



RPA Handler Guide

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Contents

1. Introduction to Flyte	5
1.1 Introduction	6
1.2 Flyte System Overview	8
1.3 The Shipping Process	9
2. User Functions of Flyte	11
2.1 Creating Service Tickets	12
2.2 Checking Depot Status	14
3. RPA Handler Tasks	15
3.1 RPA Handler Overview	16
3.2 Start of Day Procedure	17
3.3 Preparing an Outbound Shipment	24
3.4 Receiving an Outbound Shipment	30
3.5 Returning an Inbound RPA	32
3.6 Receiving an Inbound RPA	34
3.7 End of Day Procedure in Flyte	35
3.8 DroneSpot™ Maintenance	38
3.9 Handling the RPA	39
4. Battery Management	41
4.1 Introduction	42
4.2 RPA Batteries	43
4.3 Battery Safety	44
4.4 Battery Charging Station	45
4.5 Battery Charging Station Safety	47
4.6 Battery Type	48
4.7 Battery Case	48
4.8 Notifications	49
4.9 When to Charge the Batteries	50
4.10 Inserting Batteries into the RPA	51
4.11 Removing the Batteries from the RPA	52
4.12 Charging the Batteries	53
4.13 Removing Batteries from the Charging Station	55
4.14 Storing Batteries for the End of Day	56
Index	57

1. Introduction to Flyte

This section covers the following administrator user topics:

- Introduction
- Flyte System Overview
- The Shipping Process

1.1 Introduction

Flyte is Drone Delivery Canada's (DDC) proprietary flight management software used for all flights. It is a web-based platform where customers can initiate RPA shipments, assign user roles, and operate the system.

The system consists of a variety of components that work together and communicate with Flyte.

The components are:

- Depots
- RPAs
- DroneSpot™(s)
- Charging stations

Depots

The depots are storage facilities for all the components such as the RPAs, batteries, and charging stations. Each route has two depots.

RPA

The RPA (Remotely Piloted Aircraft) or 'Drone' is the pilotless aircraft that completes the shipment. Each route is equipped with at least one RPA to complete the shipment.



Note: RPAs may also be referred to as UAVs (Unmanned Aerial Systems) or UASs (Unmanned Aerial Systems). This document will refer to them as RPAs.

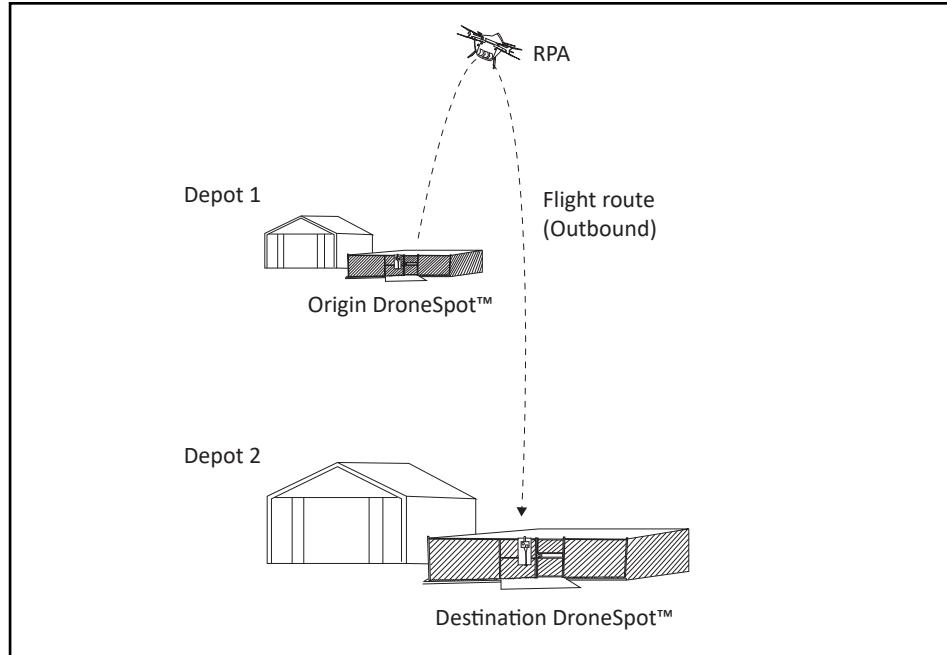


Figure 1: Component Overview

DroneSpot™(s)

The DroneSpot™(s) are secured areas where the RPA lands and takes off from. Each depot has a minimum of one DroneSpot™.

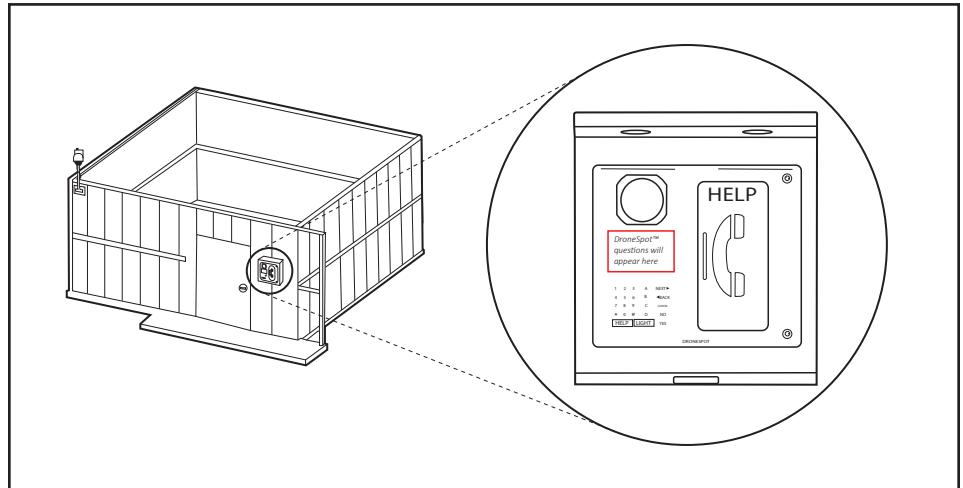


Figure 2: DroneSpot™ & DroneSpot™ Interface

Charging stations

The charging station is a system to manage the batteries for the operations. Each depot has a minimum of one charging station. The charging station stores the batteries when not in use and charges the batteries when needed for a flight.



Figure 3: Charging Station

1.2 Flyte System Overview

Flyte is the flight management software and interface for all RPA shipments.

Flyte Communication Overview

All RPA shipments begin when the customer inputs shipping information into Flyte. Flyte communicates with the DroneSpot™ and reads current weather and radar information. When a RPA is ready to takeoff, Flyte communicates with the Operation Control Centre (OCC), where an operator launches the RPA.

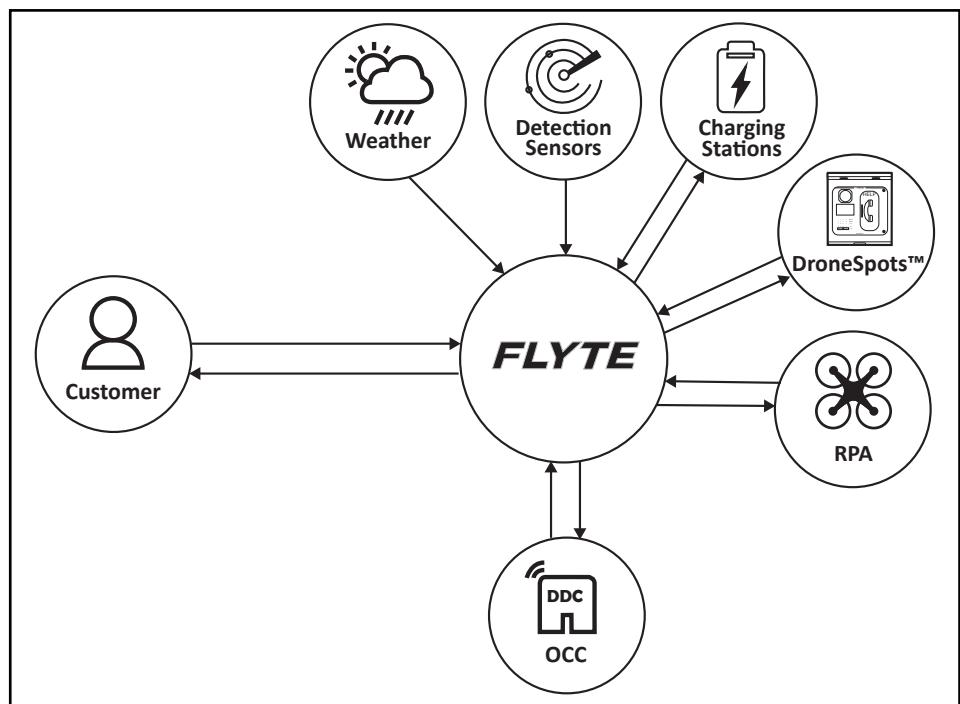
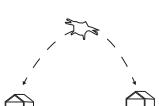


Figure 4: Flyte Communication Overview

1.3 The Shipping Process

The shipping process begins when a customer enters shipment information into Flyte. An overview of the shipping process is as follows.

Step	Description
1. Shipment 	The customer enters the shipment information through the Flyte website.
2. Notification 	The customer receives an email notification from Flyte to bring the shipment to the DroneSpot™.
3. Preparation 	The customer enters the DroneSpot™ and answers a series of questions on the DroneSpot™ interface to prepare the RPA for flight. These questions include, "Have you loaded the payload?"
4. Take-Off 	Flight controllers in the OCC (Operations Control Centre) verify the RPA is clear for takeoff and remotely launch the RPA.
5. Monitor 	DDC monitors the flight from the OCC
6. Land 	The RPA lands and the customer collects the shipment.

2. User Functions of Flyte

This section covers the following user topics:

- Creating Service Tickets
- Checking Depot Status
- Creating a Shipment with Flyte

2.1 Creating Service Tickets

You may have a customer service inquiry, a technical issue, or a general support question. Create a service ticket directly within Flyte.

Getting started

Before starting this procedure, ensure:

- You are the Administrator or the Logistics Director.

To create a ticket

1. Login to Flyte at <https://flyte.dronedeliverycanada.com> and enter your user name and password.
2. Select **Tickets** from the left side menu.
3. Select **CREATE NEW TICKET**.
4. Select which department the ticket is being issued for. The options are: General support, Technical support, and Sales support.

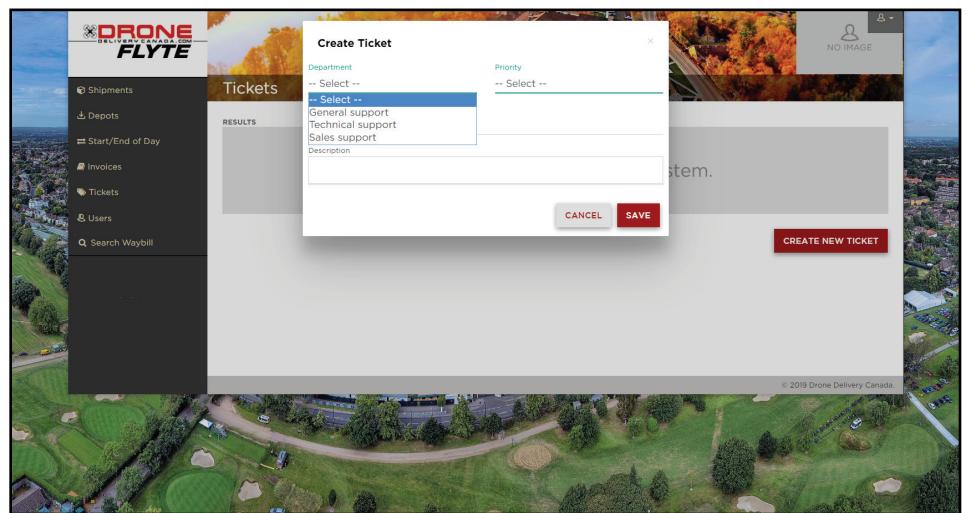


Figure 5: Create Ticket - Department

5. Select the priority of the issue. The options are: Low, Normal, High, and Urgent.

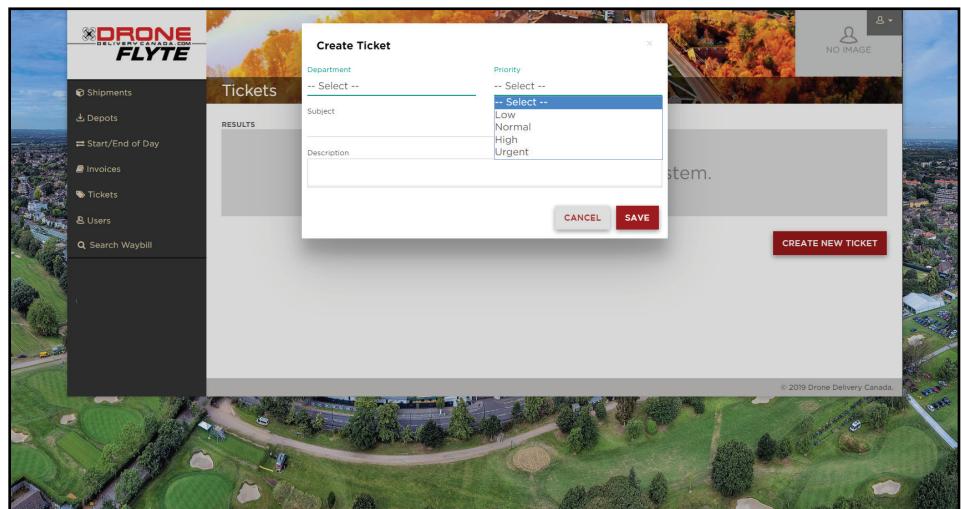


Figure 6: Create Ticket - Priority

6. In the **Subject** line, enter a short description of the issue. For example: "Comm Trouble with DroneSpot™ 2".
7. In the **Description** field, enter a detailed description of the issue.



Note: You will be contacted through Flyte to resolve the issue.

2.2 Checking Depot Status

Use the depot function to check if a DroneSpot™ is occupied or idle, identify the RPAs assigned to each DroneSpot™, and check the status of the battery charging stations.

Getting started

Before starting this procedure, ensure:

- You are the Administrator, Logistics Director, Shipper, or RPA Handler.

To check the depot status

1. Login to Flyte at <https://flyte.dronedeliverycanada.com> and enter your user name and password.
2. Select **Depot** from the left side menu.
3. To view the depot status, select the arrow on the right side of the depot.



Figure 7: Checking Depot Status

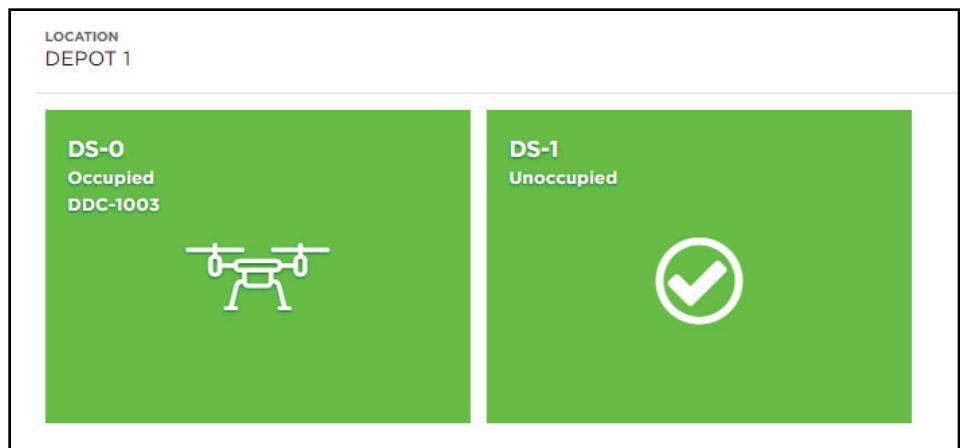


Figure 8: Depot Status

3. RPA Handler Tasks

This section covers the following RPA Handler tasks:

- RPA Handler Overview
- Start of Day Procedure
- Preparing an Outbound Shipment
- Receiving an Outbound Shipment
- Returning an Inbound RPA
- Receiving an Inbound RPA
- End of Day Procedure in Flyte
- DroneSpot™ Maintenance
- Handling the RPA

3.1 RPA Handler Overview

The RPA Handler is the only role authorized to enter the DroneSpot™. During normal operation they have 6 key responsibilities, which are:

1. Start of Day Procedures

This involves bringing the DroneSpot™ online and setting up the RPA for operation in the DroneSpot™.

2. Preparing an Outbound Shipment

This involves preparing the RPA at the origin DroneSpot™ for a shipment by loading the payload and batteries.

3. Receiving an Outbound Shipment

This involves receiving a shipment at the destination DroneSpot™ from an outbound flight.

4. Preparing an Inbound RPA

This involves preparing the RPA to return back to the origin DroneSpot™.

5. Receiving an Inbound RPA

This involves receiving a returned RPA at the origin DroneSpot™.

6. End of Day Procedures

This involves closing the DroneSpot™ and taking the RPA out of operation for the service day.

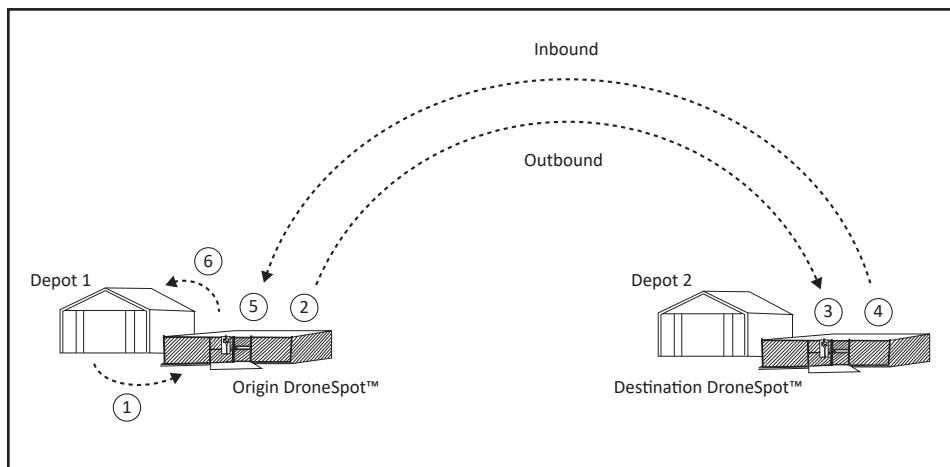


Figure 9: RPA Handler Overview

3.2 Start of Day Procedure

Use Flyte to initiate the ‘Start of Day’ procedure and prepare the DroneSpot™(s) for the start of the business day.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler at the depot.
- DroneSpot™(s) are powered ‘ON’, accessible over the Internet, and ‘offline’.
- You’re using an Internet connected device with Google Chrome.



Note: If the RPAs are ‘online’, perform the ‘End of Day’ procedure first.

To perform the ‘Start of Day’ procedure

1. Login to Flyte at <https://flyte.dronedeliverycanada.com> and enter your username and password.
2. Select **Start/End Day** from the left side menu. Ensure the **Start of Day** toggle switch on the top right of the screen is selected.
3. Select the DroneSpot™(s) to bring online.
 - a. Select the DroneSpot™(s) to bring online by selecting the check box.

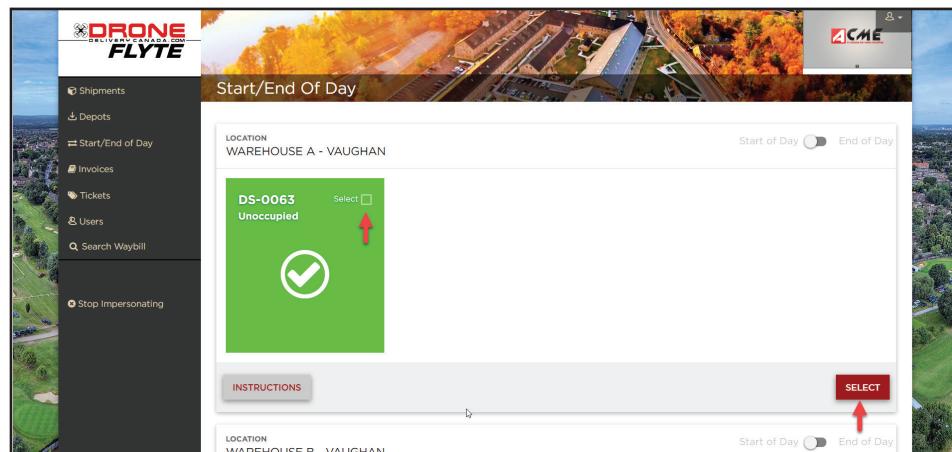


Figure 10: DroneSpot™ Selection - Start of Day

- a. Press the **Select** button.
- b. Press **OK** to confirm the selection.



Note: If Flyte can't communicate with the DroneSpot™, the status will indicate 'Communication Failed'. This may be due to a poor connection. If the problem persists, contact customer support.

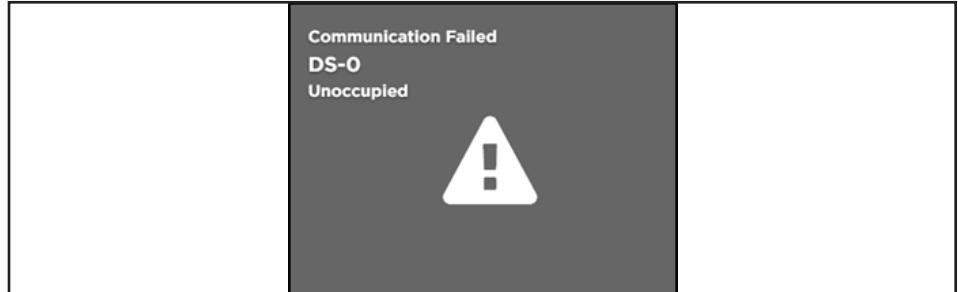


Figure 11: Communication Failed

4. Prepare the DroneSpot™.
 - a. Retrieve the assigned RPA and go to the DroneSpot™.
 - b. Enter the assigned RPA Handler PIN on the keypad to unlock the door.

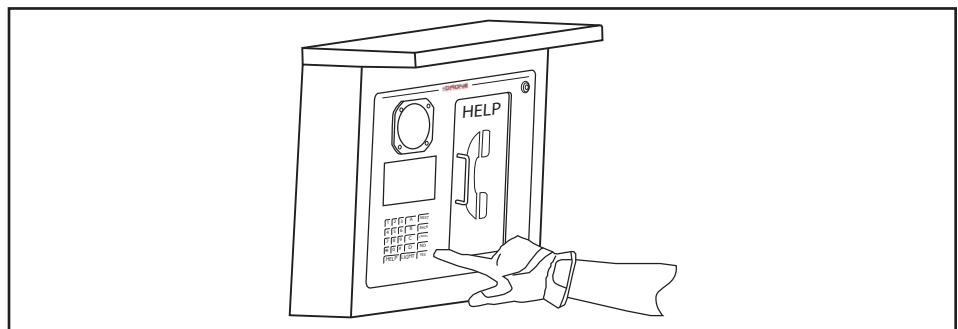
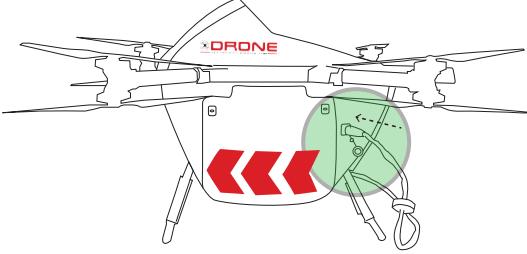
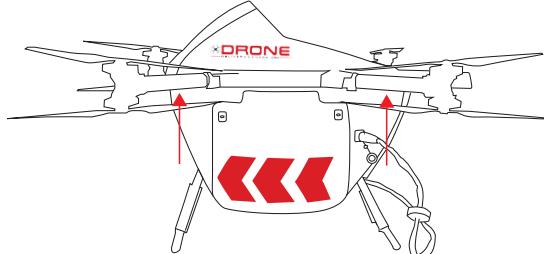
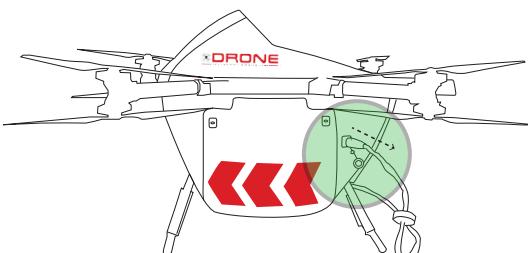
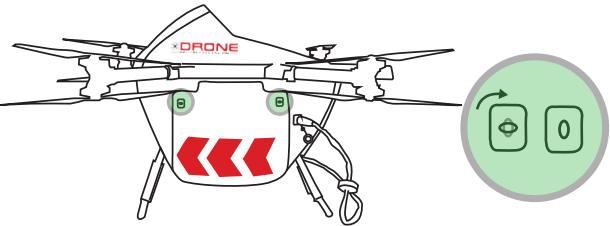
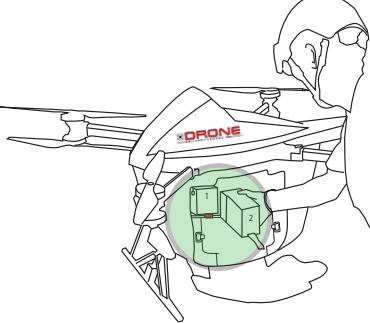
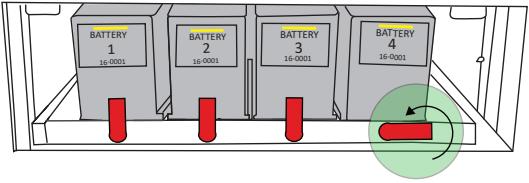


Figure 12: Enter the Assigned RPA Handler PIN

- c. Enter the DroneSpot™ and place the RPA beside the landing target.
- d. Answer the following questions on the interior DroneSpot™ interface.

Question	Description
<p><i>Place RPA in the DroneSpot™ and insert the umbilical. Complete?</i></p>	<p>Unreel the umbilical from the cabinet. Unreel the umbilical from the cabinet. Connect the umbilical to the RPA by removing the cap, inserting the umbilical, and screwing the collar in place.</p>  <p>Figure 13: Insert Umbilical</p>
<p><i>Wait for the RPA to complete startup. Complete?</i></p>	<p>Wait for the LED lights under the boom arms to turn on. This identifies the startup procedure is complete.</p>  <p>Figure 14: LED Lights</p>
<p><i>Unplug the umbilical from the RPA. Complete?</i></p>	<p>Unscrew and unplug the umbilical. Screw the cap back on. Reel the umbilical back into the cabinet.</p>  <p>Figure 15: Unplug Umbilical</p>

Question	Description
<p><i>Insert the propulsion batteries for compass and landing aid check. Complete?</i></p>	<p>Open the RPA door by turning the two locks in each corner.</p>  <p>Starting from the left side, load battery 1 into the battery bay with the number upright and tag facing out. Repeat these steps for all four batteries. Slide each battery until they firmly connect with the terminal. Rotate the red clip to the lock position. For more detailed instructions, refer to “4.10 Inserting Batteries into the RPA” on page 51.</p>  <p>Close and lock the RPA door by turning the two locks in each corner.</p> 

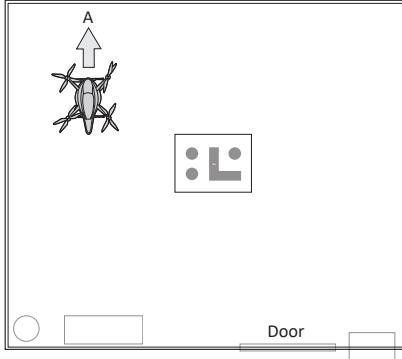
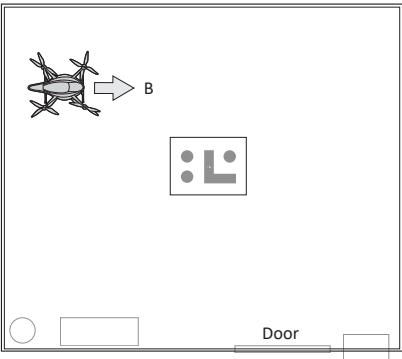
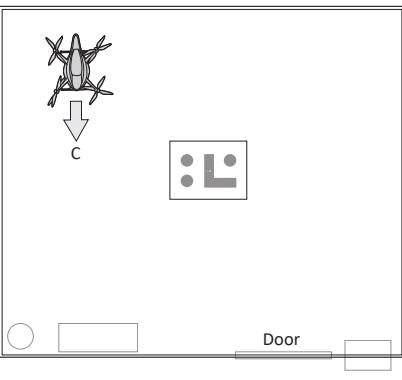
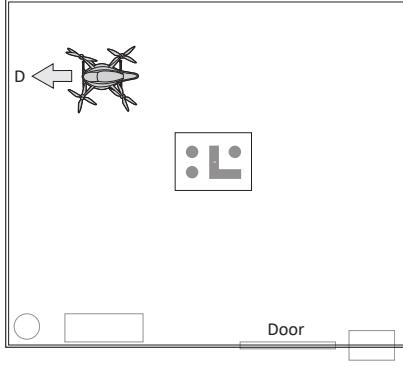
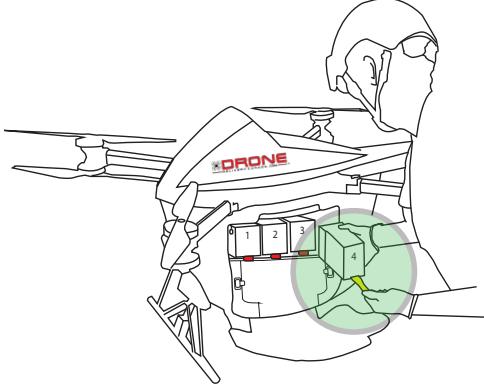
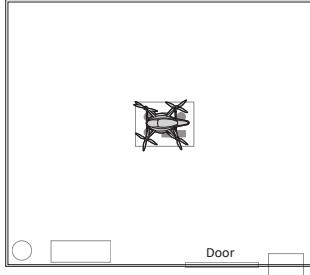
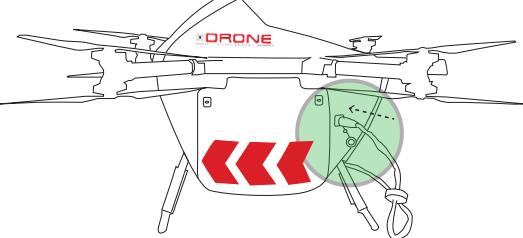
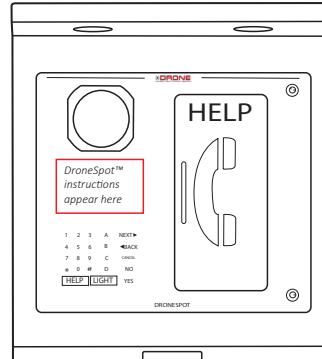
Question	Description
<i>Move the RPA to the back left corner and point towards Wall A. Complete?</i>	<p>Begin compass check by placing RPA in the upper left corner. Place the front legs of the landing gear in the jig closest to Wall A. Point the RPA nose towards Wall A.</p> 
<i>Rotate the RPA to face Wall B. Complete?</i>	<p>Rotate the RPA clockwise 90° to face Wall B. Place the rear legs of the landing gear in the jig closest to Wall D.</p> 
<i>Rotate the RPA to face Wall C. Complete?</i>	<p>Rotate the RPA clockwise 90° to face Wall C. Place the rear legs of the landing gear in the jig closest to Wall A.</p> 

Figure 19: RPA Facing Wall A

Figure 20: RPA Facing Wall B

Figure 21: RPA Facing Wall C

Question	Description
<p><i>Rotate the RPA to face Wall D. Complete?</i></p>	<p>Rotate the RPA clockwise 90° to face Wall D. Place the front legs of the landing gear in the jig closest to Wall D.</p> 
<p><i>Remove propulsion batteries from the RPA. Complete?</i></p>	<p>Open the RPA door and place the red clips in the unlock position. Slide each battery out of the slots in descending numerical order (starting from 4) and place in the carrying case. Repeat these steps for all four batteries. For detailed instructions, refer to “4.11 Removing the Batteries from the RPA” on page 52.</p> 

Question	Description
<i>Re-center the RPA in the DroneSpot™. Complete?</i>	<p>Ensure RPA is on the landing target in the center of the DroneSpot™.</p>  <p>Figure 24: Re-Center RPA</p>
<i>Reconnect the umbilical to the RPA. Complete?</i>	<p>Connect the umbilical to the RPA by removing the cap, inserting the umbilical, and screwing the collar in place.</p>  <p>Figure 25: Insert Umbilical</p>
<i>Start of Day Complete. Press YES.</i>	<p>Press YES on the DroneSpot™ to confirm the Start of Day procedures are complete.</p>  <p>Figure 26: DroneSpot™ Interface</p>

- e. Exit the DroneSpot™ and close the door.
- f. Answer the final question on the exterior DroneSpot™ interface.

3.3 Preparing an Outbound Shipment

Once the shipment has been entered into Flyte, it is the RPA Handler's responsibility to complete the shipment procedure.

Getting started

Before starting this procedure, ensure:

- You have received a notification from Flyte to go to the DroneSpot™.
- You have the waybill and the package. Refer to "3.3 Creating a Shipment with Flyte" on page 24.
- You have fully charged batteries. Refer to "4.13 Removing Batteries from the Charging Station" on page 55.
- The RPA has undergone the 'Start of Day' procedure and does not have batteries installed. Refer to "3.2 Start of Day Procedure" on page 17.



Note: The RPA Handler is the only role qualified to conduct the outgoing RPA shipping procedure.

To send the shipment

1. Go to the DroneSpot™ and scan the waybill with the scanner on the bottom of the exterior DroneSpot™ interface. Ensure the waybill is secured to the package.

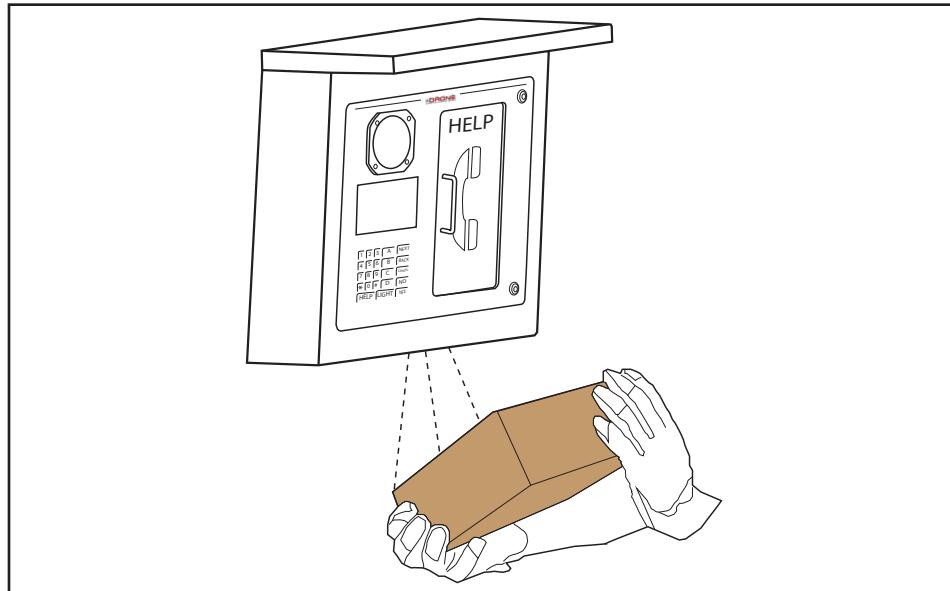
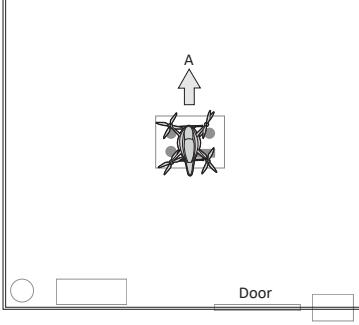
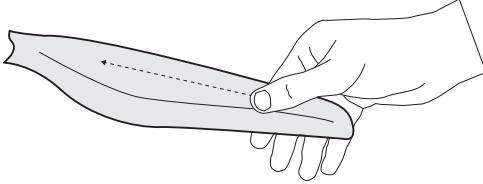
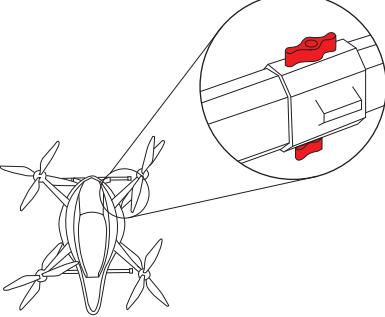
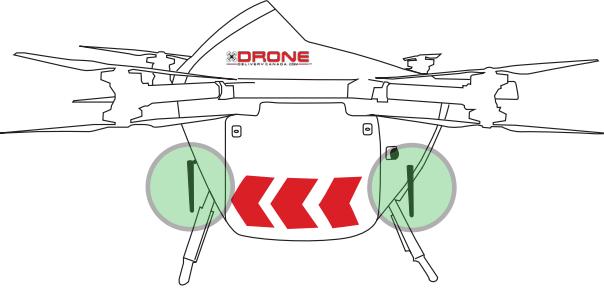
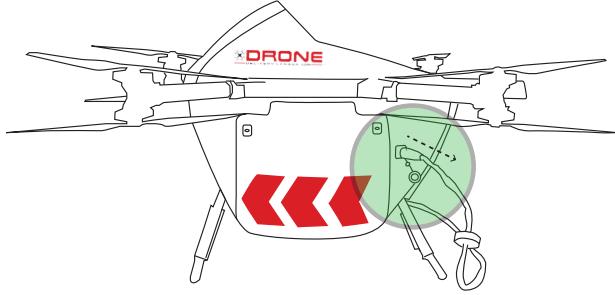
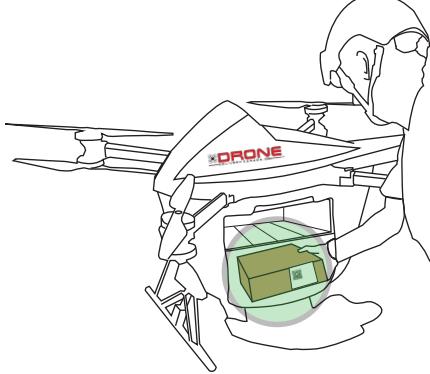
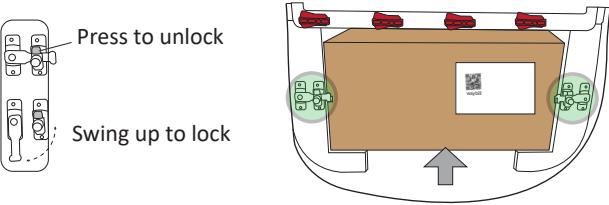


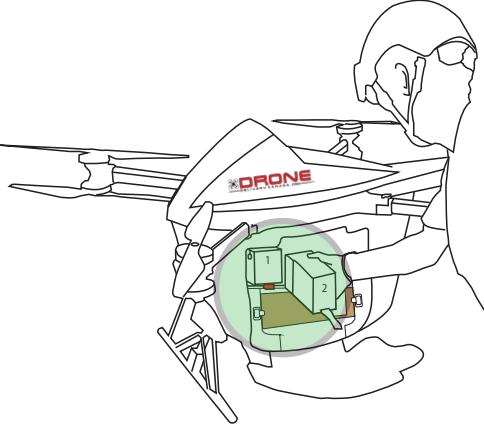
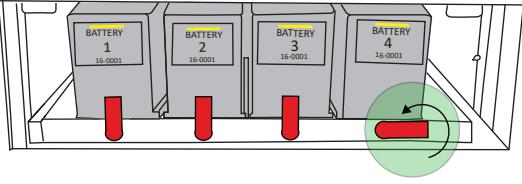
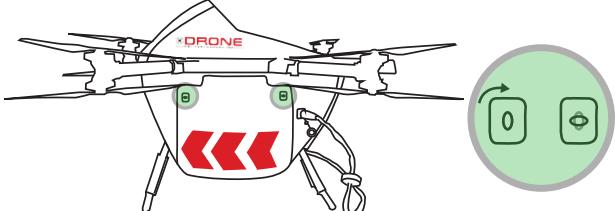
Figure 27: Scan the Waybill

2. Enter the assigned RPA Handler PIN on the keypad to unlock the door, then enter the DroneSpot™. Refer to "Enter the Assigned RPA Handler PIN" on page 18.
3. Answer the following questions on the interior DroneSpot™ interface.

Question	Description
<i>Is the RPA pointed towards Wall A?</i>	<p>With the RPA on the landing target, point the nose of the RPA towards Wall A.</p> 
<i>Are the propellers free of any cracks or nicks?</i>	<p>Inspect all 8 propellers to ensure they are suitable for flight. They should be free of any cracks or nicks. This can be ensured by running your hand along them. If you notice any damage, notify DDC as they must be replaced by a certified technician.</p> 
<i>Have you inspected the top and side covers?</i>	<p>Perform a physical and visual inspection of the covers to ensure they are secure and won't come loose during flight.</p>
<i>Have you inspected the landing gear?</i>	<p>Perform a physical and visual inspection of the landing gear. Ensure the landing gear is:</p> <ul style="list-style-type: none"> • Securely in place. • Correctly placed. • Parallel to each other. <p>If necessary, move the drone to ensure the landing gear is securely attached to the RPA.</p>

Question	Description
<i>Are the red boom locks tight?</i>	<p>Perform a visual inspection of the red boom locks to ensure they are tight. DO NOT TIGHTEN. If the locks appear loose, press the # symbol on the DroneSpot™ for assistance from DDC.</p>  <p>Figure 30: Red Boom Locks</p>
<p><i>Have you inspected the antennae?</i></p> <p>!</p>	<p>Perform a visual inspection to ensure:</p> <ul style="list-style-type: none"> • The antennae are aligned with the tension marker. • The antennae are secured in place and will not come loose during flight. <p>If they are not aligned, press the # symbol on the DroneSpot™ for assistance from DDC.</p>  <p>Figure 31: RPA Antennae</p> <p>Be Advised: Do not touch the antennae as this could damage the modems.</p>
<i>Is the secured area free and clear of debris?</i>	<p>Scan the area and clear any debris or impediments if possible and safe to do so. Refer to "DroneSpot™ Maintenance" on page 38.</p>

Question	Description
<i>Is the umbilical cap closed and secure?</i>	<p>Disconnect the umbilical from the RPA and close the umbilical cap.</p>  <p>Figure 32: RPA Umbilical</p>
<i>Have you secured the payload?</i>	<p>Load the payload with the secured waybill into the payload area of the RPA located under the batteries.</p>  <p>Figure 33: Loading the Payload</p> <p>Unlock the clips by pressing PUSH on the clips. Place the package in the payload compartment. Secure the package by locking the security clips on each side of the payload compartment.</p>  <p>Figure 34: Security Clips</p>

Question	Description
<i>Have you loaded the batteries?</i>	<p>Starting from the left side, load Battery 1 into the battery bay with the number upright and tag facing out. Repeat in order for all four batteries. Slide the batteries until they firmly connect with the terminal. Rotate the red clips to the lock position.</p>  <p>Figure 35: Loading Batteries</p>
	 <p>Figure 36: Battery Lock</p>
<i>Is the RPA door locked and secure?</i>	<p>Once the batteries and packages have been loaded, close the RPA door. Ensure the locks are rotated to the lock position.</p>  <p>Figure 37: Locking RPA Door</p>

4. Exit the DroneSpot™ and close the door.
5. If the DroneSpot™ is clear and ready for takeoff, answer **YES** to the final question on the exterior DroneSpot™ interface.



Be Advised: The DroneSpot™ will give an audio warning through the speakers.

3.4 Receiving an Outbound Shipment

Once the shipment has reached its destination, it is the RPA Handler's responsibility to remove the shipment from the RPA.

Getting started

Before starting this procedure, ensure:

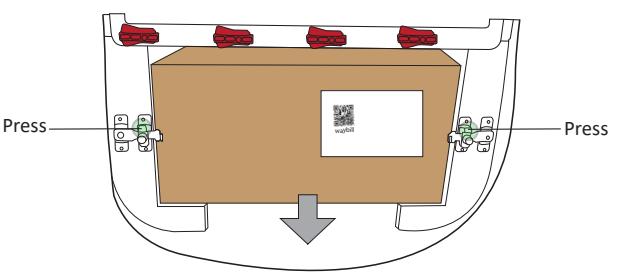
- The RPA has landed, and the DroneSpot™ is safe to enter.
- You are the RPA Handler.
- Flyte has sent you a message indicating that the shipment has arrived.



Note: The RPA Handler is the only role qualified to receive the shipment.

To receive the shipment

1. Go to the DroneSpot™.
2. Enter the assigned RPA Handler PIN on the keypad to unlock the door, then enter the DroneSpot™.
3. Answer the following questions on the interior DroneSpot™ interface.

Question	Description
<i>Have you offloaded the payload?</i>	Unfasten the security clips on each side of the payload compartment by pressing the top latch. Refer to "Figure 34: Security Clips" on page 27. Remove the package with the secured waybill from the payload area of the RPA located under the batteries.  <i>Figure 38: Removing Payload</i>

Question	Description
<i>Is the RPA in good condition?</i>	Perform a physical and visual inspection of the RPA. Ensure all components have remained in good condition, are securely in place, are correctly placed, and are free of any cracks or nicks.
<i>Is the umbilical cap closed and secure?</i>	Plug the umbilical into the RPA. Refer to “Figure 13: Insert Umbilical” on page 19.

4. Exit the DroneSpot™ and close the door.
5. Scan the waybill. Refer to “Figure 27: Scan the Waybill” on page 24.
6. Answer the final question on the exterior DroneSpot™ interface.

3.5 Returning an Inbound RPA

After a shipment is complete, the RPA will need to return to its origin depot location.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler.
- Flyte has sent you a message to return the RPA.
- Flyte has sent you a message to bring batteries.



Note: The RPA Handler is the only role qualified to return the RPA.

To return the RPA

1. Go to the DroneSpot™.
2. Enter the assigned RPA Handler PIN on the keypad to unlock the door, then enter the DroneSpot™.
3. Answer the following questions on the interior DroneSpot™ interface.

Question	Description
<i>Are the propellers free of any cracks or nicks?</i>	Inspect all 8 propellers to ensure they are suitable for flight. They should be free of any cracks or nicks. This can be ensured by running your hand along them. If you notice any damage, notify DDC as they must be replaced by a certified technician. Refer to “Figure 29: Propeller Inspection” on page 25.
<i>Have you inspected the top and side covers?</i>	Perform a physical and visual inspection of the covers to ensure they are secure and won’t come loose during flight.
<i>Have you inspected the antennae?</i>	Refer to “Figure 31: RPA Antennae” on page 26.
<i>Have you replaced the propulsion batteries?</i>	<p>Starting from Battery 4, unload the batteries in descending numerical order. Place the old batteries in the carrying case.</p> <p>Starting from the left side, load Battery 1 into the battery bay with the number upright and tag facing out. Repeat in order for all four batteries. Slide the batteries until they firmly connect with the terminal. Rotate the red clips to the lock position. Refer to “Figure 17: Loading Batteries” on page 20.</p>

Question	Description
<i>Is the RPA door locked and secure?</i>	Ensure the RPA door is locked. Refer to “Figure 37: Locking RPA Door” on page 28.
<i>Is the umbilical cap closed and secure?</i>	Ensure the umbilical is disconnected. Refer to “Figure 15: Unplug Umbilical” on page 19.

4. Exit the DroneSpot™ and close the door.
5. Answer the final question on the exterior DroneSpot™ interface.

3.6 Receiving an Inbound RPA

After the RPA returns to the original depot location, the RPA Handler must receive the returned RPA.

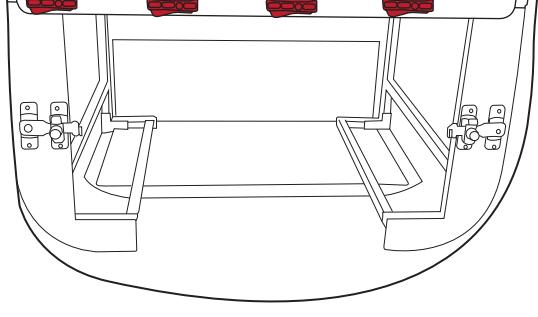
Getting started

Before starting this procedure, ensure:

- The RPA has landed, and the DroneSpot™ is safe to enter.
- You are the RPA Handler.

To receive the returned RPA

1. Go to the DroneSpot™.
2. Enter the assigned RPA Handler PIN on the keypad to unlock the door, then enter the DroneSpot™.
3. Answer the following questions on the interior DroneSpot™ interface.

Question	Description
<i>Confirm that the payload compartment is empty?</i>	Open the RPA door. Inspect the payload area located under the batteries. Remove contents if necessary. Close and lock the RPA door. 
<i>Is the umbilical cap closed and secure?</i>	Plug the umbilical into the RPA. Refer to “Figure 13: Insert Umbilical” on page 19.

4. Exit the DroneSpot™ and close the door.
5. Answer the final question on the exterior DroneSpot™ interface.

3.7 End of Day Procedure in Flyte

Use Flyte to initiate the ‘End of Day’ procedure to prepare the DroneSpot™(s) for the end of the business day.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler at the depot.
- DroneSpot™(s) are powered ‘ON’, accessible over the Internet, and online.
- You’re using an Internet connected device with Google Chrome.

To perform the ‘End of Day’ Procedure

1. Login to Flyte at <https://flyte.dronedeliverycanada.com> and enter your username and password.
2. Select **Start/End Day** from the left side menu. Ensure the **End of Day** toggle switch on the top right of the screen is selected.
3. Select the DroneSpot™(s) to take offline.
 - a. Select the DroneSpot™(s) to take offline by selecting the check box.

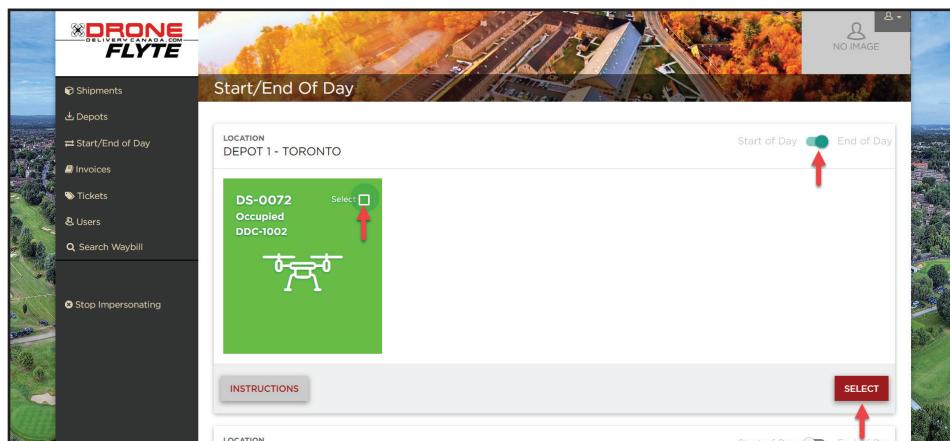
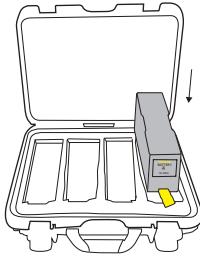


Figure 40: DroneSpot™ Selection - End of Day

- b. Press the **Select** button.
- c. Press **OK** to confirm the selection.
4. Close the DroneSpot™.
 - a. Head to the DroneSpot™ taken offline in step 3.
 - b. Enter the assigned RPA Handler PIN on the keypad to unlock the door. Refer to “Enter the Assigned RPA Handler PIN” on page 18.
 - c. Enter the DroneSpot™ and answer the following questions on the interior DroneSpot™ interface.

Question	Description
<i>Have all propulsion batteries been removed?</i>	<p>Open the RPA door and place the red clips in the unlock position. Slide each battery out of the slots in descending numerical order (starting from 4) and place in the carrying case. For detailed instructions, refer to “4.11 Removing the Batteries from the RPA” on page 52.</p> 
<i>Have the RPA boom arm lights turned off??</i>	<p>To complete the End of Day procedure, the boom arm lights must turn off after removing the batteries.</p>
<i>Is the umbilical cap closed and secure?</i>	<p>Remove the umbilical from the RPA. Refer to “Figure 15: Unplug Umbilical” on page 19.</p>
<i>End of Day Complete. Press YES.</i>	<p>Ensure all the tasks are complete and press YES on the DroneSpot™ interface.</p>

- d. Retrieve the RPA.
- e. Exit the DroneSpot™ and close the door.
- f. Answer the final question on the exterior DroneSpot™ interface.



Note: The DroneSpot™ will put itself into an ‘Idle’ state and will then be ‘offline’.

- 5. Repeat step 4 for any other DroneSpot™(s) brought offline in step 3.
- 6. After all DroneSpot™(s) have been taken offline, log out of Flyte.



Be Advised: In the event of severe weather, DDC may ask you to shut down the DroneSpot™ before the end of the business day.



Note: If the answer to any of the DroneSpot™ questions is **NO**, further instructions will be provided through Flyte. If the problem persists, Flyte will automatically contact DDC support.



Note: If the answer to any of these questions is **unknown** or **unclear**, contact DDC support by pressing the '#' symbol on the interior drone spot interface.

3.8 DroneSpot™ Maintenance

The condition and cleanliness of the DroneSpot™ is vital for safe RPA operations. It is the RPA Handler's responsibility that the DroneSpot™ is properly maintained.

Please complete and review the following items to maintain the DroneSpot™:

- Sweep the DroneSpot™ to clear any foreign objects and debris.
- Clear any water, snow, or ice from the DroneSpot™.
- Ensure the DroneSpot™ landing pads are **always** dry and clear of any debris.
- Ensure the DroneSpot™ electronics externals are dry.
- Check for any visible damage to the DroneSpot™ electronics externals and wiring.
- Clear any foreign objects and debris from the DroneSpot™ fencing/walls.
- Ensure the following two signs are on the DroneSpot™ walls:



Figure 42: DroneSpot™ Sign I



Figure 43: DroneSpot™ Sign II

For support, contact DDC at: (647)476-2662

Ensure the following security sign is in place at the perimeter of the flight area.



Figure 44: Security Perimeter Sign

3.9 Handling the RPA



Be Advised: Not following established standard operating procedures and utilizing improper RPA handling methods may result in serious injury to personnel or damages to the RPA or impact safety of flight.

When moving the Sparrow with one person, lift the RPA on the Boom Arm Connectors that are diagonally across from each other. Refer to “Figure 45: Lifting the Sparrow”.

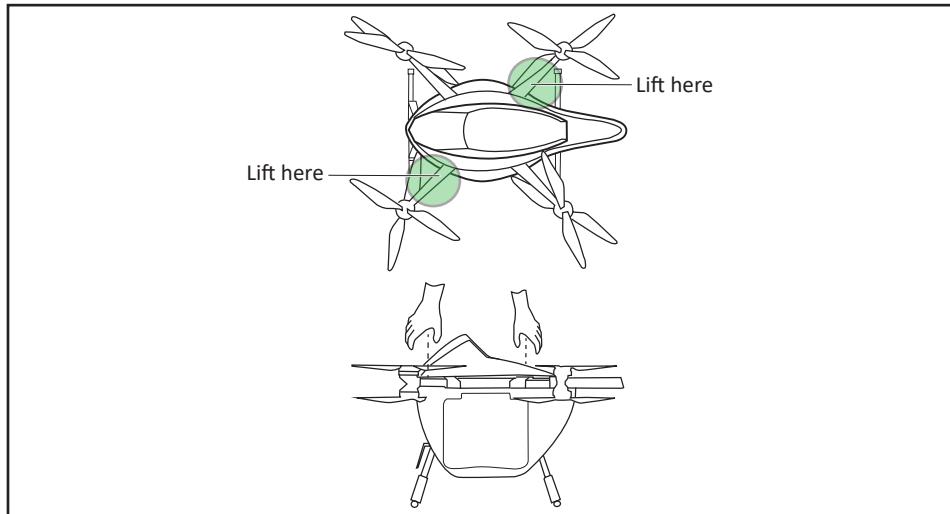


Figure 45: Lifting the Sparrow

If two people are required, lift the RPA by the side boom arms. Refer to “Figure 46: Lifting the Sparrow (Two People)”.

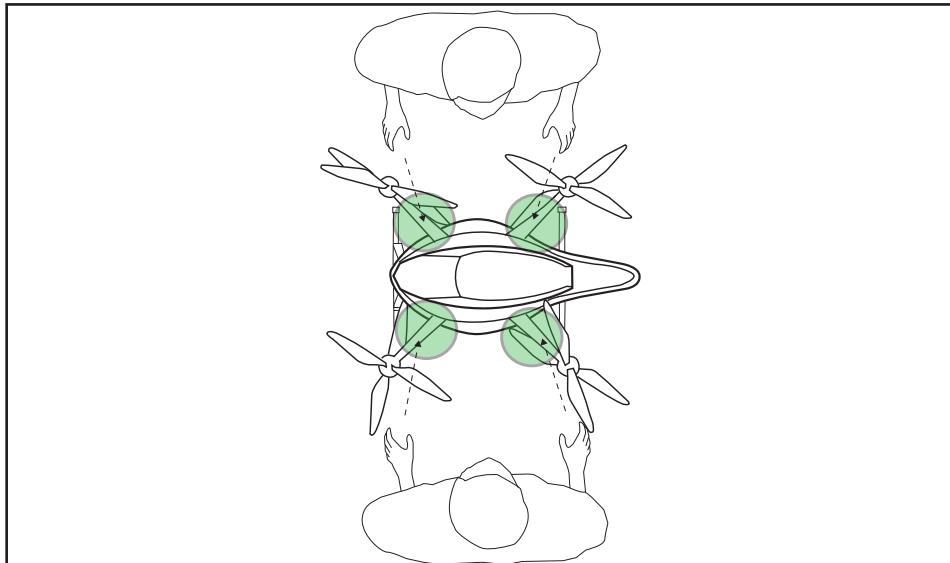


Figure 46: Lifting the Sparrow (Two People)

In the event the RPA does not have the boom arms attached, lift and carry the RPA by holding the inner boom arms. Refer to “Figure 47: Lifting the Sparrow Without Boom Arms”.

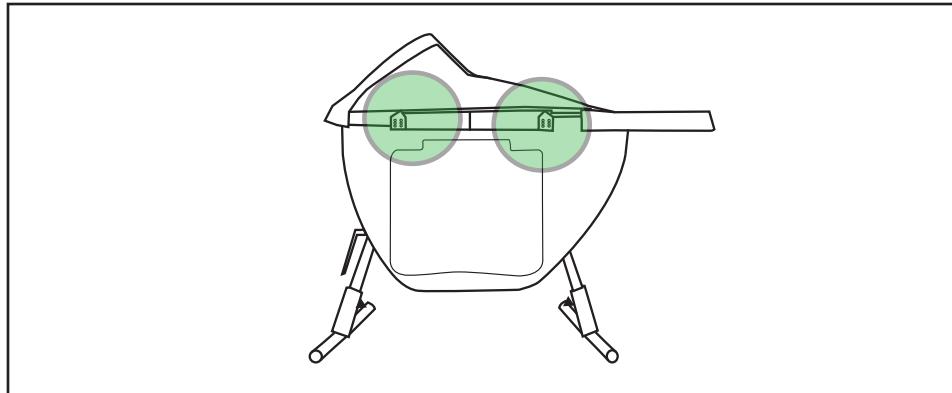


Figure 47: Lifting the Sparrow Without Boom Arms



Be Advised: Do not lift the RPA by the cowling. Always follow proper RPA handling procedures.

4. Battery Management

This section covers the following battery related topics:

- Introduction
- RPA Batteries
- Battery Safety
- Battery Charging Station
- Battery Type
- Battery Case
- Notifications
- Inserting Batteries into the RPA
- Removing the Batteries from the RPA
- Charging the Batteries
- Removing Batteries from the Charging Station

4.1 Introduction

Each origin depot is equipped with at least one battery charging station. The RPA Handler is solely responsible for all aspects of battery management. Flyte will instruct the RPA Handler with notifications. Each battery is equipped with an RFID to track its identification and duty cycle.

Flyte communicates with the charging station and the RPA Handler. The RPA Handler directly interacts with the charging station by removing discharged batteries from the RPA, inserting discharged batteries into the battery charging station, removing charged batteries from the charging station, and inserting charged batteries into the RPA.

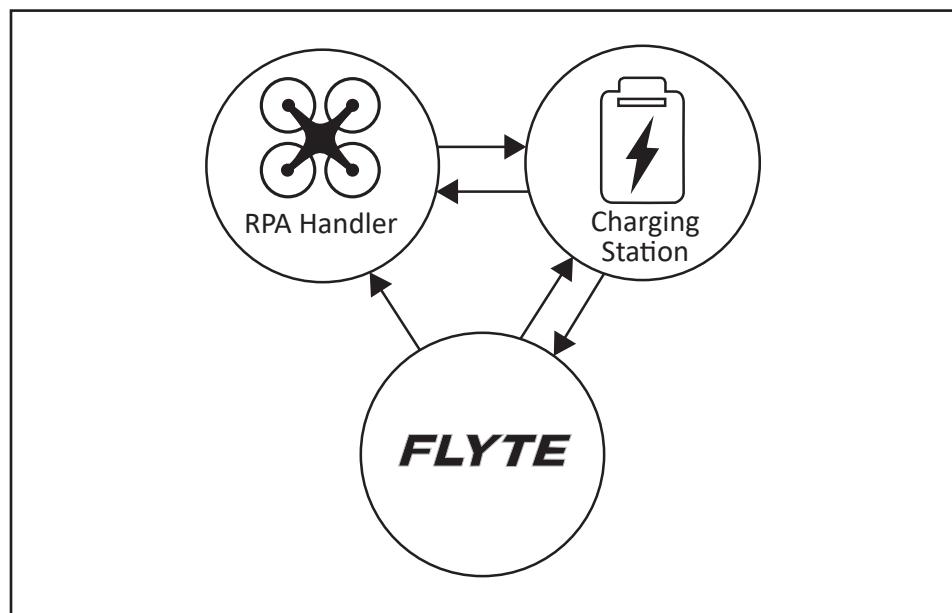


Figure 48: RPA Handler Battery Management

Each depot is equipped with a battery charging station that the RPA Handler will use to charge and discharge the batteries for the RPA. Flyte will direct the RPA Handler with a notification on when to charge or replace the batteries.

Flyte communicates with the charging station and the RPA Handler, while the RPA Handler directly interacts with the charging station by charging batteries, retrieving batteries, or discharging batteries.

The RPA Handler is solely responsible for using the battery charging station.

4.2 RPA Batteries

DDC batteries are specifically designed and manufactured to work with DDC RPAs. Ensure you have the correct batteries for the RPA.

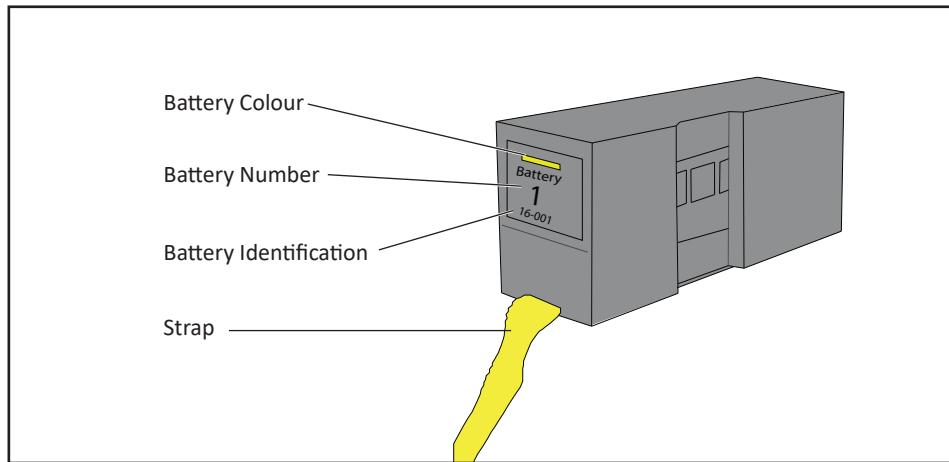


Figure 49: RPA Battery

Battery Colour: Indicates the type of battery. For more information on the different battery types see “4.6 Battery Type” on page 48.

Battery Identification: Indicates the set number and battery number to create a unique identification for each battery. Each set of batteries is built together and must always be used together.

Battery Number: Indicates the battery number in a set of four.

Strap: Used to pull batteries out the battery charging station and RPA. Always use the strap when removing batteries.



Be Advised: Batteries are susceptible to factors such as temperature or overcharging, which can affect their performance. Always inspect the batteries for any physical defects.

4.3 Battery Safety

Proper battery loading/unloading is done only by a qualified RPA Handler and is essential to the safety of all staff and ensures proper operation of the aircraft. Failure to comply with the proper battery handling procedures could result in injury or damage to the RPAS aircraft.

The RPA batteries are composed of Lithium Polymer (LiPo) which can catch fire if exposed to air. These batteries are susceptible to overheating or catching fire, particularly if they have been incorrectly handled or if they have been damaged.

In the case of a fire from or smoke coming from the RPA, follow the battery fire procedure below.

To put out a battery fire:

1. Extinguish fire.
 - a. If the RPA is safe to approach, extinguish the fire with a CO₂ or powder extinguisher.
 - b. If the fire is uncontrollable, call emergency services.
2. Disconnect the battery after the fire has been extinguished.
3. Place the battery in a fireproof container such as a LiPo safety bag.
4. Put the contained battery in an open area away from flammable materials for at least one hour.
5. Once the condition has been stabilized, remove the battery from the container.
6. Remove the battery from service.



A battery can still ignite after one hour. Ensure batteries that have been damaged by fire are properly disposed of.

4.4 Battery Charging Station

The battery charging station communicates with Flyte and lets the RPA Handler know what series of actions to take with the batteries. An overview of the charging station is as follows.

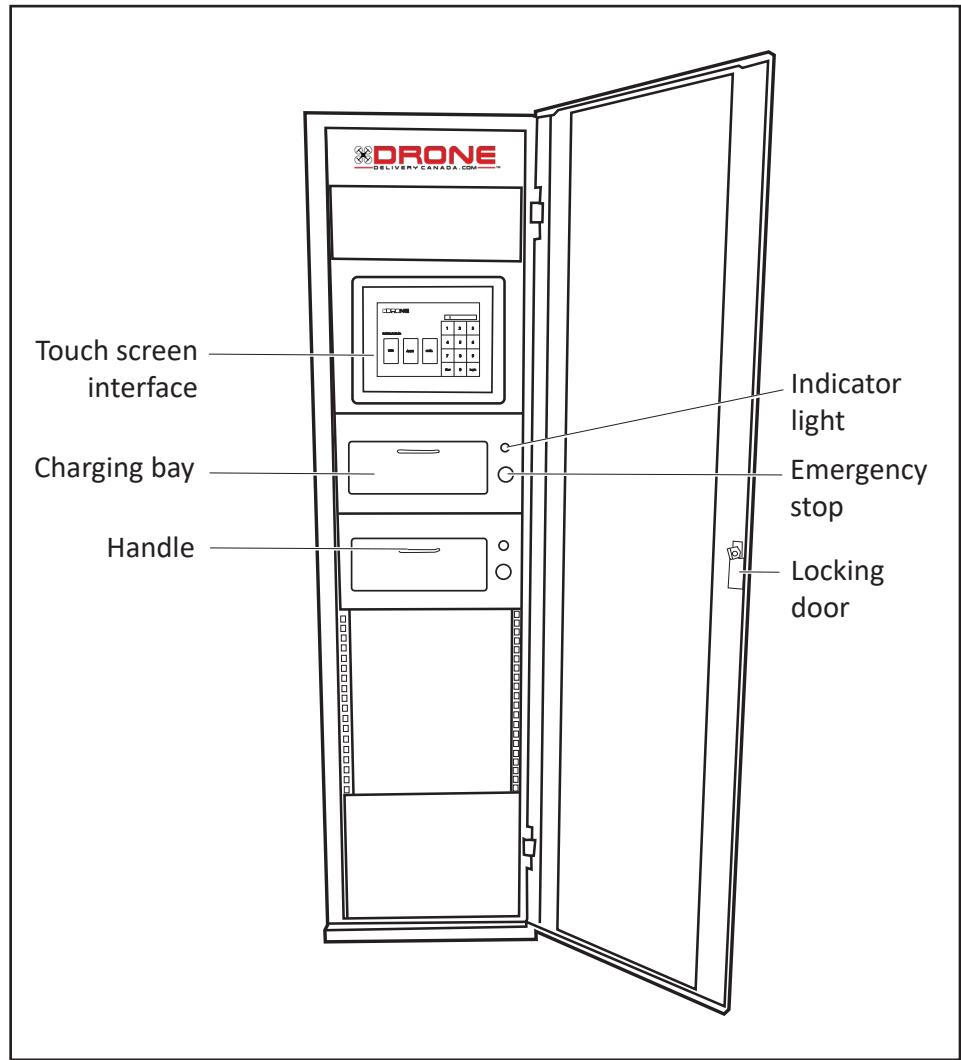


Figure 50: Battery Charging Station

Charging Station Indicator Lights

The indicator light appears to the right side of the battery bay and indicates the current status of that bay.

Light Colour	Status	Description
Yellow	Idle	In Admin mode, the batteries are currently being charged, stored, or discharged.
Green	Complete	The charger is currently idle or is occupied with a fully charged battery.
Flashing Green	Door unlocked	The charger bay has been unlocked after a correct PIN entry.
Red	Error or Charging	The emergency stop button has been pressed, or the charger is in an error state. The batteries are currently charging.
Flashing Red	Cannot Charge	The charger is currently occupied but one or more of the contained batteries cannot be charged.

4.5 Battery Charging Station Safety

To ensure proper operation of the battery charging station, follow these safety guidelines:

- Do not remove the upper or lower side covers of the charging unit. Make sure all external panels are closed and secured in place.
- Do not touch the any of the internal contacts.
- In the event of an emergency, press both emergency buttons at the same time to cut the main power. The indicator LEDs will turn red to confirm the power has been cut.
- When inserting a battery, ensure the battery slides smoothly into the sled without any resistance. The notches on the bottom sides of the battery must be inside the sleds.
- Make sure that sleds are clean and there is no mechanical resistance when inserting the batteries. If the battery does not slide smoothly into the sled, contact DDC.
- Ensure all connectors on the battery and in the charging bay are clean and dry.



Be Advised: DO NOT insert a battery if the connectors on battery or sled board are not clean and dry. This may cause the battery to short.



Be Advised: If you notice a issue or problem with the charging station, contact DDC before attempting to fix the issue.



Note: Pressing both emergency stop buttons at the same time will cut the main power to the battery charging station.

4.6 Battery Type

The Sparrow's battery characteristics are outlined in the table below.

Battery Colour	Power	RPA used in	Type
Yellow	16,000 mAH	Sparrow	Lithium Polymer



Be Advised: Ensure you have the correct batteries for the RPA. The wrong battery type may damage the RPA or battery charging station.

4.7 Battery Case

A battery case must always be used when transporting batteries. This includes transporting batteries over short distances such as from the DroneSpot™ to the battery charging station.



Figure 51: Battery Case

To use the battery case

1. Place batteries in the case with the straps facing forward. Partially tuck straps underneath the batteries to prevent them from sticking out of the case.
2. Place Battery 1 in the left slot. Repeat in order for Battery 2, Battery 3, and Battery 4.
3. Close the case and secure the latch at the front.

4.8 Notifications

Flyte communicates with the RPA Handler by sending email notifications that provide instructions for their next task.

Outbound Notifications

The outbound email notification instructs the RPA Handler to prepare the DroneSpot™ and RPA for an outbound flight.

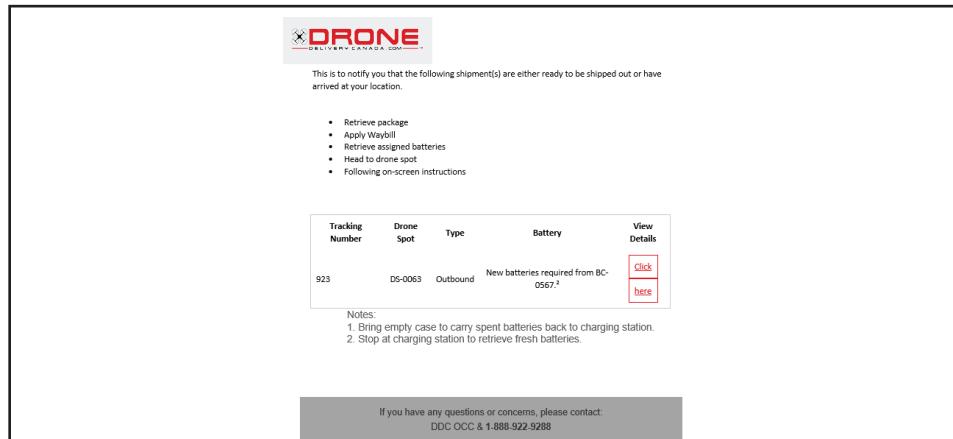


Figure 52: Outbound Notification

“Figure 52: Outbound Notification” instructs the RPA Handler to retrieve the assigned batteries from the charging station.

Inbound Notifications

The inbound email notification instructs the RPA handler to prepare the DroneSpot™ and RPA for an inbound flight.

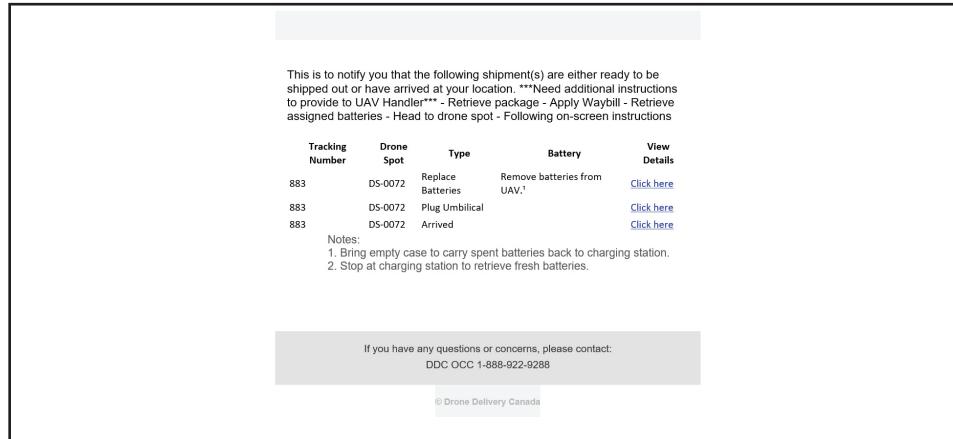


Figure 53: Inbound Notification

“Figure 53: Inbound Notification” instructs the RPA Handler to replace the batteries and plug the umbilical in the RPA.

4.9 When to Charge the Batteries

At the start of each day, two sets of batteries will be in the charger.

There will be multiple flights each day and it is important to alternate between the two sets of batteries. It is also important to give the batteries time to cool down between flights and before charging them again.

Before every Outbound/Inbound shipment, a fresh set of batteries should be inserted into the RPA.

The following table describes how to alternate between the two sets of batteries for flights.

Battery Set	Start of Day	Outbound/ Inbound Flight 1	Outbound/ Inbound Flight 2	End of Day
Set 1	Remove from charging station; bring for Start of Day tasks	Charge for 20 minutes	Remove from charging station; use in RPA; put in storage mode for 20 minutes after use	Put in storage
Set 2	Charge in the charging station	Remove from charging station; use in RPA; put in storage mode for 20 minutes after use	Charge for 20 minutes	Put in storage



Note: After the batteries have been used for a flight, it is important to put them in the charger in storage mode for 20 minutes so that they can cool properly before being charged again.

4.10 Inserting Batteries into the RPA

The RPA Handler will receive a notification from the Flyte system indicating the RPA needs charged batteries.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler.
- The DroneSpot™ is safe to enter.
- Flyte has sent the RPA Handler a message to bring/install batteries.

To insert the batteries in the RPA

1. Open the RPA door by turning the two bay latches to the open position. Refer to “Figure 16: Unlocking RPA Door” on page 20.
2. Move the red battery clips to the unlock position.

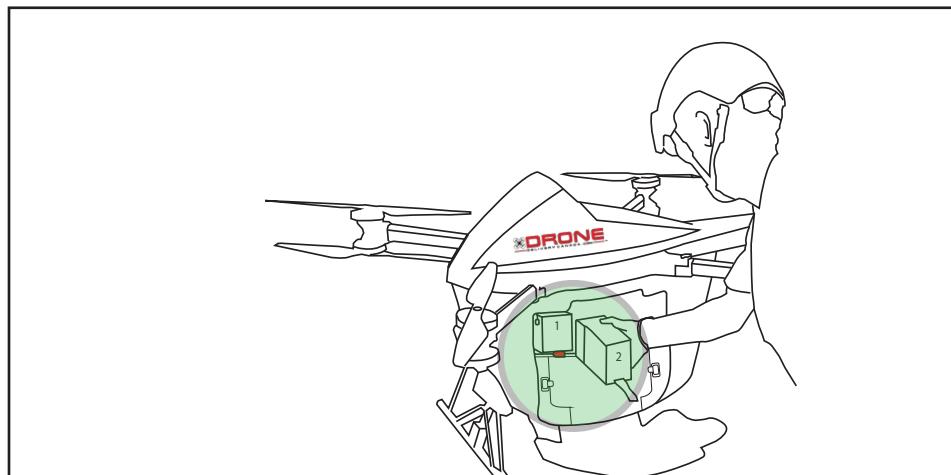


Figure 54: Inserting Batteries into RPA

3. Starting on the left-hand side with Battery 1, slide the battery in the charging bay labeled **Battery 1**. Ensure the battery label is facing outward.
4. Repeat with Battery 2, then Battery 3, then Battery 4.
5. Slide each battery in until they firmly connect with the terminal.
6. Rotate the red battery locks to lock the batteries in place.
7. Close the RPA door and lock it by turning the two latches to the closed position. Refer to “Figure 37: Locking RPA Door” on page 28.

4.11 Removing the Batteries from the RPA

The RPA Handler will receive a notification from the Flyte system indicating if the batteries in the RPA need to be removed.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler.
- The RPA has landed, and the DroneSpot™ is safe to enter.
- Flyte has sent the RPA Handler a message to remove the batteries.
- You have the designated carrying case for the batteries.

To remove the batteries from the RPA

1. Open the RPA bay door by turning the two latches to the open position. Refer to “Figure 16: Unlocking RPA Door” on page 20.
2. Starting on the right-hand side, turn the red battery clip to the unlock position.

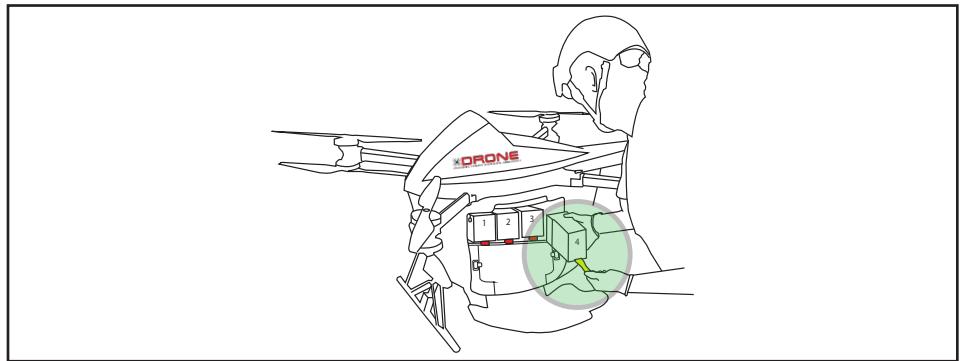


Figure 55: Removing Batteries from RPA

3. Pull the yellow strap and slide out Battery 4.
4. Place the battery in the battery carrying case.
5. Repeat steps 2, 3, and 4 in order, for Battery 3, Battery 2, and Battery 1.
6. Close the RPA door and lock it by turning the two latches to the closed position. Refer to “Figure 37: Locking RPA Door” on page 28.

4.12 Charging the Batteries

The RPA Handler will need to charge the batteries after two complete flight shipments, or four legs.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler.

To charge the batteries

1. Go to the Charging Station.
2. Select an unoccupied battery bay. It will be either battery bay 1 or 2.
3. Select **Unlock** on the touch screen. Wait for screen to flash green
4. Open the door of the corresponding battery bay.
5. Insert the batteries.
 - a. Starting on the left-hand side with Battery 1, slide the battery in the charging bay labeled Battery 1.
 - b. Push the battery in the slot until it is firmly in place with the yellow strap facing out and number upright.

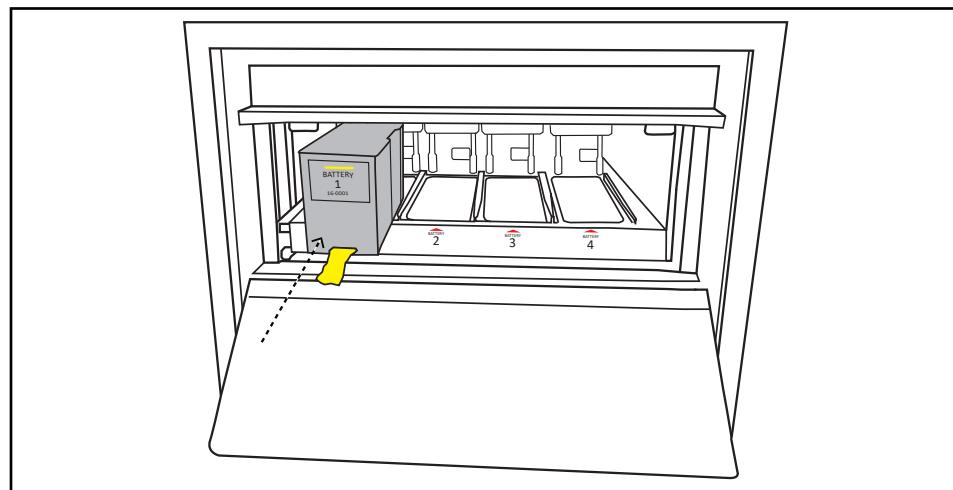


Figure 56: Battery Bays

- c. Repeat steps a and b for the remaining batteries, in order from Battery 2, Battery 3, then Battery 4.
6. Close the charging bay door.
7. Select **Charge** on the touchscreen.

The light beside the charging bay door will now show red indicating the batteries are charging.



Note: The charging station reads an RFID chip on each battery. If the batteries are not properly inserted, the charger will not read the RFID, and the screen will display an error message. You will need to reinsert the batteries to clear the message.



Be Advised: You have 15 seconds to open the battery bay door before it locks again.



Note: When placing batteries in either the RPA or the Charger, always start with Battery 1.

4.13 Removing Batteries from the Charging Station

When the Charging Station shows green, the batteries are ready to be removed.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler.

To remove the batteries from the charging station

1. Go to the Charging Station.
2. Select **Unlock** on the touch screen.
3. Open the battery bay door and remove the batteries.
 - a. Starting from the left-hand side, remove Battery 1 from the charging bay and place it in the battery carrying case. Ensure you put the battery in the correct slot in the case.
 - b. Repeat for Battery 2, Battery 3, and Battery 4.
 - c. Close the battery case.
4. Close the battery bay door.

4.14 Storing Batteries for the End of Day

At the End of Day, the batteries must be stored in the charger when not in use.

Getting started

Before starting this procedure, ensure:

- You are the RPA Handler.

To store the batteries in the charging station

1. Go to the Charging Station.
2. Select an unoccupied battery bay. It will be either battery bay 1 or 2.
3. Select **Unlock** on the touch screen. Wait for screen to flash green
4. Open the door of the corresponding battery bay.
5. Insert the batteries.
 - a. Starting on the left-hand side with Battery 1, slide the battery in the charging bay labeled Battery 1. Refer to “Figure 56: Battery Bays” on page 53.
 - b. Push the battery in the slot until it is firmly in place with the yellow strap facing out and number upright.
 - c. Repeat steps a and b for the remaining batteries, in order from Battery 2, Battery 3, then Battery 4.
6. Close the charging bay door.
7. Select **Store** on the touchscreen.

The light beside the charging bay door will now show red indicating the batteries are in storage mode.

Index

C

charging station 6, 45, 55
charging station indicator light 46
charging the batteries 53
compass check 21

D

depots 6
depot status 14
disconnect umbilical 27
drone 6
DroneSpots™ 6

L

landing gear 25

N

notifications 49

O

OCC 8

R

removing the batteries 52
RFID chip 54
RPA Batteries 43
RPA Handler PIN 18
RPAs 6

S

service ticket 12
Start of Day 17

U

UAS 6
UAV 6
umbilical cap 27

V

visual inspection 25, 32

