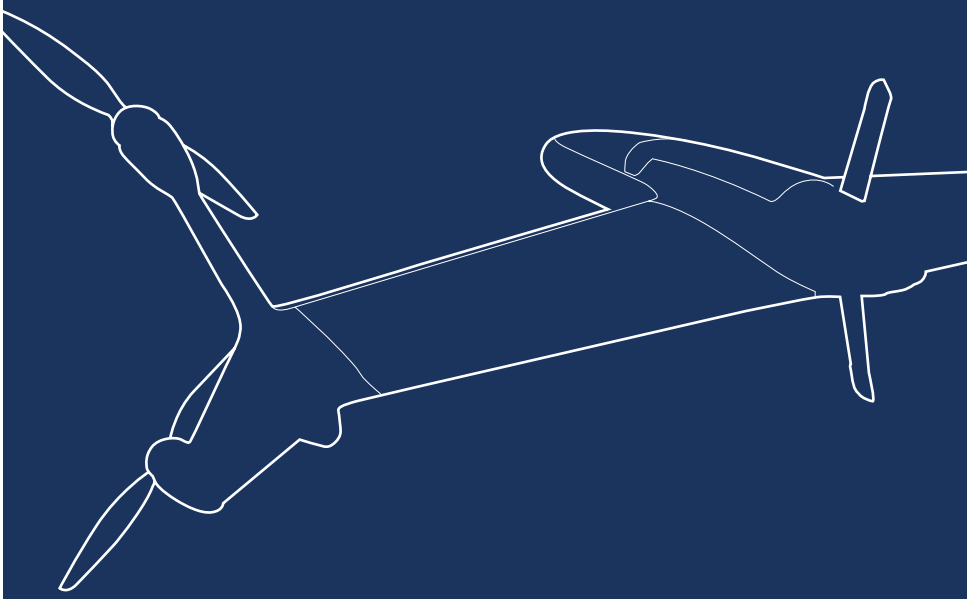
AeroVironment™

PROCEED
WITH
CERTAINTY

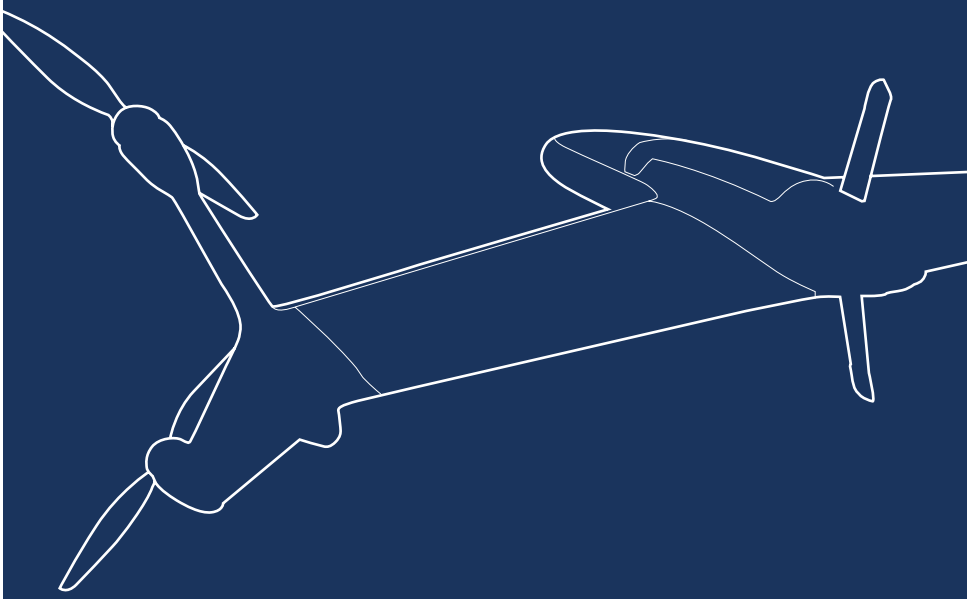


QUANTIX™ MAPPER

User Manual

AeroVironment™

PROCEED
WITH
CERTAINTY



QUANTIX™ MAPPER

User Manual

Table of Contents

AeroVironment™

Specifications

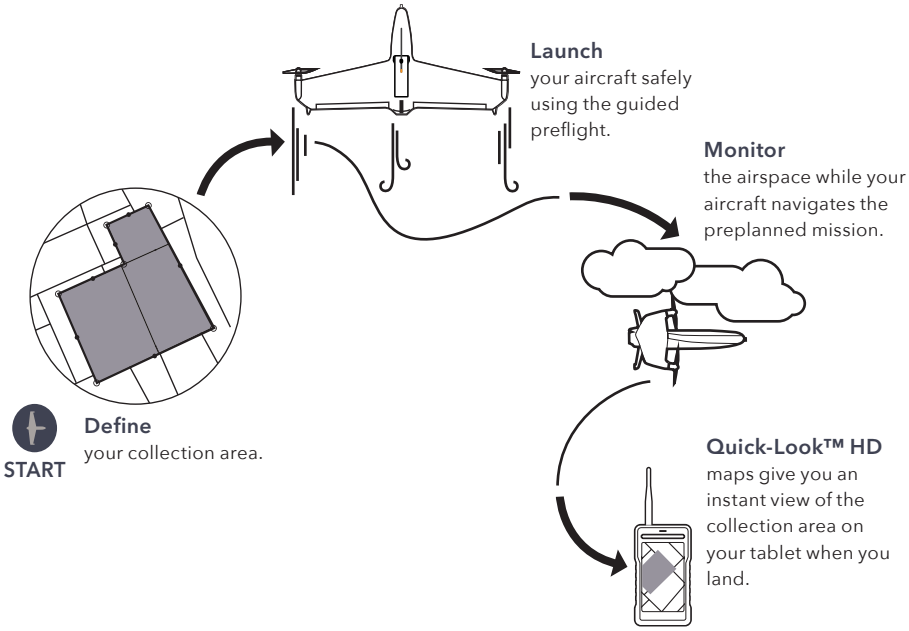
Parameter	Characteristic
Max Endurance	45 mins
Max Field Coverage Per Flight	400 acres
Range (out and back)	20 km, 2 km radio limit
Wingspan	3.2 ft (1 m)
Structure	Precision Molded Expanded Polyolefin Foam, Carbon Fiber, and Thermo Plastics
Weight (with battery)	5 lbs (2.3 kg)
Battery Type	Lithium Ion
Maximum Airspeed	45 mph (20 m/s)
Motor	4x Direct Drive Brushless Electric
Operating Temperature Range	0–120°F (-17–49°C)
Storage Temperature Range	60-100°F (16-38°C)
Acceptable Altitude Limits	0–7,500 ft altitude (0–2,286 m)
Fixed Operational Altitude	360 ft above ground level (110 m)
Launch and Landing	Vertical Tail Sitter
Wind Speed (sustained)	20 mph (9 m/s)
Ground Communications	SD Card and WiFi
Flight Communications	900 MHz Encrypted XBee Pro for US
Navigation	Automatic Waypoint Navigation
Camera Sensors	Simultaneous High Resolution 18MP True Color and Multispectral with incorporated ILS Solar Sensor

Welcome to Your Quantix™ Mapper Aircraft!

As the operator of your new unmanned aircraft, your primary tasks will be to define the collection area, ensure a safe launch, and monitor the airspace. Quantix™ Mapper will plot the best flight path for you automatically. Plus, the aircraft will automate launch and landing and navigate the preplanned route with three levels of override features to emergency-land your aircraft.

On-board processing instantly delivers georeferenced high-resolution imagery on the included operating tablet upon landing - no other devices, Internet or software required. Simply tap anywhere on the Quick-Look™ HD image to view that area in greater detail. Pinch and zoom to adjust the zoom level to centimeter accuracy.

AeroVironment Provides a Complete System for Rapid Automated Mapping

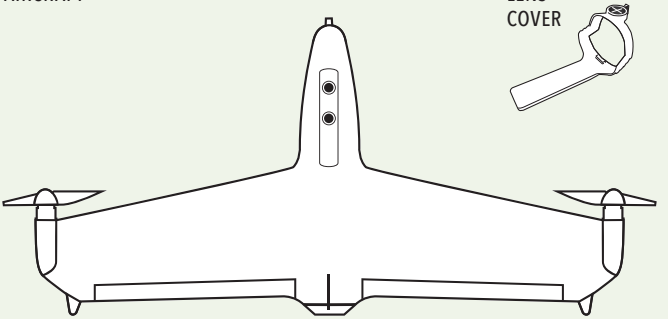


Get to Know Your Quantix™Mapper!

Quantix Mapper comes ready-to-fly right out of the box and can be deployed within 5 minutes capturing critical information quickly and accurately. With a simple swipe of a button, Quantix initiates a fully automated takeoff, flight and landing, allowing for a completely hands-free data collection. The aircraft's innovative vertical take-off and landing (VTOL) hybrid design has a range of 20 km out and back on a 45-minute single battery flight. With built-in dual 18MP cameras, Quantix Mapper simultaneously captures true color and multispectral imagery.

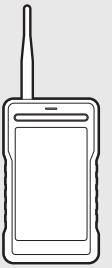
Let's start with what arrived in your reusable Quantix shipping case:

AIRCRAFT

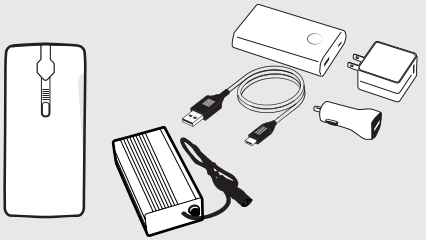


LENS COVER

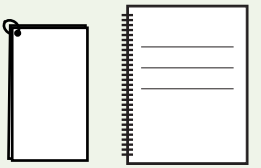
TABLET



AIRCRAFT BATTERY & CHARGER, TABLET CHARGER



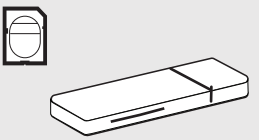
QUICK START GUIDE & USER MANUAL



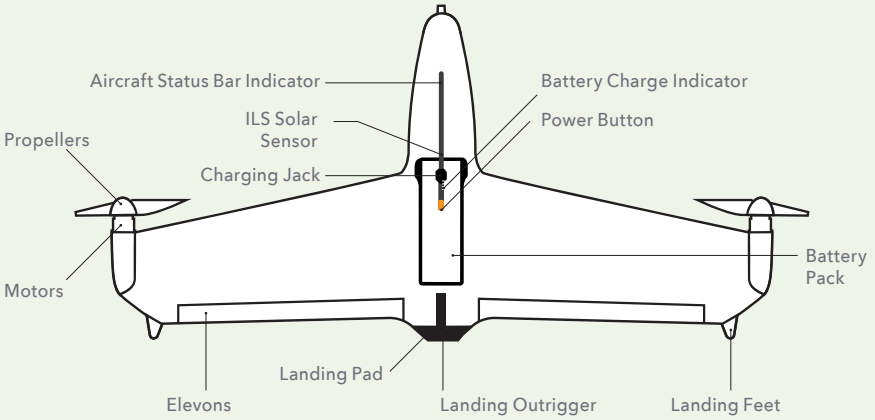
LENS CLEANING KIT

SPARE PROPS

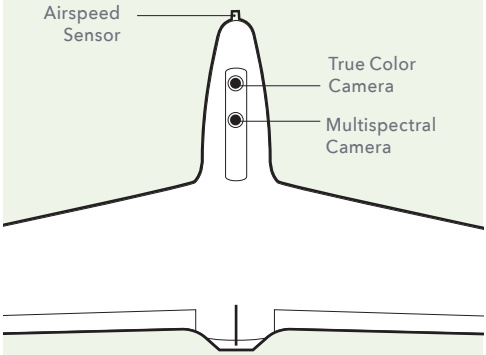
FLIGHT SD CARD AND CARD READER



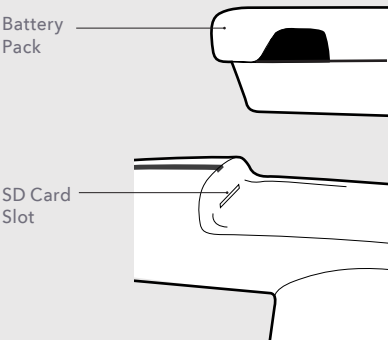
TOP OF AIRCRAFT



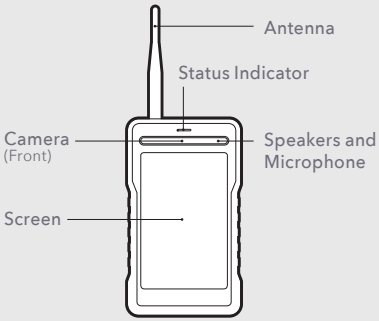
BOTTOM OF AIRCRAFT



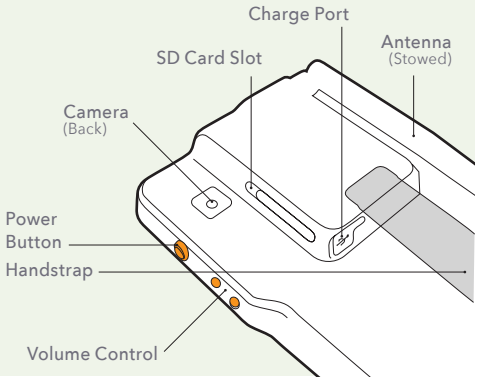
AIRCRAFT BATTERY AND SD CARD



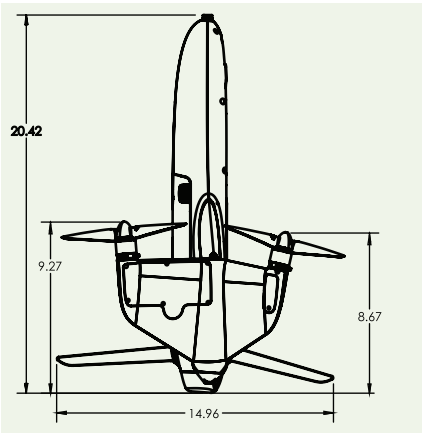
FRONT OF OPERATING TABLET

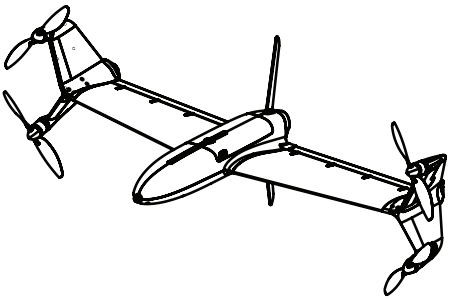


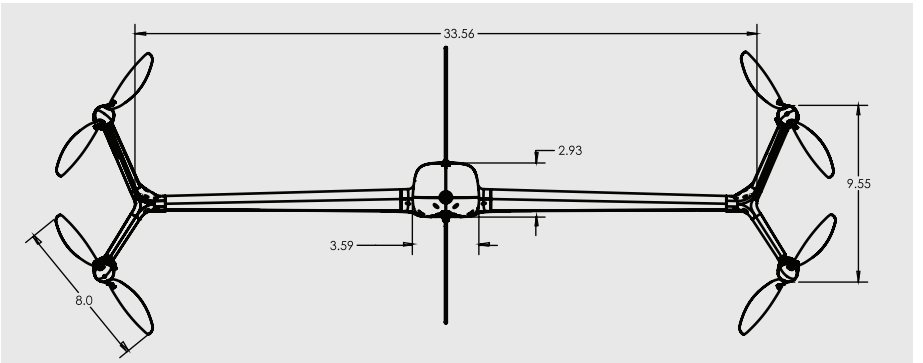
BACK OF OPERATING TABLET

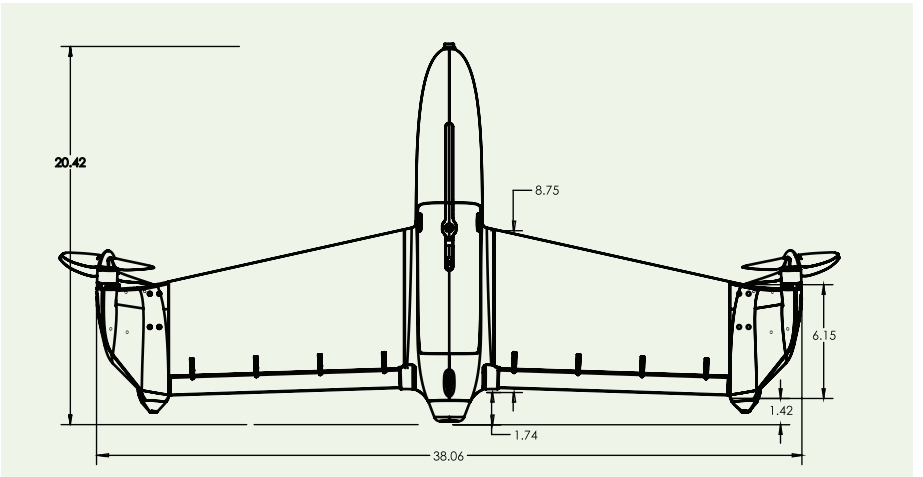


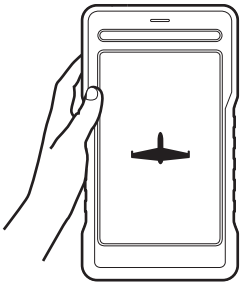
Your Quantix Mapper Defined!











First Time Tablet Setup

Your tablet will require a short setup before using it for the first time. A ©Google account is required to access the Google Play store, which is used for updating the Quantix Mapper application. Visit www.google.com to create an account.

Follow these Setup Steps:

1. Power on the tablet and select your language.
2. If a wireless connection is desired, select a Wi-Fi network and enter the Wi-Fi password. The tablet will check for software updates and will update if necessary.
3. Once the tablet is updated, enter your Gmail e-mail address and password.
4. Agree to the Google terms and conditions.
5. Enter your name into your tablet.
6. Check desired list items for Google service.
7. Agree to the NVIDIA license agreement.

Your tablet is now set up and ready to use. Be sure to fully charge your tablet before the first use with the Quantix Mapper application (see page 15 for tablet charging details).

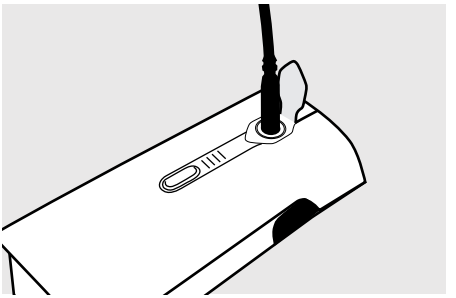
Quantix tablet includes a full-fledged Android™ tablet that has been optimized for graphics. As a result, you may get alerts for graphics and game-related content. This is normal behavior from the tablet manufacturer. Although you are free to install other applications, it is recommended that you do not run memory or storage-intensive applications. **This can adversely affect the Quantix system operation.**

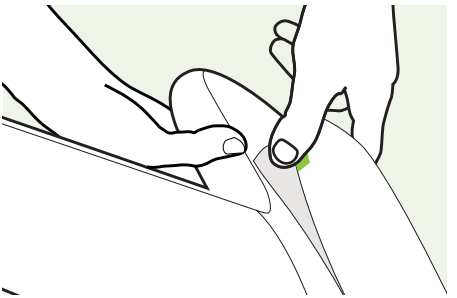
First Time Aircraft Setup

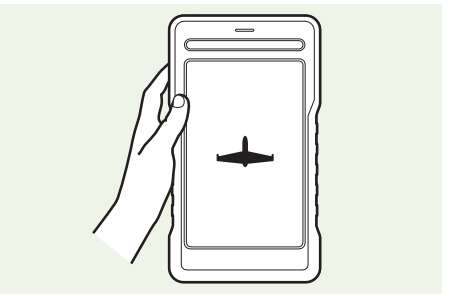
Your Quantix Mapper aircraft has been designed to minimize the setup process.

Follow These Setup Steps:

1. Unpack and inspect your Quantix Mapper aircraft.
2. Plug the charger into the battery (see page 14 for charging details). Once battery is fully charged, disconnect from charger.
3. Install a fully charged battery in the aircraft and power it on by pressing and holding the power button until the main light bar on the top of the aircraft illuminates.
4. Launch the Quantix Mapper app (see page 18 for more information regarding software updates).
5. Power down the aircraft by pressing the power button on the battery for three seconds. All lights on the main light bar will turn off.







Learn All You Can

Be sure to learn all you can before flying your aircraft.
Visit the Quantix Help Resources Page to watch tutorial videos on:

- Get to Know Your Quantix Mapper
- Before Going to the Field
- Add a New Collection Area

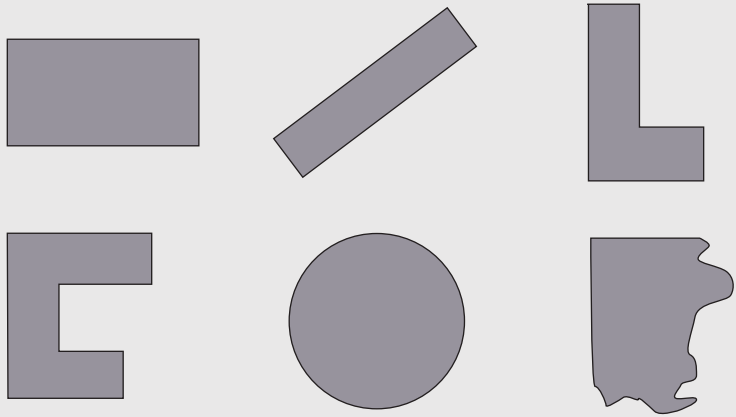
https://www.avinc.com/Quantix-Mapper

Defining Collection Area Shapes

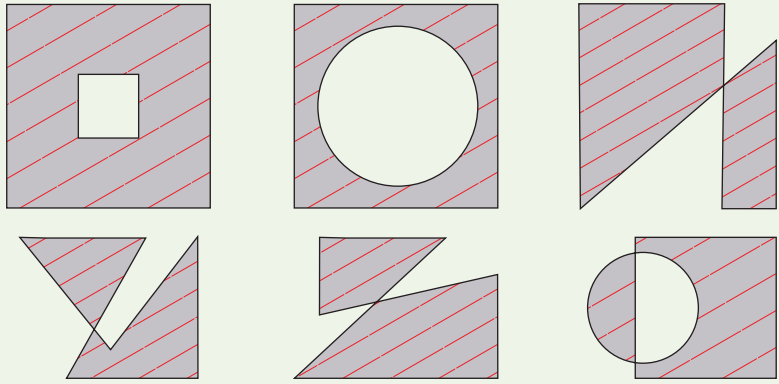
The Quantix Mapper Mission Planner has been tested on a variety of shapes and areas. The examples below will help you select a reliable shape for the Quantix Mapper Mission Planner.
In general, your collection area should be:

- A closed polygon with no "holes"
- Fewer than 100 points or corners
- As simple as possible to perform

Recommended



Not Recommended



Choosing Your Launch Location

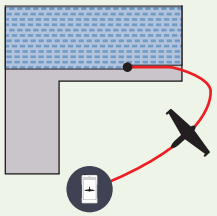
There are many options on where to place your Quantix Mapper for launch. This location will be considered 'Home.'

In general you want to choose a location that is:

- Flat and even ground
- Clear of all obstacles within a 50 ft. radius

Choose the Best Launch Location

Not Great

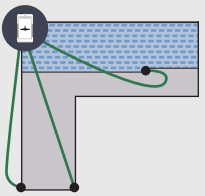


A Return Home Path Could:

- Fly over adjacent areas
- Fly into an unsafe area
- Fly into an undesirable zone

This launch location results in long Return Home paths outside the area.

Better

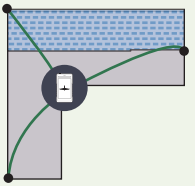


Any Return Home Path Would:

- Fly over intended areas
- Fly in a safe area
- Not fly in an ideal path

This launch location at least keeps return paths over more of the area.

Best



Centrally-Located All Return Home Paths:

- Have best line-of-sight
- Fly directly over intended areas
- Fly in a safe area

This ideal launch location is also centrally located to minimize the time to execute a Return Home.

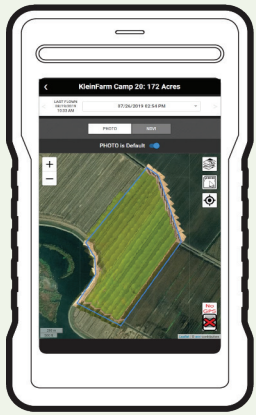
Use Your Best Judgment – Select the best possible launch location based on obstacles, neighboring fields, and prevailing winds.

Quick-Look™ HD

Investigate high-resolution NDVI and True Color right on the Quantix Mapper tablet.

First View

Quick look



Second View

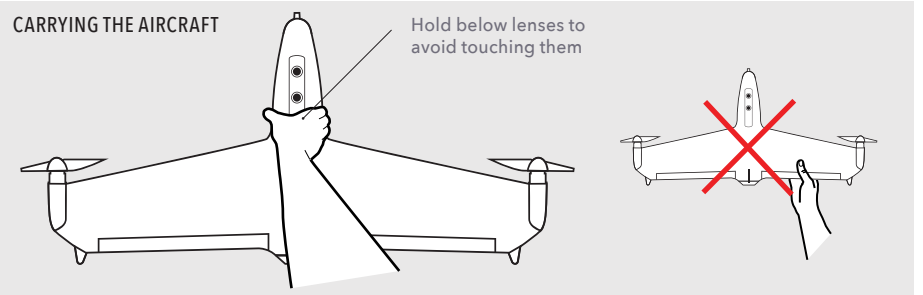
Clicking a spot pulls up georeferenced high-resolution images.

Third View

Pinch and zoom navigation to see every detail.

Handling the Aircraft

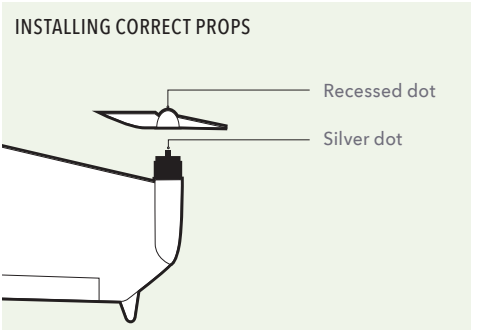
Always carry the aircraft by the fuselage (nose of the aircraft). Never try to carry it by the wings, propellers, or elevons. Improper handling may damage the aircraft.

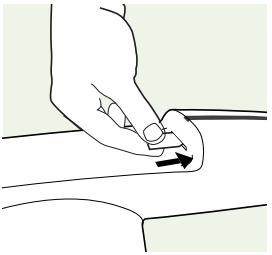


Install the Props

Install each prop by turning it in the direction indicated by arrows on the prop until firmly seated against motor.

Install the props with recessed dots onto the shaft of the motors with silver dots.



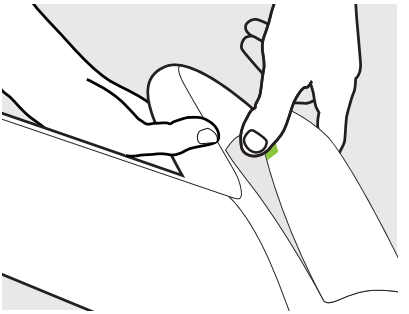


Install the flight SD Card

Install the SD Card by inserting into the aircraft flight SD slot.

Install the Battery

Install the battery pack by placing it into the cavity located on top of the aircraft. Press down and listen for a "click" sound to ensure it's locked in place.



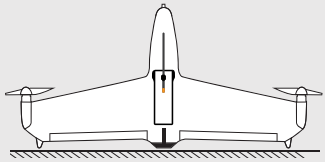
Always fully charge the battery before flying.

1 Launch/Land Location

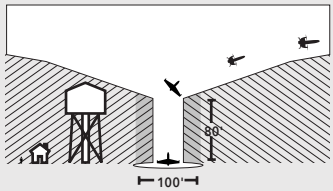
Place aircraft in an upright position near collection area. This will be the launch/land location and must have a minimum of 15 feet clearance around aircraft with a suggested safety buffer of 50 feet in every direction. This area must remain clear the entire duration of flight. The aircraft will launch vertically from this location to an elevation of 100 feet before switching to forward flight mode.

- Ensure all objects are at least 50 feet away from aircraft
- Ensure all objects that are over 80 feet tall are at least 100 feet away from the launch/land location
- Remove orange lens cover before flight

UPRIGHT AIRCRAFT FOR TAKEOFF



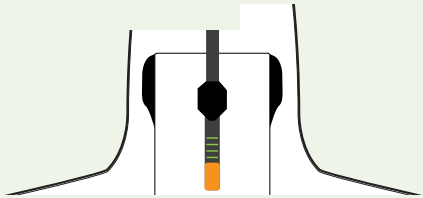
OBSTACLE CLEARANCE ZONE



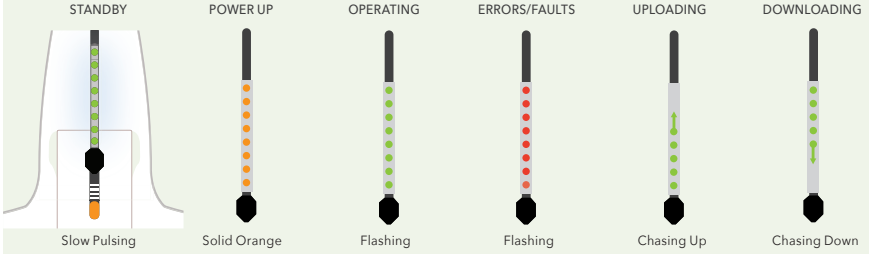
2 Power Up

Press and hold the power button to power on the aircraft. Wait for the aircraft status indicator to illuminate orange.

BATTERY INDICATOR LIGHTS



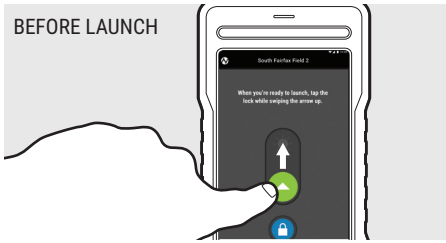
Aircraft Status Indicator



3 Conduct a Preflight Check

Open the Quantix application, login, and tap "Fly Now" for the desired collection area to start preflight check. The Quantix application will guide you through a preflight check and launch procedure, including a final confirmation swipe commanding the aircraft to launch.

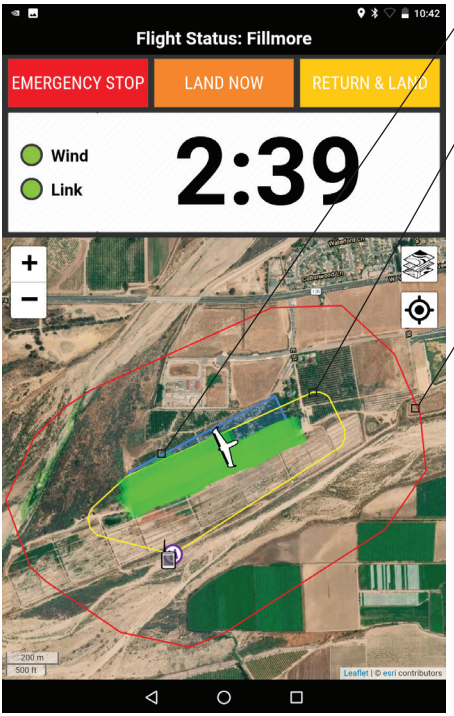
BEFORE LAUNCH



During Airspeed Sensor Check – Ensure thumb completely covers and seals sensor port on nose of aircraft.

What You Are Seeing

While your Quantix is flying, it provides you with information regarding its status. Examples are: flight time remaining, images taken, and aircraft location.

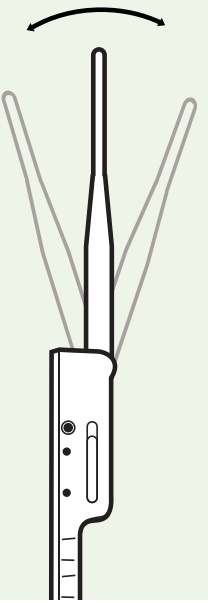


- Blue: Collection Area
  - The user-defined area Quantix flies while collecting images
- Yellow: Flight Area
  - The area Quantix flies in; includes launch and landing, flying to and from the collection area, and while collecting images
- Red: Flight Boundary
  - Quantix lands immediately if the the flight boundary is reached

Keeping a Strong Connection

To ensure a strong connection between the tablet and aircraft, the antenna should be directed towards the sky at all times.

KEEPING A STRONG CONNECTION

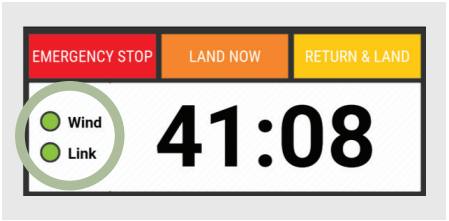


Your Job is to Monitor the Sky

The aircraft is programmed to select the best path for your field, launch and land as positioned by you, and fly according to your predefined flight area or path. Your primary task in the field is to maintain safe operations by monitoring the airspace for any possible conflicts in accordance with local airspace regulations.

Stop Lights

Your Quantix Mapper will update you on the status of the wind speed and the link from its current location and altitude.

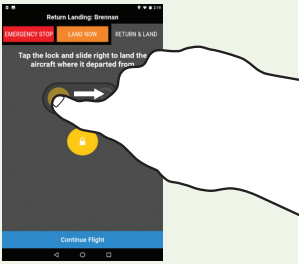


- Green: Conditions are good.
- Yellow: Conditions are less than ideal, but manageable.
- Red: Conditions are bad. Consider overriding your flight.

Three Ways to Override Your Flight

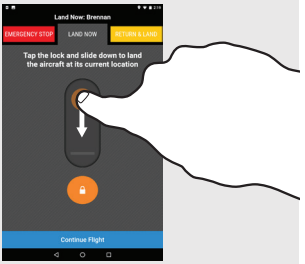
Return and Land

To cancel current flight, use 'Return & Land' option. It will cancel current flight and return aircraft to the landing location and land.



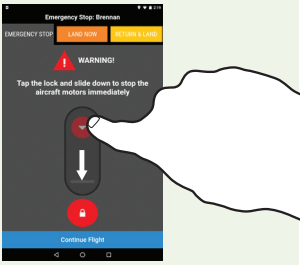
Land Now

The immediate maneuver for landing is the 'Land Now' option, which will land the aircraft at its current location.



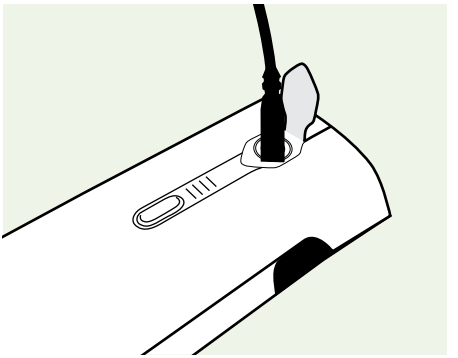
Emergency Stop

As a last resort option, 'Emergency Stop' may be selected. The aircraft motors will immediately stop functioning, and the aircraft will free-fall from the sky.

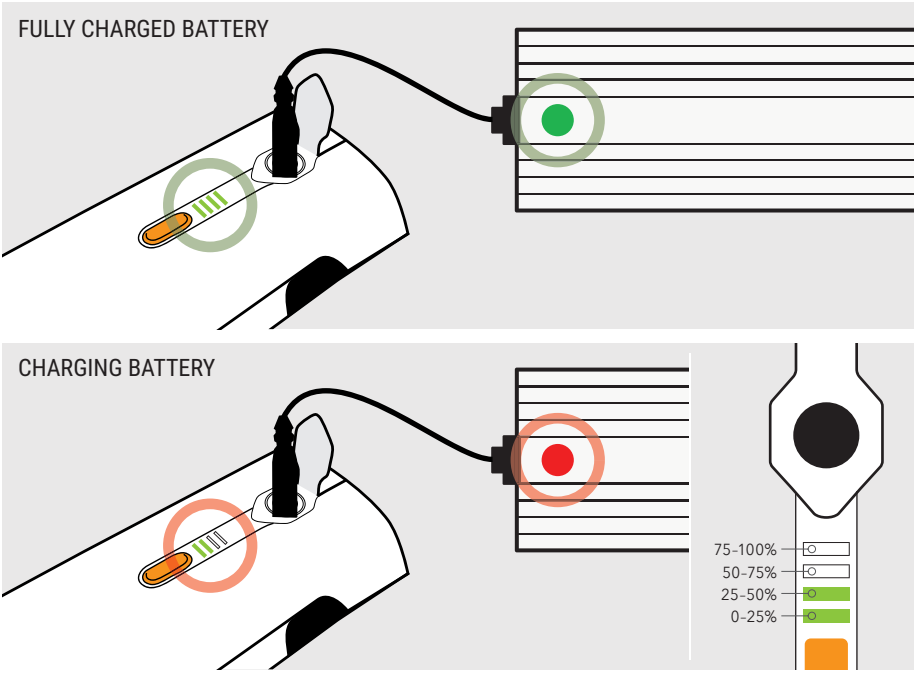


1 Charge the Aircraft Battery

Remove battery from aircraft. Lift the flap on the charging jack to access the charging port. Plug in the aircraft charger to the battery and wall outlet to begin charging. The first charge may take up to 4 hours.



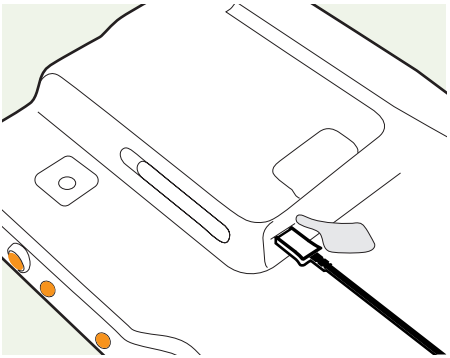
Be Ready to Fly with a Fully Charged Battery



To check your battery charge state, press the power button for one second; battery charge will temporarily display for approximately three seconds.

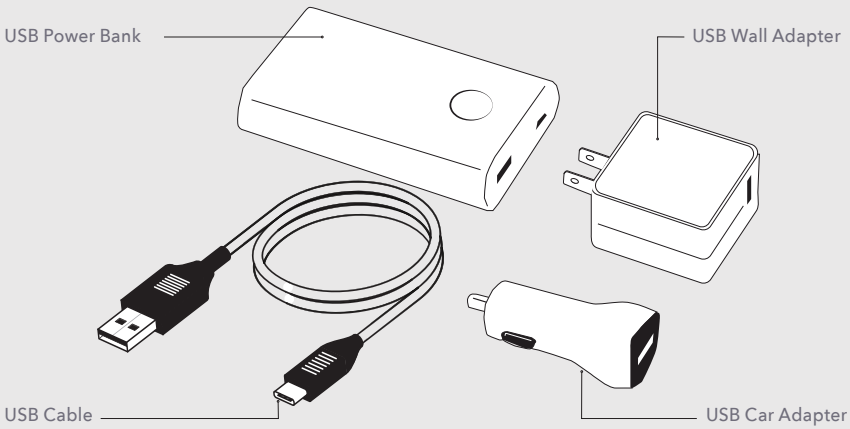
2 Charge the Tablet Battery

The tablet charging jack is located on the back side of the tablet. The tablet may be charged using the wall, car, or portable chargers included in your charging kit. The first charge may take up to 2 hours.



Charging Accessories

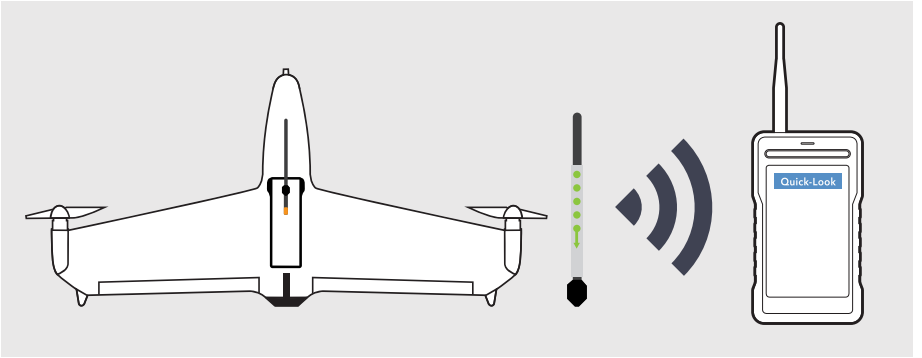
Your Quantix tablet comes with a variety of charging options for use in the field, home, or office. The battery chargers will require plug adapters if not using a 110V AC power source.



Charge while tablet is powered off for best charging results.

Taking a Quick Look

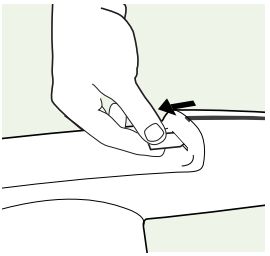
Wait for the Quick-Look bar to turn blue after the aircraft lands. Tap Quick-Look to view the low resolution imagery.



Note:

Do not power off the aircraft until the "See Quick Look" bar appears, indicating that transfer of the low resolution Quick-Look to the tablet is complete.

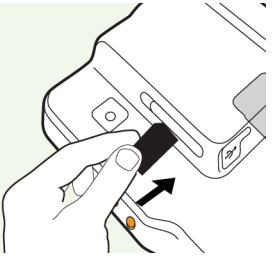
Viewing High-Resolution Imagery



Move SD Card to Tablet

Push in to release the Flight SD Card from the aircraft SD slot.

Remove the Flight SD card and insert into the tablet SD slot.



Quick-Look HD

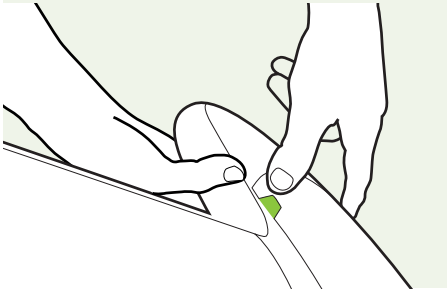
View your high-resolution georeferenced imagery on the tablet's Quick-Look HD App. No other devices, Internet or software required.

The time to process the Quick-Look will vary depending on the size of your collection area.

Changing the Battery

While gripping the fuselage, squeeze the tabs on both sides of the battery. Lift the battery out of the aircraft. When placing the battery pack back into the aircraft, listen for a "click" sound to ensure it's locked in place.

CHANGING THE BATTERY



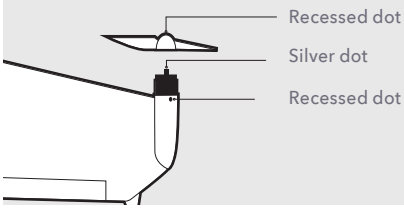
Replacing the Props

Props need to be replaced if there are visible scratches, chips, cracks or other signs of damage. Damaged props can degrade flight imagery.

Remove props by gripping the motor and unscrewing the prop in the direction indicated by arrows on the prop.

Replace the prop by turning it in the direction indicated by arrows on the prop until firmly seated against the motor.

REPLACING THE PROPS



Cleaning ILS and Camera Lenses

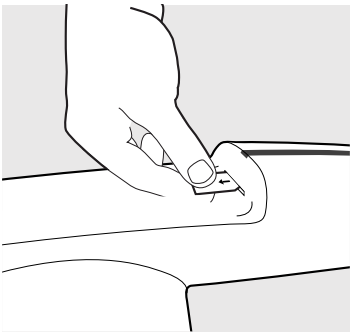
If the lenses get dirty, gently clean with the included cleaning package. Take special care to prevent micro-debris from scratching the lens surface.

To Clean:

- Use air bulb to blow dust and dirt from lens surface.
- Gently brush away any remaining debris.
- Repeat air bulb application to ensure lens is free from dirt particles.
- Examine lens for water spots or fingerprints.
- Remove any fingerprints or water spots with the included lens pen.

Replacing Your SD Cards

If it becomes necessary to replace the flight SD memory card, the replacement card must have the following specifications:



- SD Extended Capacity (SDXC)
- 64 GB of storage or greater
- Speed class rating of U-3 or greater
- UHS bus speed mode single data rate 104 (SDR 104)

Cards with specifications other than those listed above will not function in Quantix Mapper.

Your Quantix Mapper comes with a 128GB PNY Flight SD Card (Model No. P-SDX128U395-GE) .

Formatting Your Flight SD Card

SD card performance normally degrades over time, and your Flight SD card may eventually fail to write images fast enough to keep up with a Quantix Mapper flight. It is suggested to reformat the SD card after two to three flights or 1500 acres. This will minimize potential data loss from disk fragmentation.

It is also recommend to use the same model SD card that was provided with your system.

Updating Aircraft and Tablet Software

We're always working to improve the Quantix Mapper application and aircraft. If a software update becomes available, you will be notified.

Binding to a New Aircraft

If you need to select an aircraft different from the one previously flown, select the desired plane from the list.

Aircraft Fault Responses

The Quantix Mapper aircraft is designed to respond automatically to faults and anomalies.

Fault	Aircraft Response
Preflight errors	Aircraft will not launch.
Loss of Link	After 60 seconds of not communicating with the tablet, the aircraft will cancel the mission, return home and land at flight path altitude.
Low Battery	If the aircraft determines there is insufficient battery power to complete the mission, it will cancel the mission, return home and land at flight path altitude.
Depleted Battery	If the aircraft determines there is insufficient battery power to return home, it will land immediately at flight path altitude.
Temperature Warning (Battery)	Aircraft will not launch.
Onboard Storage Becomes Full	Aircraft will not launch.
Loss of GPS	The aircraft will land immediately.
Navigation Error	The aircraft will land immediately.
Violating Keep-in-Zone	The aircraft will land immediately.

The Quantix Mapper application will notify you should any of these faults occur.

Locate Aircraft After Unplanned Landing

If your Quantix Mapper aircraft has an unplanned landing, do not close the Quantix Mapper application. Use the map icons to reach the aircraft. Once you have reached the aircraft, follow these steps:

1. Use the emergency stop command if the props are still rotating.
2. Power down the aircraft.
3. Inspect the aircraft and props for damage.
4. Remove the SD card.

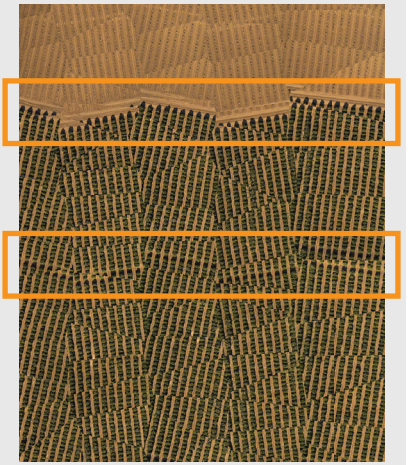
Recognizing a Bad Magnetometer

Your Quantix Mapper aircraft magnetometer (mag) may occasionally require calibration. This could be due to environmental factors or a location change.

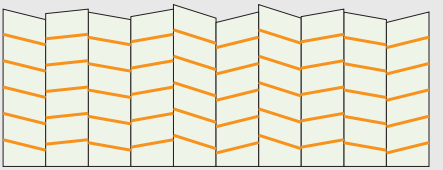
Your aircraft will require mag calibration when your Quick-Look images display the map tiles in a herringbone pattern.

Note: This may be less obvious with other mission types.

HERRINGBONE IMAGE – QUICK-LOOK



HERRINGBONE IMAGE – GRAPHIC REPRESENTATION



Mag Calibration

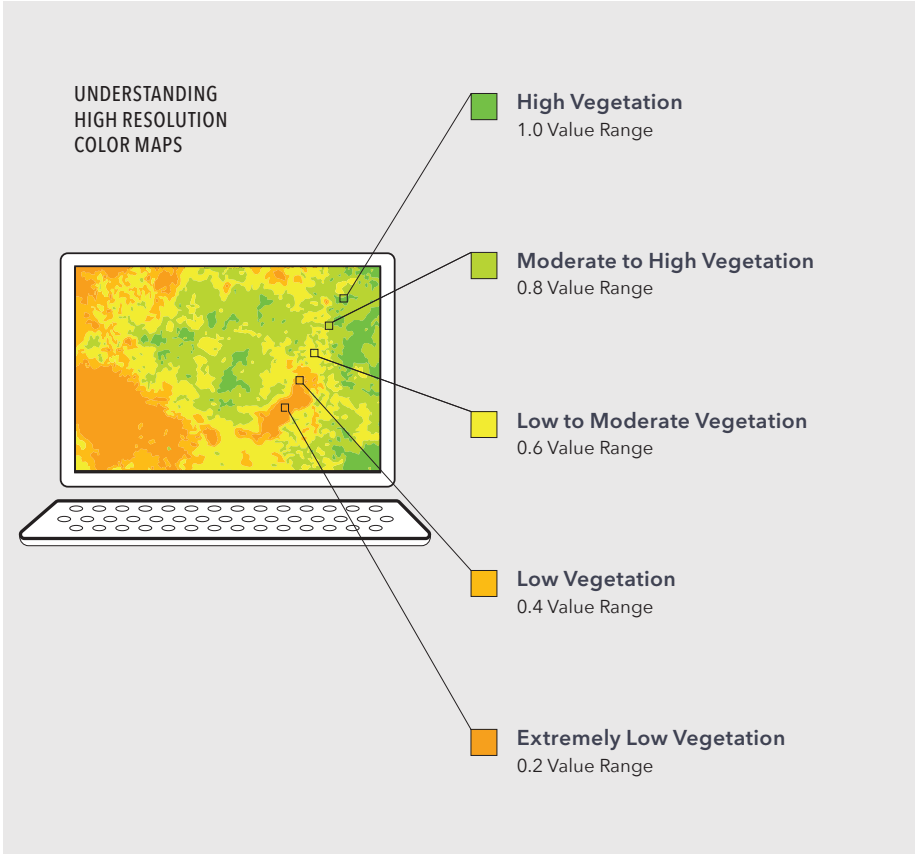
Ensure the following good practices are observed prior to calibration:

- Do not perform a calibration indoors or within 10 feet of a building.
- Do not perform a calibration within 15 feet of a vehicle.
- Empty your pockets of all electronics (phones, watches, etc.), large metallic objects (multi-tool, knives, etc.), and magnetic objects.
  - Keys and metal objects of similar size are okay if kept away from the aircraft.
  - Be sure to place removed items at least 5–10 feet away from the calibration location.

Watch the Mag Calibration instructional video prior to calibration. To access the video, open the Quantix Mapper application on your tablet, login, select Settings in the Menu button, and select Mag Calibration. Tap the Play button on the video at the top of the screen to start the video. After watching the video, tap the Continue button and follow the instructions to complete calibration.

What is NDVI?

NDVI is the most common vegetation index in remote sensing to measure healthy vegetation. Normalized Difference Vegetation Index (NDVI) quantifies vegetation by measuring the difference between near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs). The result of this formula generates a value between -1 and +1. When you have higher NDVI values, you have healthier vegetation. When you have lower NDVI, you have less or no vegetation.



General Warnings

- This product is not a toy. Not suitable for children under the age of 16.
- Keep clear of props while aircraft is powered.
- Motors may be hot to the touch.
- Never fly Quantix Mapper;
  - Over people not involved in flight.
  - Over buildings or vehicles.
  - Over animals.
  - Near other aircraft.
- Never fly Quantix Mapper within 5 miles of an airport.
- Always maintain visual contact with Quantix Mapper.
- Do not fly in inclement weather.
- Do not operate from a moving vehicle.
- Do not operate under the influence of drugs or alcohol.
- Do not operate a damaged aircraft.
- Do not alter the aircraft in any way.
- Use ONLY AeroVironment brand Quantix Mapper replacement parts.
- Keep a safe distance (50 ft.) from the aircraft during takeoffs and landings.
- Do not immerse any part of Quantix Mapper in any liquid.
- Product specifications may change without prior notice.
- Do not fly Quantix Mapper at night.
- User takes full responsibility for the result of using this equipment.
- Flying at higher altitudes increases the time required for the aircraft to return to home or emergency land.

RF Exposure Warning

To comply with RF exposure guidelines, the antenna used for this transmitter must be installed and operated to provide a minimum separation distance of at least 20 cm (8 in.) from the body (excluding hands) and must not be co-located or operated in conjunction with any other antenna or transmitter.

Aircraft and Tablet Batteries

- Do not use damaged or swollen batteries.
- Do not submerge batteries in water.
- For best battery life, store batteries in temperatures between (-22°F to 77°F).
- Do not charge batteries with chargers other than those supplied with your system.
- Do not alter or disassemble batteries.
- Do not dispose of battery in the trash.
- Follow local regulations regarding battery disposal.
- Do not puncture, short or incinerate batteries.

Disclaimers

AeroVironment is not liable for damage or injuries due to:

- Operating Quantix Mapper in violation of local laws and regulations.
- Operating Quantix Mapper while impaired in judgment from drugs or alcohol.
- Operating Quantix Mapper in any unsafe, unprofessional or incorrect manner.
- Operating Quantix Mapper in inclement weather.
- Failure to ensure there are no obstacles or obstructions in the set flight path.
- Failure to comply with official Quantix Mapper operating instructions and guidelines.
- Using unauthorized parts or modifications to the aircraft.
- Knowingly operating Quantix Mapper while the aircraft is damaged or otherwise unfit to fly.
- Force majeure.
- Failure to obtain permission to take imagery of all property designated by the operator during mission planning.

Frequently Asked Questions

Go to www.avinc.com/Quantix-Mapper to view instructional videos and the most recently and commonly asked questions.

Customer Service Information

Warranty Information

Your Quantix Mapper system is under warranty for 100 flight hours (estimated 35,000–50,000 acres) or one year from date of purchase, whichever occurs first.

Product warranty will be honored if Quantix Mapper is flown within the guidelines outlined in this User Manual.

Contact Information

Parts/Sales

- Local Quantix Mapper Dealer
- 888.372.2890
- www.avinc.com/Quantix-Mapper

Customer Support

- ciscustomerservice@avinc.com
- 888.372.2890
- www.avinc.com/Quantix-Mapper

Quantix Mapper Aircraft FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense. The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment.

FCC ID: PZR-79902

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference; and
2. This device must accept any interference received, including interference that may cause undesired operation.

AeroVironment™

AeroVironment (NASDAQ: AVAV) is a technology solutions provider at the intersection of future-defining capabilities that include robotics, sensors, software analytics and connectivity.

The company pioneered and is a leader in the markets for small Unmanned Aircraft Systems (UAS), Tactical Missile Systems (TMS), High-Altitude Pseudo-Satellites (HAPS) and Commercial Information Solutions (CIS). For more information visit **www.avinc.com.**

AeroVironment, Inc.
900 Innovators Way
Simi Valley, CA 93065

Customer Service:
888.372.2890
ciscustomerservice@avinc.com

www.avinc.com/Quantix-Mapper

87732_10 Edit Date April 2020