# USER MANUAL



## WHAT'S IN THE CRATE?

#### HELIPAD



#### PAPA REMOTE



#### **ACCESSORIES**



Aircraft GPU Cord



**Extension Cord** 



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**SAFETY** 

#### SAFETY PRECAUTIONS

Please read and follow the instructions laid out for use of your new equipment. Remember this tug is capable of moving several tons. If used incorrectly it can cause harm to aircraft, hangars, and itself or even death to persons. This tug will aid you in the safe & easy movement of your aircraft, however you are responsible for the safe use and operation of the tug. Always be aware of your surroundings when operating your Tug. Be aware of your wingtips and tail to avoid any kind of property or personal damage. Always stay close enough to the unit to use the E-stop in case of an emergency while the tug is powered on.

The E-stops on the tug are for Emergency use only, they are not meant to be used as the primary power switch. Using the E-stop during use will cause damage to the tug and aircraft, only use the E-stop in case of an emergency.

Be aware of the distance the tug needs to slow down and come to a stop. Get familiar with the acceleration and deceleration of the tug before using it with an aircraft connected. The acceleration and deceleration times will change only slightly with an aircraft connected. Always ensure that the aircraft is properly loaded, secure, and safe to move before you start towing. This includes the use of any safety and securing devices provided by BestTugs™ for use with your Papa and aircraft. ie: tighten aircraft down using the provided strap(s). If you notice damage on the securing straps contact BestTugs™ for a replacement.

E-stop





#### **ELECTRICAL SAFETY**

Your new BestTugs™ Papa is fully electric and operates using a 36 Volt 330 AH (Amp Hour) 3300 CCA (Cold Cranking Amp) battery bank. This gives your tug the power it needs to move the aircraft, but it's also enough power to cause damage to, or destroy any components incorrectly installed into the wiring harness.

Any modifications made to this unit must be authorized by BestTugs™. Attempting to modify ANY part of this unit without the written consent of BestTugs™ voids any and all warranty applicable to this unit and may cause tug failure.

Working on this unit without insulated tools can cause electric shock. Always follow the proper maintenance procedures & heed any safety precautions given in this user manual. Improper maintenance of the batteries inside this unit can lead to battery failure, acid leaks, or in extreme cases explosion. If any batteries fall out of specification during the use of this unit immediately cease operation and replace the bad battery. Continued operation with a bad battery can cause further & more severe failure.

Use extreme caution not to contact the frame of the tug & the battery terminals, the frame of the tug will carry a ground through motor & controller bolt points. Touching a battery post when also contacting the frame may cause serious injury, or death. Using Insulated tools will minimize the risk of electric shock. It takes only a few amps and seconds to cause lethal amounts of damage if not careful.



Orange liquid is Anti-Corrosive.

#### BATTERY SAFETY

Batteries are a consumable part of this unit, typical battery life is between 2-4 years for AGM batteries. Failure to take proper care of the batteries will greatly decrease their life span. See pg. 12 for more info on properly charging the unit.

If the batteries are not maintained properly they may develop internal shorts which can lead to battery expansion and possible acid leaks. If any of the batteries inside this unit start leaking replace It/them immediately. Wear non permeable gloves & safety glasses when working on the batteries.



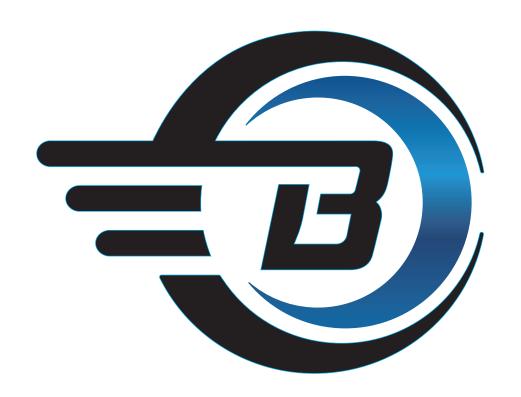
When removing the batteries for maintenance or replacement use a lifting team or a crane hoist to lift them out and to the side of the unit, each battery weighs roughly 180 lbs.

Be careful of the wires removed from each terminal as they can still be short circuited through the frame. or other terminals until all batteries are disconnected & capacitors have been discharged (this can take more than 30 minutes from the time the batteries are removed).

When charging the batteries use only the specific charger that came with your unit. Use of alternative charging methods may result in damage to the batteries and potentially damage to the electrical systems inside the unit.

Do not modify the batteries, chargers, or other systems inside your tug without authorized & written approval from BestTugs™. Doing so without approval will void all warranty associated with that unit.





## **OPERATIONS**

#### GETTING STARTED

To turn on your Helipad start by pressing the power button on the handheld remote . Then rotate the battery disconnect to the ON position . The red Status light should come on, if it doesn't turn on, check that the E-stops are extended (rotate clockwise). To wake the tug up tap the E-button on the remote . this will turn the controller & relays on making it operation ready.

The wheel will control left and right movement, the trigger will control forward and reverse movement. Get familiar with the throttle and steering before using the unit with an aircraft.

The throttle and steering both use exponential control, the more the trigger or wheel is moved the faster the unit will drive or turn. This unit has a reverse brake mode which will not allow the tug to go from full speed in a direction to full speed in the opposing direction without the throttle returning to neutral. In this mode the maximum speed will be reduced to 50%. To disengage this mode release the throttle, you can reapply throttle immediately.

The display on the remote has indicators which show what position each accessory is in. The steering and throttle trim should remain at -0. Applying steering or throttle trim may introduce unwanted tug movement.

Your new Papa also comes with our automatic shut down timer, this will disable the tug if it's been idle for more then 2 hours from start up, or 30 minutes from last movement. This is an additional safety feature, do not leave the unit on when away from the pad as once it's disconnected from the remote it can intercept radio signals causing movement or other actions.



**Remote functions 1** 



Rotate battery disconnect to turn on tug =B





Position indicator



#### SECURING LOAD

When landing on the helipad use the direction indicators to put the nose of the helicopter forward on the helipad. Once the helicopter is landed on the pad, use the included straps to secure it to the large D rings fore and aft . Once the helicopter is secured you can freely move the pad, the wings can be raised and lowered at any point. When raising the wings with a helicopter stationed on the platform be vigilant and ensure that the wings wont collide with the helicopter.

Moving the wings with the helicopter positioned on one or more wing is not recommended as it could lead to damage to the aircraft.



Tug Capacity - $M^{J}$ = Safe weight M = Tug max tow /5 J = Slope °			
*Weight li	mits are for constant use		
0°	14,000		
1°	11,200		
2°	8,400		
3°	5,600		
IS WADO	TE HO! HECOMMENDED		



#### WING OPERATION

The Wing Raise and Wing Lower buttons are used to adjust the wing positions, holding either button will engage the corresponding actuator movement. The button can be released at any point and the actuators will disengage for partial movement.

Either wing can be disabled independently of the other by flipping the switch adjacent to it. Flipping the switch fully up will engage the wing, flipping it down will disengage the wing it's next to.

The wings are not designed to secure the helicopter, only to reduce the cross section of the helipad. The helicopter must be secured before movement regardless of wing position.

When moving the wings mind the pinch points between each wing and the frame. These actuators are designed to move several tons, they can cause harm to any body parts or components caught between the wings. Any of the E-stops can be depressed to stop both tug movement and wing movement.



**Remote functions 2** 







## JUMP START OPERATION

To use the Jump Start on your Papa tug simply turn the tug on following the normal procedure. The Jump Start voltage screens will illuminate to show that the Jump Start is ready to use. Connect the aircraft cables to the aircraft, then to the correct plug for your aircrafts voltage.

Papa provides ground power as follows

- 12 Volts @ up to 3300 CCA. 🗐
  - 12 voits @ up to 3300 CCA.
- 24 Volts @ up to 3300 CCA. 🗐

Be sure to check each aircrafts POH for detailed Jump Starting instructions and specifications. If the unit does not fall within specification for the aircraft do not attempt a Jump Start.

To use the Bus Tie Feature, connect the 110 Volt AC extension cord to the GPU as shown on page 10. then depress the 30 minute Bus tie button. This will connect the 56 amp GPU to the Jump Start panel to provide longer term high amperage ground power. This can be used to run high current systems like air conditioning, cabin lighting and heaters for some time before a flight. Using this method can drain the batteries over time, we recommend monitoring the battery voltage to prevent the batteries getting below 12.2 Volts per battery.





#### 56A GPU OPERATION

To use the continuous 28.5 Volt GPU in stand alone operation, connect a 110 volt extension cord into the GPU panel and connect the aircraft cables to the continuous power plug then connect the cables to the aircraft.

This panel can be used with the tug turned off, and will provide clean power for avionics updates, flight planing and other low current loads. If the aircraft is pulling over 56 Amps the panel will attempt to match the amperage needed but will begin to lower the voltage in order to protect the electrical components inside. If the Continuous power shuts down due to an over current draw let it rest for 5 minutes before continuing operation and consider using the Bus Tie feature to allow for higher amp draw.





#### **ACCESSORIES**

Lights can be operated through the two position rocker switches on the accessory panel adjacent to the Battery Disconnect switch. The Deck light switch will control the under and over glow lighting. The headlights can be turned on and off with the Lights switch.

The green and red directional lights on the top of the deck are always powered, they will only turn off with the tugs wake/sleep or primary power switch (battery disconnect).

The state of charge shows the current voltage in a percentage this voltage will fluctuate when operating the tug, it's normal for the percentage to get low during movement and raise after stopping. Charge the tug before 70% for the best battery life.

To open the controller bay & storage bay lift both of the lock levers and lift the bay door up.





#### **CHARGING**

It's important to charge the tug often enough to keep the battery voltage nominal, if the batteries are depleted too much they can become permanently damaged. Charge the tug when the display reads between 65%-75% at rest for best battery life.

The battery charge state can be found on the screen. Your charger functions in stages, this helps to analyze the batteries and give them the best charging conditions.

Stage 1 - System Check, Battery Analyzing: During this stage the red "Charge" LED will flash indicating it is analyzing all battery connections and states. After this the "System Check OK" indicator will illuminate green.

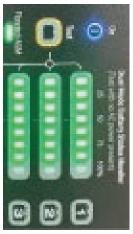
Stage 2 - Charging: During this stage the "Charging" indicator will be solid red, the charger will use all available charging amps (controlled by temperature) until the battery voltage is raised to 14.8 VDC (Factory AGM setting).

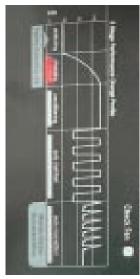
Stage 3 - Conditioning: During this stage the "Conditioning" status indicator will be amber. Batteries will hold at 14.8 VDC to complete charging while conditioning each battery.

Stage 4 - Auto Maintain (Energy Saver): During this stage the blue "Power" and Green "Auto Maintain" LED"s will be on. This stage will keep the batteries at full charge until the charger is disconnected.



Charge port







#### **FUSES**

There are several fuses in the unit to prevent damage to the electrical components. When replacing the fuses turn the battery disconnect OFF and push the new fuse firmly into place before turning the unit on.

Charging fuses: 25 Amps

LED Fuses: 20 Amps

Direction LED Fuse: 5 Amps

Wing Fuses: 10 Amps





In-line fuses for charging

#### DECKING

The decking can be removed for maintenance purposes and to be replaced. To remove the decking remove the bolts holding each in place and then use a team of people to lift the decking away from the frame. Don't remove the decking with the wing in the upright position or you risk damage to the tug & decking.

The decking is made of a super strong composite material with a durable textured polyurea hybrid coated surface to provide grip for landing and walking on the pad. Be aware of the small lip around the edge of the platform and do not step directly on the lighting surface.

When removing the decking it's advised to remove the section over top of the batteries to provide clear access and sight to the battery terminals. Install all bolts loosely before tightening them down to allow the panels to be moved and aligned. Don't over torque the bolts on the decking as they can cause damage to the surface coating.



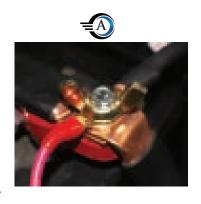


#### BATTERY REPLACEMENTS

When replacing the batteries in the unit, start by removing the decking directly over the battery terminals and remove the battery wires starting with the main ground. A diagram of the battery terminal removal order can be found on page 17.

Once the battery terminals are removed, lift the batteries out of the tug, you must team lift the batteries as they weigh roughly 180 Lbs each. Be careful not to let the terminals touch the exposed wires or the frame as they could create a short causing damage to the battery, tug, or persons. Use extreme care when removing or installing batteries.

Replacing the AA batteries in the remote before they run out of charge is crucial. If the tug is on and does not have a connection to the remote it is subject to potential radio interference. Remove the battery cover on the bottom and remove the batteries, then install the new ones. Only do this while the tug and remote are turned off.









### TROUBLE SHOOTING

The unit isn't turning on	<ul> <li>Cycle all four E-stops (rotate clockwise until extended) then cycle the battery disconnect Off and On again. Press the "E" Wake - Sleep button on the remote to Sleep, then back to wake.</li> <li>Check Fuses</li> <li>Check Battery voltage</li> </ul>	
The unit was on, then stopped working	- Cycle the master power switch OFF for 5 seconds, and turn ON to reset the internal sleep timer.	
The Power LED is on but the unit wont move	<ul> <li>Power cycle the unit</li> <li>Check Fuses</li> <li>Check that the units wheels are making contact with the ground</li> </ul>	
Tug died outside of hangar	- The tug can be moved manually by releasing the parking brake. Move the parking brake lever to the "OFF" Position. Do not exceed safe towing speed of 2.17 Mph.	
Tug struggles to pull the aircraft	Ensure the aircraft falls within tugs weight capability found on Page 7. Ensure batteries are charged, and still good. During a tug movement none should fall below 11 Volts DC measured individually.	
Tug making excessive noise / grinding noise coming from under the cover	Chain tension needs to be adjusted. If over 1/2" of play on the chain add tension, if under 1/2" of play remove tension.	





#### **BATTERY WIRING**

