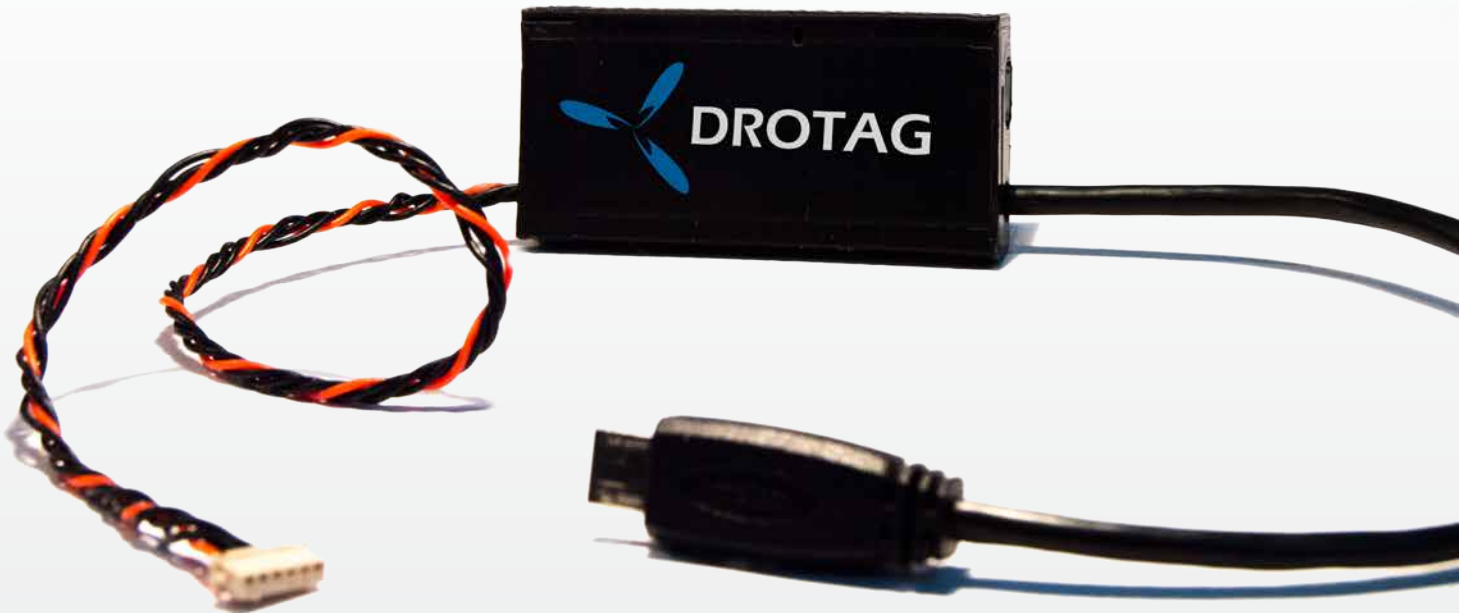# AIRBORNE PROJECTS

Airborne Projects specializes in building drone solutions with emphasis on telemetry gathering and integration with avionics and automatic flight systems.

DROTAG.CHDK - Onboard CHDK Image Tagging

Quick Start Guide

DroTag is a small board that simply sits between your **CHDK capable** camera and your **Pixhawk**, allowing you to plan the camera trigger events and have the **pictures taken automatically geo-tagged on the fly**.

Upon landing you only need to take out the card from the DroTag board and the images are immediately available and ready to be visualized/used by your mapping software.

Contents

1 Context

This User Guide's goal is to get the Airborne Projects' **DROTAG.CHDK** product working with your tethering camera and you APM based Flight Controller.

DROTAG.CHDK is a small board that simply sits between your CHDK enabled camera and your Flight Controller (like Pixhawk), allowing you to remote trigger the camera (manual or automatically) and have taken pictures automatically geo-tagged. Upon landing you only need to take out the card from the camera and the images are immediately available and ready to be visualized/used by your preferred stitching software.

DROTAG.CHDK is compatible with all the cameras that have CHDK enabled as well as LUA scripting enabled. This should be enabled by default in most recent CHDK versions.

2 Assumptions

1. The **DROTAG.CHDK** module is connected to one of the available telemetry output found on your flight controller (Pixhawk/APM/NAVIO/etc);

2. The power to the **DROTAG.CHDK** is supplied by the autopilot's telemetry port;

3. The microSD card that came with your package is inserted in the **DROTAG.CHDK** board. Another card with the image supplied by Airborne Projects can also be used;

4. To get the pictures geo-tagged you need a GPS fix on your Flight Controller. Without it, the camera triggers User Guidely and saves the picture but no additional tags are written;

5. The microSD card image you receive is bound to the **DROTAG.CHDK** serial number. That means you can use any microSD card you wish but you can only run it on your board. If you would like to run **DROTAG.CHDK** in another board contact us at *our email*;

3 Package Contents

- **DROTAG.CHDK** board;

- microSD card loaded with Airborne Project's **DROTAG.CHDK**software;

- An operation Checklist;

- **DROTAG.CHDK**User Guide;

4 Hardware installation

Below you can find a picture illustrating the installation. We point out that good practices are advised regarding fixation of the board. **Boards and Cables should be stowed clear of propellers in a vibration resistant manner.**

4.1 Setup your TELEM Port Parameters

This step is required to configure the TELEMETRY Port that you are willing to use. It only needs to be done once or anytime you change the parameters mentioned in this section. In the following instructions SERIAL1 prefix corresponds to TELEM1. If you would like to use TELEM2 the applicable parameters are prefixed by SERIAL2. Accordingly, prefix SERIAL4 corresponds to physical port TELEM4/5.

1. Connect your Flight Controller to Mission Planner (or equivalent);

2. Select the **Config/Tuning** tab;

3. Select **Full Parameter Tree**;

4. Find the command node **SERIAL1** and set:

    (a) SERIAL1_BAUD 57

    (b) SERIAL1_PROTOCOL 1

5. Click **Write Params**;

6. **Power Cycle** your Flight Controller in order to the changes take effect;

4.2 One Time CHDK Configuration

You need to ensure the **Remote Parameters** setting is correct in your CHDK camera. To do this follow the instructions:

1. Turn on your camera;

2. Press the '**Play button**' to enable CHDK menus;

3. Press the '**Menu button**' to go to CHDK main menu;

4. Navigate to '**CHDK Settings** option and press the **Func.Set** button;

5. Navigate and enter **Remote Parameters**;

6. Verify that **Enable Remote** is **NOT** enabled (without the dot);

5 Preflight Mission Planning

DROTAG.CHDK relies on APM messages to trigger the camera and add tags to it, so it is worth taking the time to learn the constraints of mission planning. Here at Airborne Projects we do the planning of the mission and waypoint upload through Mission Planner.

Although planning a mission in Mission Planner or others is outside the scope of this User Guide there are some parameters that need to be taken into account. Specifically the **Photo every (est)** and the **Trigger Method**.

Other parameters and tutorials on Mission Planner can be found on this link. We seriously advise our customers to get comfortable with tutorials as this part of the flight is the only one which is not automated.

5.1 Time Between Pictures or "Photo every (est)"

If the time between triggers in your mission plan is less than the amount of time your camera takes a pictures then, some pictures may be missed or triggered out of turn, producing defective results. To achieve better results always manipulate the Flight speed to have enough time between waypoints/camera triggers.

There are many ways around the **Photo every (est)"** each with their own drawbacks. Below, you can find the available approaches in order of best to worse:

1. **Slightly Slower flight -** Your mission will take longer to fly but all your pictures will be with the desired Ground Resolution(pixel/cm) which is the normal requirement parameter when doing aerial photography.

2. **Higher Altitude -** When flying higher you can sacrifice Ground Resolution to obtain pictures with bigger area covered. With bigger area covered in each picture, the more time you have to take next one. You may hit a hard limit on both the altitude as well as on the Ground Resolution requirements.

3. **Overlap or Sidelap reduction -** It may be possible, due to end use of the collected pictures to reduce the sidelap or overlap of the pictures so that they are less frequent. This increases the time between pictures.

4. **2 passes -** You can program the mission to perform the same flight path twice with a slight offset to get the same overlap at the cost of extended mission time. This option is not available automatically by Mission Planner and needs User Guidely creating the mission waypoints.

5.2   Trigger Method

DROTAG.CHDK requires the **DO_DIGICAM_CONTROL** Trigger Method in order to trigger the camera shutter. This command should be executed every time a camera trigger is required. When drawing your grid in Mission Planner you should define this command as default and all the trigger messages will be automatically created according to your Survey Grid configuration.

As the actual trigger does not have any mechanical or analog component, there is no need to configure any Servos or Relay pins. It is just as simple as that.

6   Flight Checklist

Included with **DROTAG.CHDK** is a checklist to execute before the flight. This checklist is not mandatory but is a good starting point to guarantee no errors.

1. Verify camera and cables are secure.

2. Verify the **DROTAG.CHDK** has microSD card inserted.

3. Power On the camera and check it's battery.

4. (Optional) Verify camera settings are correct.

5. Power On general power UAV general power.

6. (Optional) Wait for GPS Lock.

7. Listen for a camera trigger.

8. The **DROTAG.CHDK**system is ready to go! Have a nice flight!

6.1   Flight checklist - Detailed Explanation

1. **Verify camera and cables are secure -** This item is responsible for no damage or loss of equipment. Not getting pictures is bad, destroying your hardware is worse.

2. **Verify the DROTAG.CHDK has microSD card inserted -** Without the microSD card inserted the problem **DROTAG.CHDK** software cannot run. The end result is your camera will do nothing.

3. **Power on the camera and check battery -** The camera should be powered before the **DRO-TAG.CHDK** board because the software running will not see any camera available. If the **DRO-TAG.CHDK** board is powered before camera it can be reset and it will try to check the camera again. Powering on the camera early is also useful to check if there is any error in the camera. The camera battery check serves as a situational awareness reminder. It is up to the operator to ensure the camera has enough battery to perform the flight.

4. **(Optional) Verify camera settings are correct -** This is optional because the camera settings should not change between flights. You should observer this item if the camera settings were previously changed. Incorrect picture settings can make **DROTAG.CHDK** under-perform severely because some settings can cause the camera to have big delays between trigger and picture shooting, blocking **DROTAG.CHDK** while flight is carried on normally. Incorrect picture settings can also lead to blurry, dark or white pictures. Standard guidelines to camera settings are given in the appendix.

5. **Power On general power to Pixhawk -** This will power the **DROTAG.CHDK** board allowing it to take control of the camera.

6. **(Optional) Wait for GPS Lock -** The APM needs to acquire a 3D Fix to have a position estimate. The position estimate of APM is what enables coordinates tagging into the picture. The way you check for this event is not the same in all the APM/GPS receivers. On the Pixhawk when the **LED is green** the GPS is locked and this item is passed.

7. **Listen for 1 camera trigger -** The camera trigger is a way for you to know that **DROTAG.CHDK** was able to take control of the camera, trigger it, and tag it. You can also User Guidely trigger the camera if you have any channel in your Radio bound to the camera action. This User Guide trigger will record a picture.

8. **DROTAG System is Ready to Go! -** The operator can take-off and start the mission knowing the camera system is working.

7   In Flight Capabilities

You can only interact with **DROTAG.CHDK** in flight by associating an RC channel to Camera trigger. All other interactions are automatically triggered by APM.

8   After Flight Capabilities

When you take the memory card out of your camera all the pictures that **DROTAG.CHDK** triggered should have the geographical position tagged.

9   Troubleshooting

9.1   Significant delay in pictures

This happens if the camera was not configured with User Guide settings. The automatic modes of the cameras always take a certain amount of time find the correct settings. Not only can it take long for the automatic focus to settle but it can also find that long exposure times are adequate. Possible actions are:

- Follow the recommended settings provided in the appendix.

- Abnormal behavior. Contact us.

10 Further Information

DROTAG.CHDK relies on several open source projects. Airborne Projects takes open source licenses very seriously and we have a public repository for the modifications made to the open source projects it relies on, fulfilling the clauses of GNU Public License and Lesser GNU Public License where applicable. We are not a company of lawyers so if we made any licensing mistake let us know so we can correct it as soon as possible.

11 How to update the Converter's firmware

To update the converter's firmware you just need to contact us through info@airborneprojects.com and request the new application binary. When you receive the application binary just copy it to the root of the microSD card and replace the previous one. Nothing else should be necessary, unless an amend is published in this User Guide.