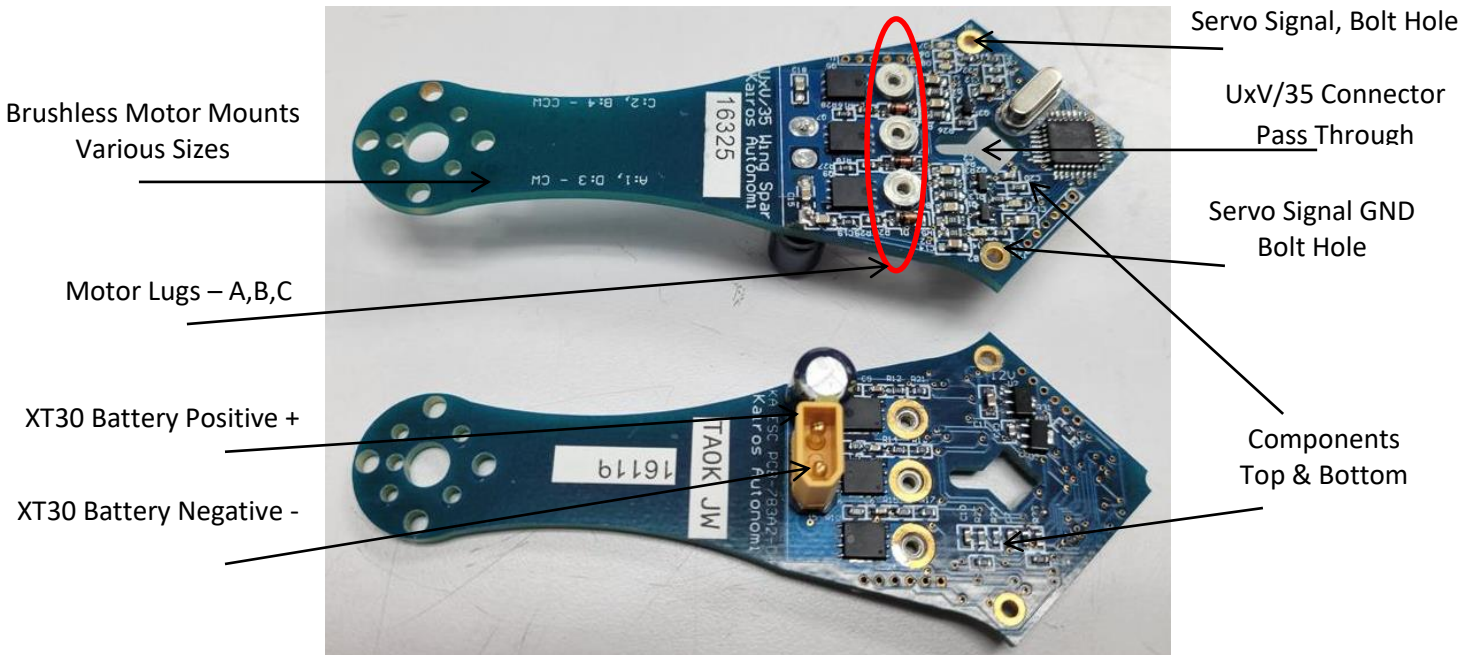
Flight Basket with UxV/35

## ESC Boards

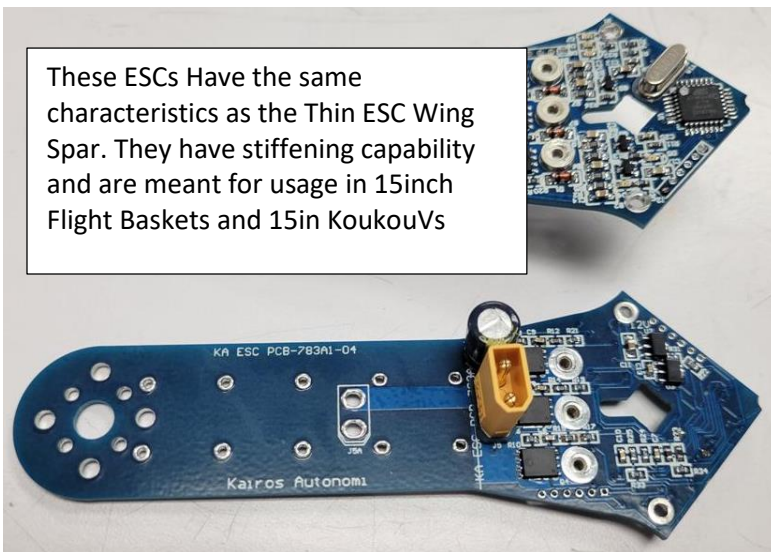
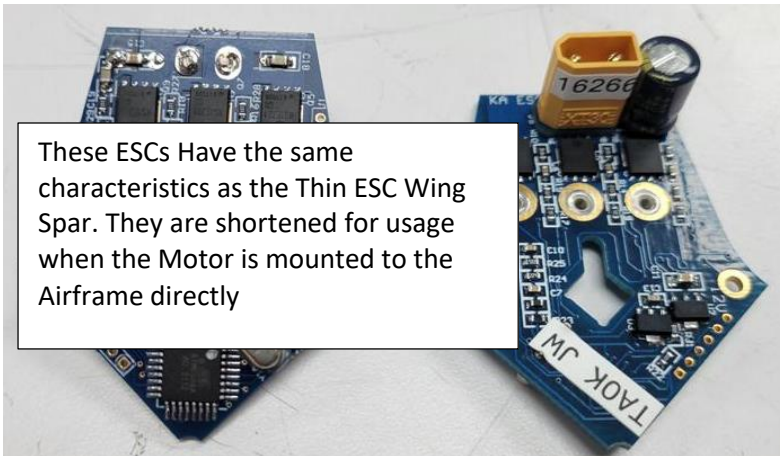
The ESC Wing Spar was designed to contain the ESC, its connections and a place to mount the motor.



Original ESC Wing Spar



Thin ESC Wing Spar, 13in Flight Basket

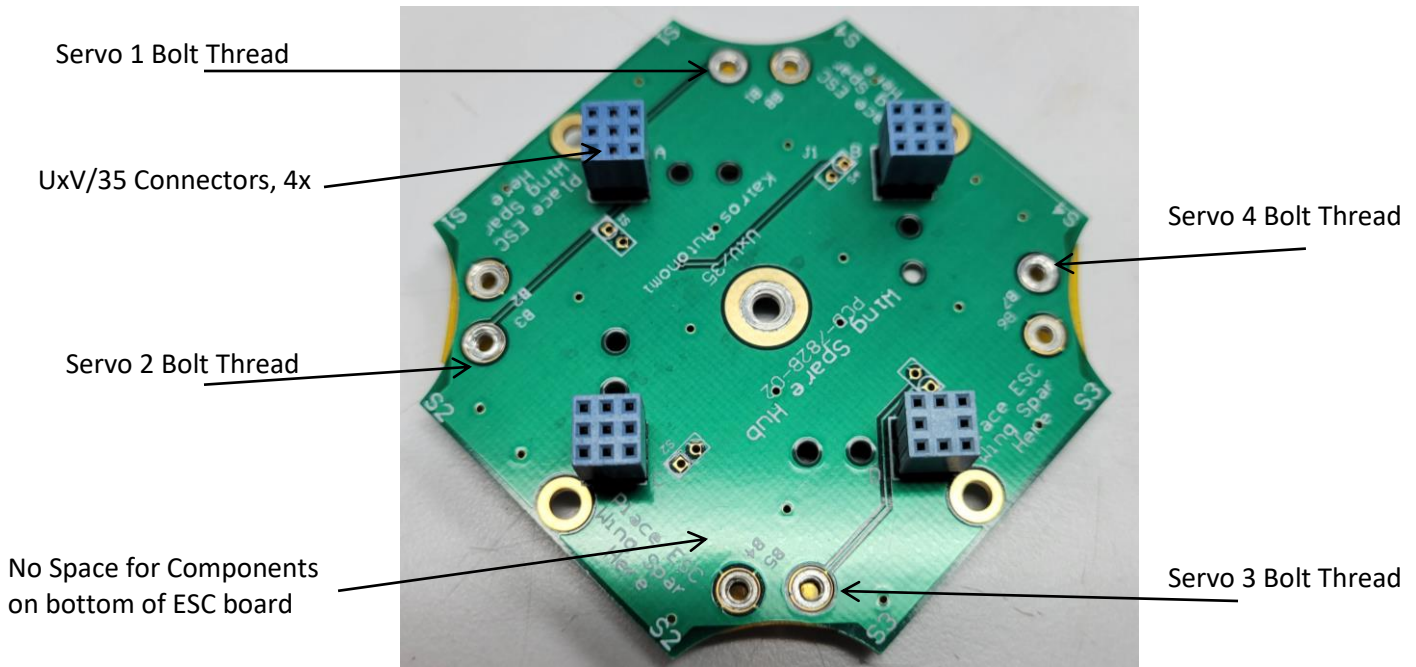


## t Thick ESC Wing Spar 15in Flight Basket & KoukouV

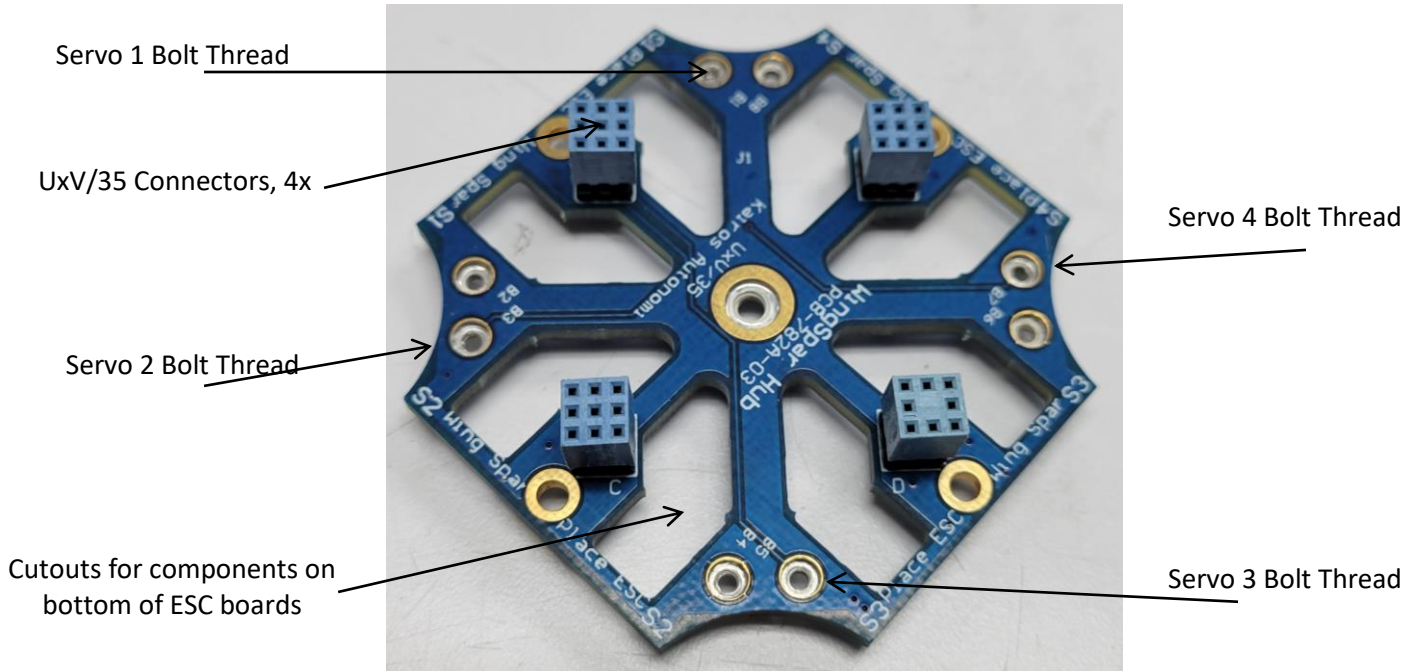
# UxV/35 ESC Design Note

## ESC Connection Hubs

ESC are carried on these hub for orientation and physical mounting.



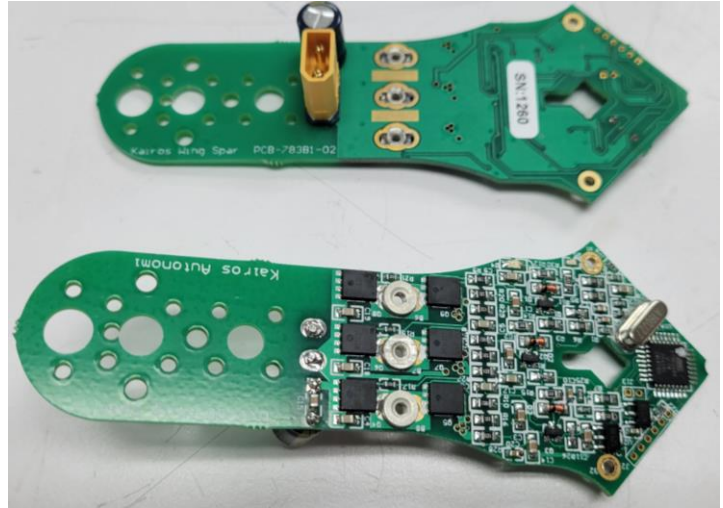
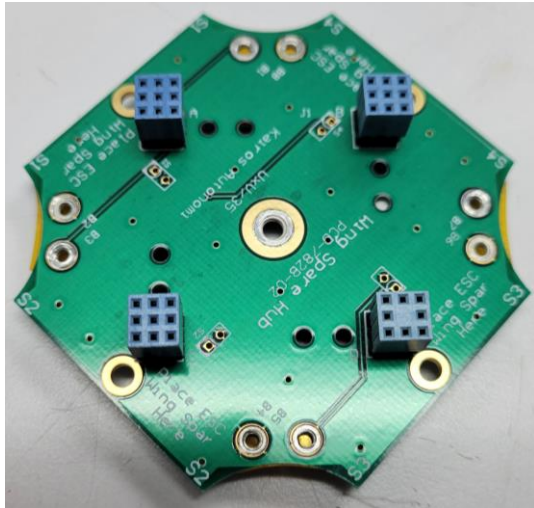
Original ESC Wing Spar Hub



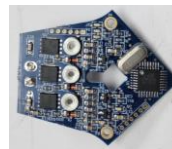
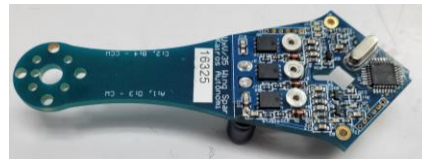
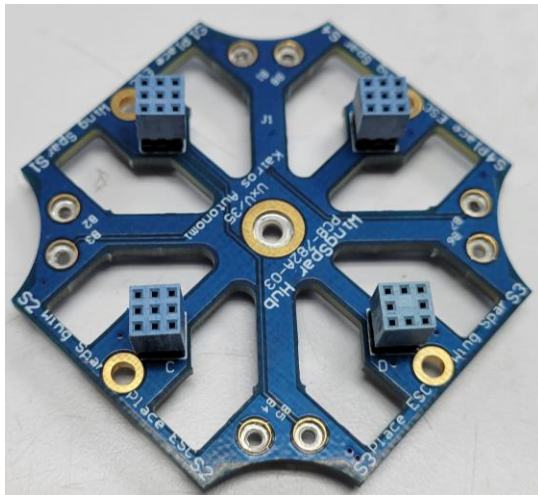
Compact ESC Wing Spar Hub

## ESC and Hub Compatibility

The Hubs and Wing Spar ESCs can be combined to make a full ESC wing that is a UxV/35 quadcopter. There is a specific compatibility between the Hub and Wing Spar ESCs.



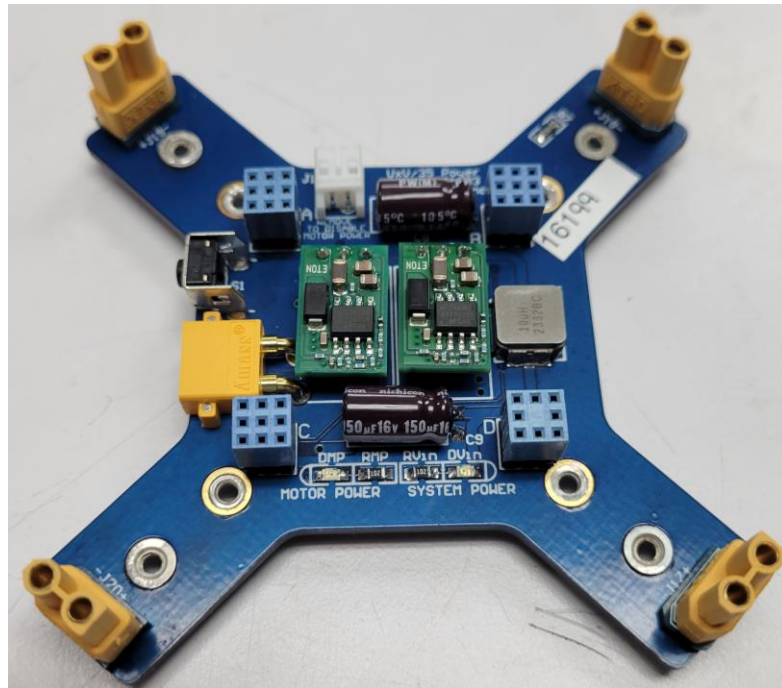
Use these types of ESC Spars with this ESC Hub. Since there is no space on the hub for components on the bottom of the ESC Spar, they work well together. These were the first released version of the UxV/35 Hub and ESC Wing Spar approach. We the stock of them is depleted, newer versions are available.



ESC Wing Spars and Short ESCs have components on the top and bottom of the board. The compact ESC hub has spaces available for the bottom mounted components. Any type of Wing Spar ESC will work with this hub.

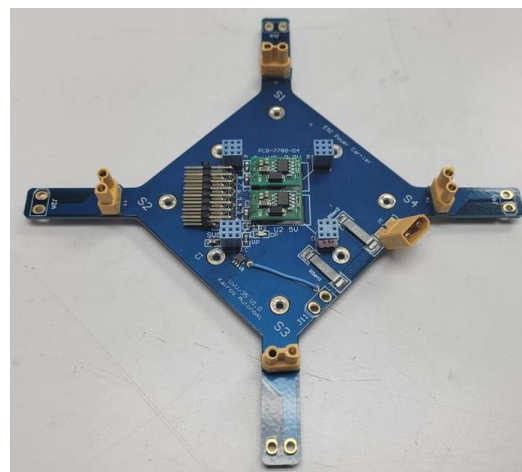
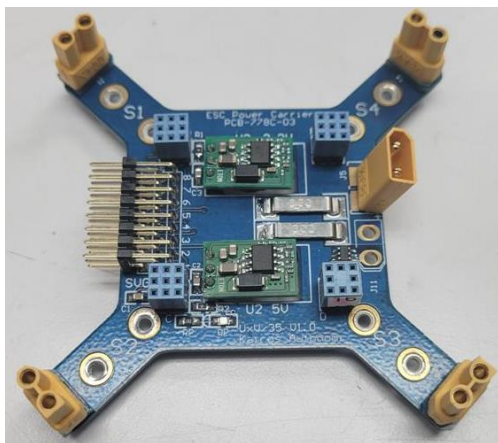
## External Power ESC Base boards

Base boards bring all of the ESC components together including power. Power can be applied externally by a LiPo or using commonly available LiPo cells like the 18650 and the 21700.



## Switching ESC Wing External Battery Base

This is the smallest full featured base board available. It has On/Off, integrated Safety relay and directly connects to the compact ESC Wing Spares. It uses an external battery. A simpler version of this base board exists that does not have the power on/off and safety features.

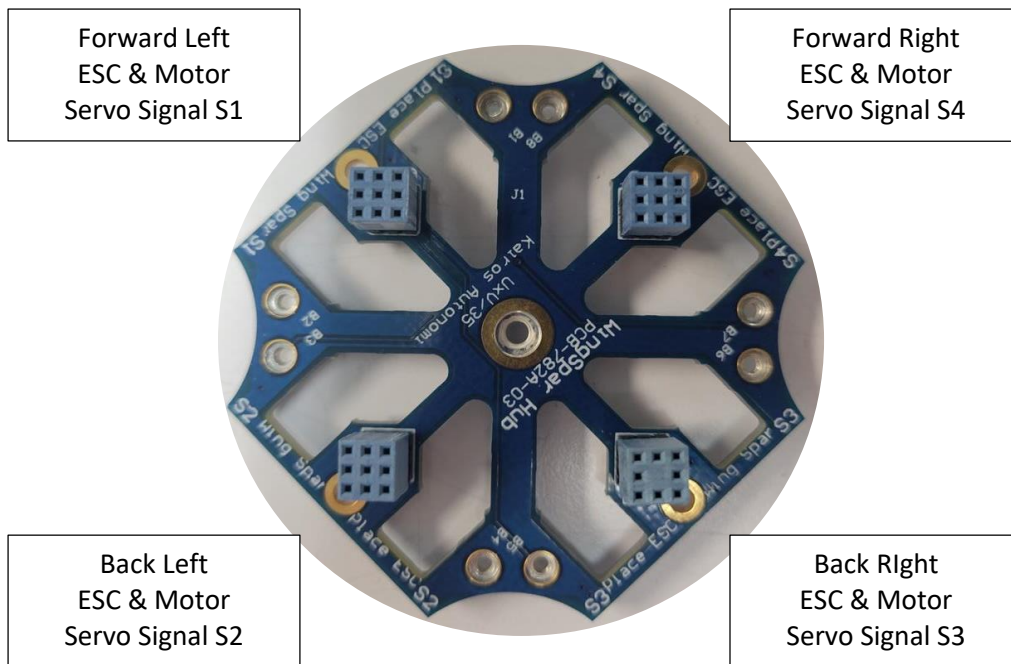
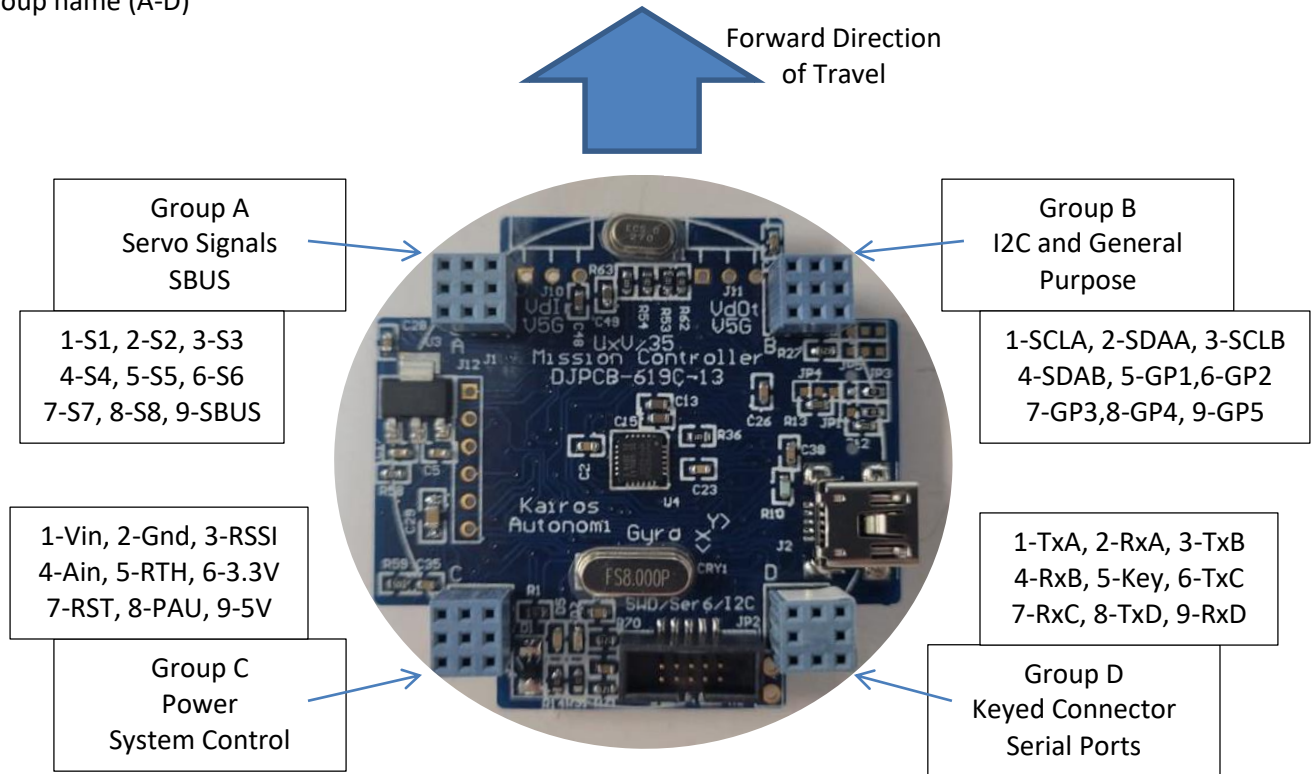


These base boards do not have on/off or safety switching. They have all Servo Signals brought out for usage as well as S1-S4 routed to the ESC Wing spars. The right one is rotated 45 degrees so it can easily fit in ducted fan UAVs.

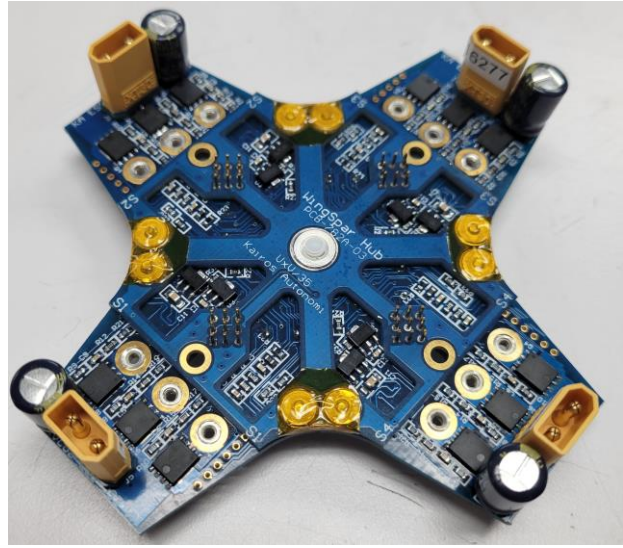
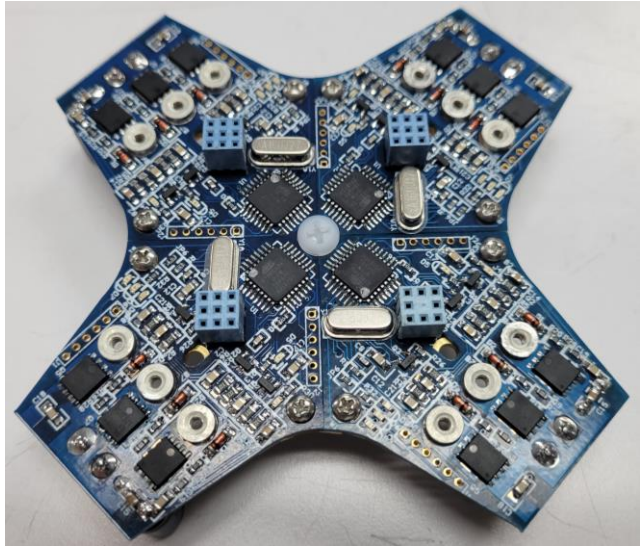
# UxV/35 ESC Design Note

## ESC Orientation

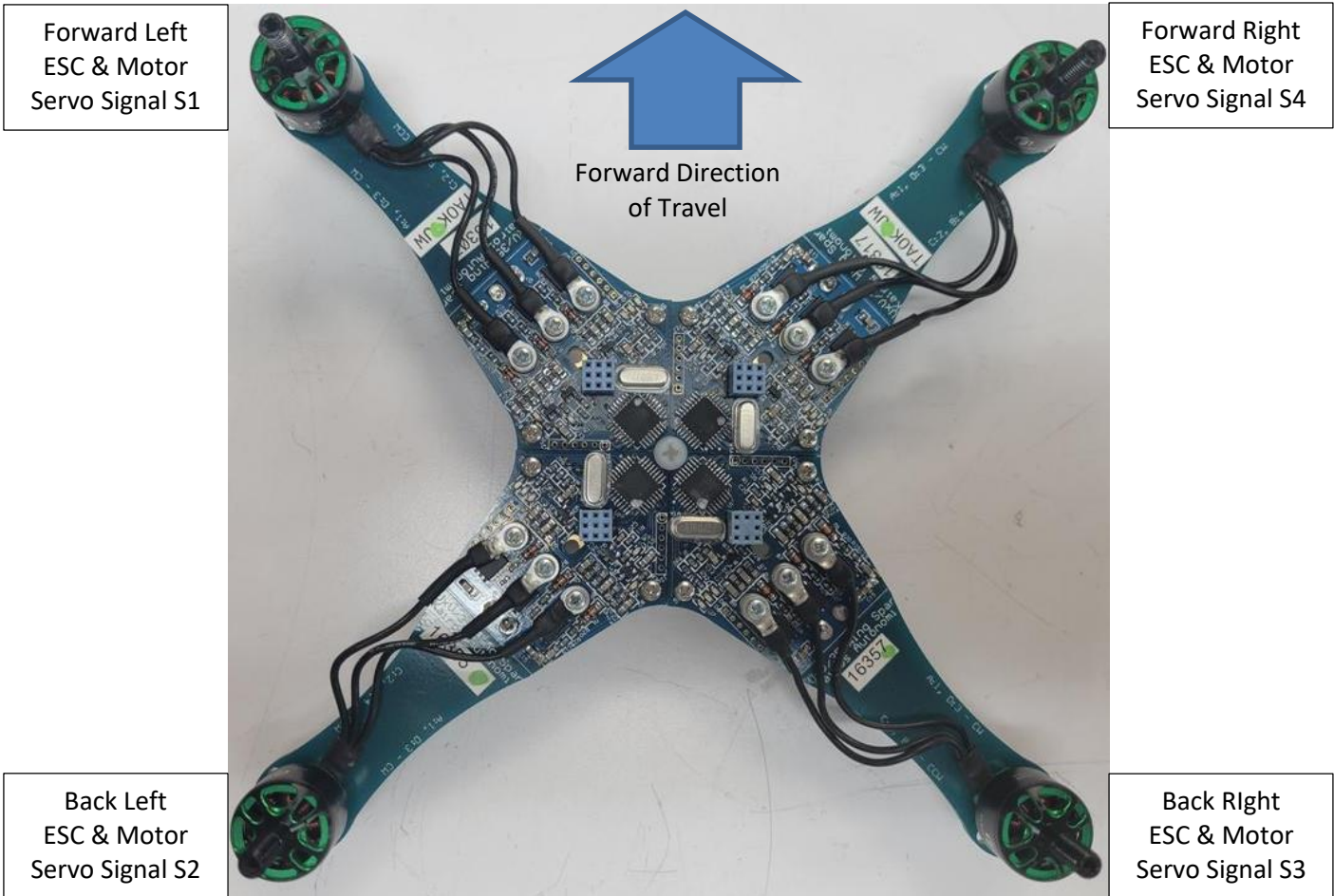
The orientation of a UxV/35 flight stack is controlled by the orientation of the Mission Controller. The UxV/35 stack has a common description and pinout. Each corner connector of the UxV/35 connector set is assigned a Group name (A-D)



# UxV/35 ESC Design Note

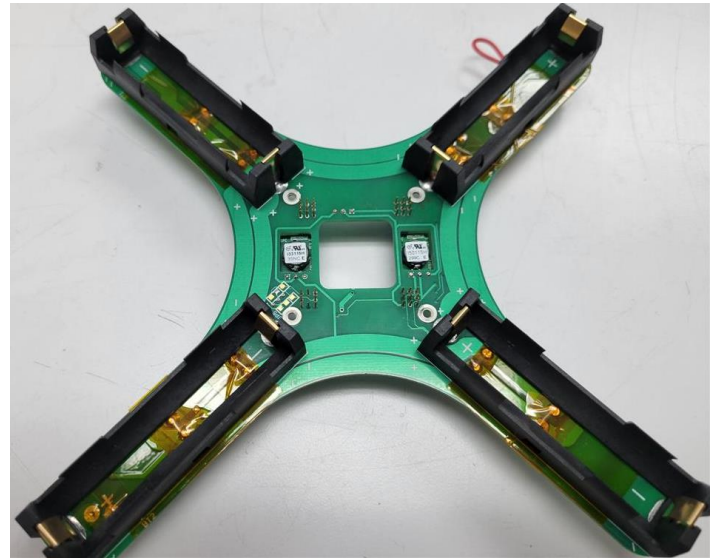
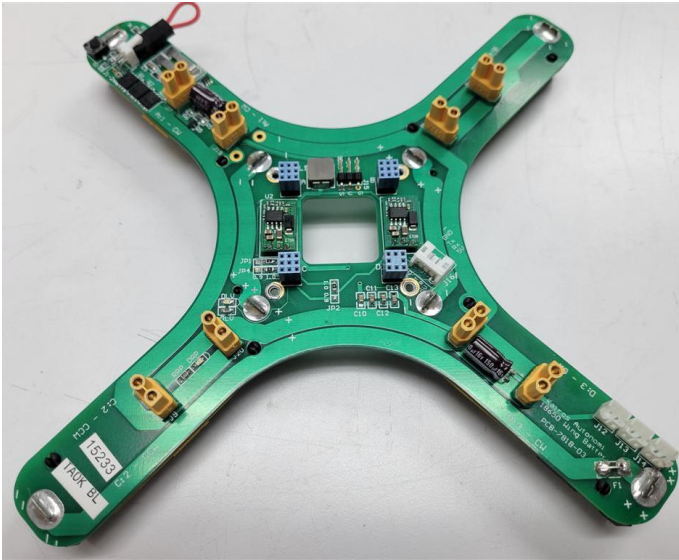


Shown is the Assembled Compact ESC Wing. The four Short ESCs are attached with their corner screws and the center cantilever bolt. An ESC Wing Spar could also have been assembled here and motors attached to the ESC Wing as shown below. The ESC Hub assigns ESC Servo signals to the ESC Spars.

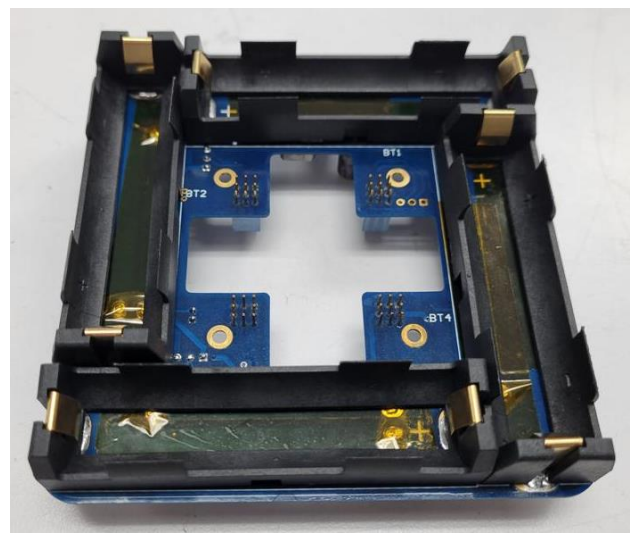




## Base Boards and Assembly



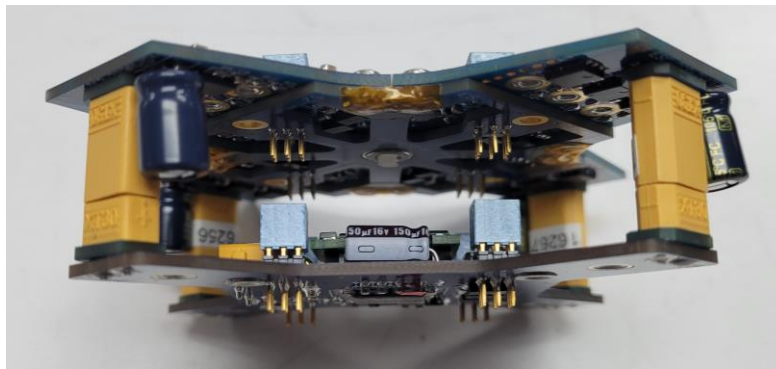
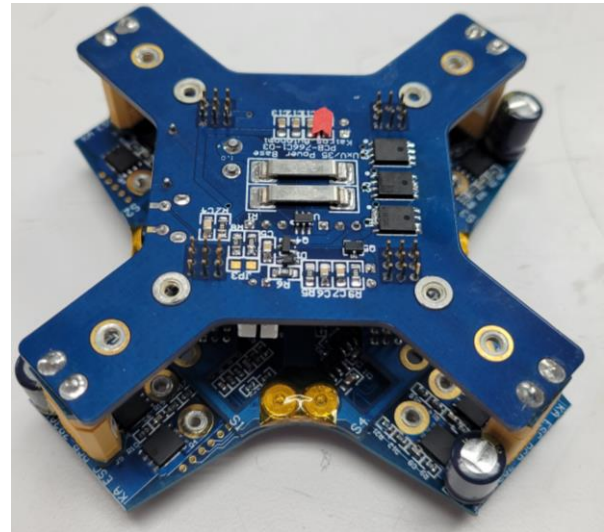
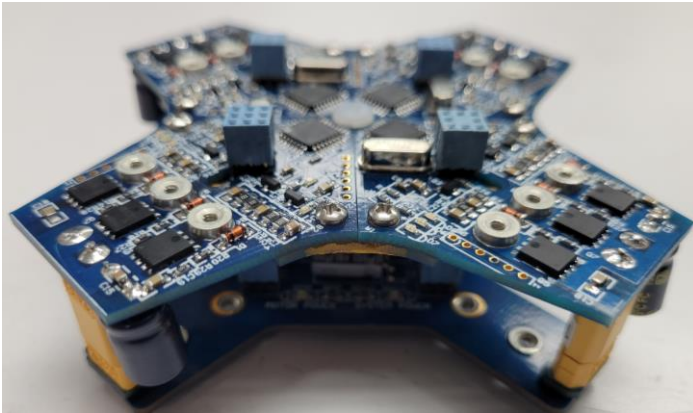
These ESC base boards have integral 18650 and 21700 batteries on board. They contain power On/Off switching and integrated Safety relays. Note the clear center hole for camera or other sensor looking at the out the bottom of the assembled bird. Note the two sets of XT30s, One out from the center more than the other. This accommodates the original ESC Wing Spar XT30 distance and the Compact XT30 distance.

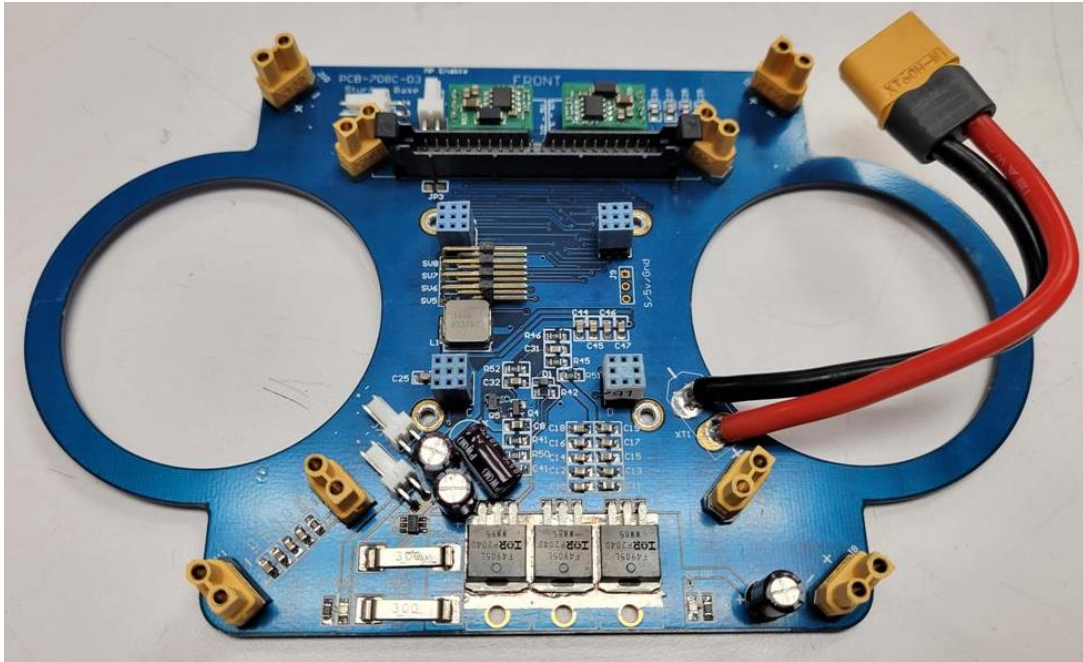


This base board is dimensionally smaller but contains the same features as the one above. It has a generous center hole and extra XT30 power connectors.

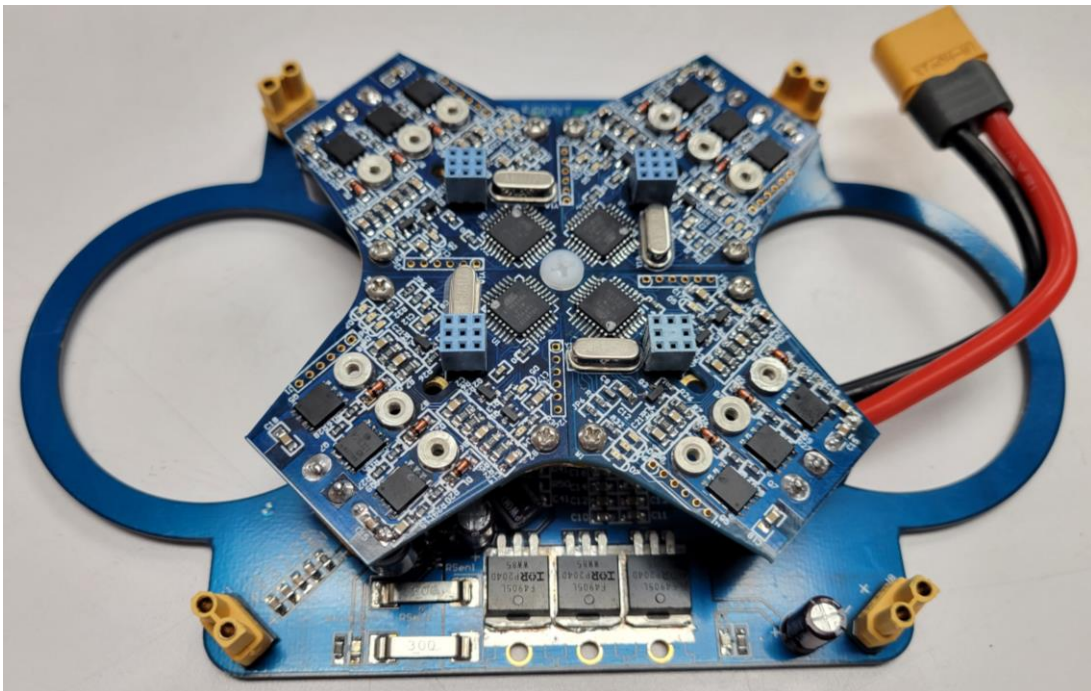
# UxV/35 ESC Design Note

The Assembled Compact ESC Wing is placed on an external battery base board. UAV power On/Off and Safety relay capability exist on this assembly. Not the space for an additional UxV/35 board in the assembly.





Sturnus Mother board with UxV/35 and XT30 power connections for ESC Wing Assembly. Note the two sets of XT30s, One out from the center more than the other. This accommodates the original ESC Wing Spar XT30 distance and the Compact XT30 distance. It contains On/Off switching and Safety relay integration.



The Compact ESC Wing Assembly plug directly on to the UxV/35 sockets. There is room for one UxV/35 board between the Sturnus base board and the ESC Wing Assembly. This is usually a communications board.

# UxV/35 ESC Design Note



## Revision History

This document will evolve based upon technology enhancements and customer feedback. Check here to see what is new.

1.00.00 08/12/24	GATJR	Initial Release
1.00.01 08/13/24	GATJR	Added Simple Baseboards Added UxV/35 Orientation discussion for ESCs Added some section titles Tightened up text in various places.