Tutorial : DJI GO 4 « extras » on Android devices

V1 : 21/11/2017

This tutorial is mainly oriented torward DJI Spark owners (but many aspects will still hold for other DJI models) and tries to cover the following tasks:

- Patching the official DJI GO 4 app from a Windows PC with software available at https://github.com/Bin4ry/deejayeye-modder
- Installing non-patched official DJI GO 4 together with the patched version on the same device
- Offline planning a mission and flying it from DJI GO 4

Disclaimer:

You have to endorse all the possible consequences of the actions described in this document. Some may even not being legal depending the place where you live. They may void the warranty of your DJI device.

Pre-requisite skills:

- Knowing how to transfer a file from your Android device to your PC and vice-versa
- Navigation into directories from a windows console windows (cd command)

Pre-requisite software packages:

On your Android device:

- App Cloner

  https://play.google.com/store/apps/details?id=com.applisto.appcloner

  this will allow making a clone of the patched apk and use it together with official DJI GO 4

- Sqliteprime

  https://play.google.com/store/apps/details?id=com.lastempirestudio.sqliteprime

  this will allow easy modifications of dji.db for loading flightplans.

On your PC :

- Java SE Runtime. You can download and install it from here:

  http://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html

  http://www.oracle.com/technetwork/java/javase/downloads/jre9-downloads-3848532.html

  For version 8 or 9. I'm using version 8 at this time and have not tested version 9.

  On a 64 bit machine, you can (and probably should) install both 32 and 64 bits versions.

  There are online and offline versions available.

  Java SE runtime is mandatory for running the patching software.

- APM mission planner :

http://ardupilot.org/planner/docs/common-install-mission-planner.html

This will allow easy drawing of flight plans on top of satellite image views.

- A small command line utility for converting from Ardu Mission Planner format to DJI database format

  https://www.dropbox.com/s/h7g6x7ftda1ubgy/ArduMissionToDJISQL.zip?dl=0

Patching DJI GO 4

At the time this tutorial is written, easy patching is only possible with version 4.1.9 of DJI GO 4.

This version lacks some of the new features of latest versions such as panorama etc. However it's still possible to fly it with Spark fw .701 and this tutorial covers installing lastest version together with the patched one so you can easily switch version upond needs without needing to go through tedious non-field friendly uninstall/reinstall process.

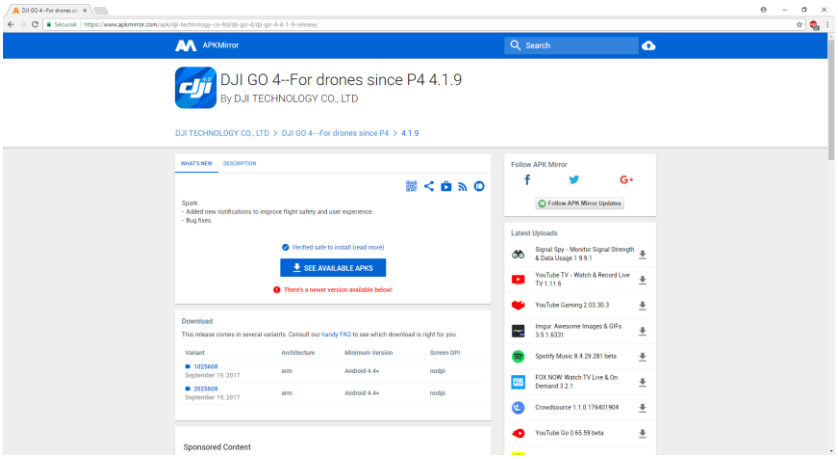
On the other hand, patching official DJI GO 4 will bring you new flight modes (orbit, waypoints) and will allow forcing FCC mode.

Get the DJI GO 4 version 4.1.9 apk (application package)

If you have not updated and the official 4.1.9 version is still installed on your device, you can extract the apk file from your phone with some ApkExtractor software (I'm using this software https://play.google.com/store/apps/details?id=com.ext.ui but there are many others)

The other way is to download it from apkmirror website where they archive a lot of versions of a lot of applications :

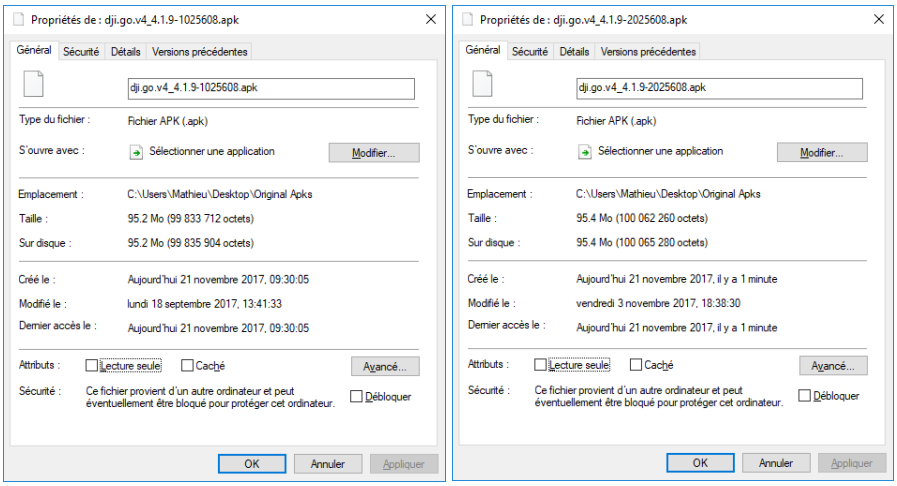
https://www.apkmirror.com/apk/dji-technology-co-ltd/dji-go-4/dji-go-4-4-1-9-release/

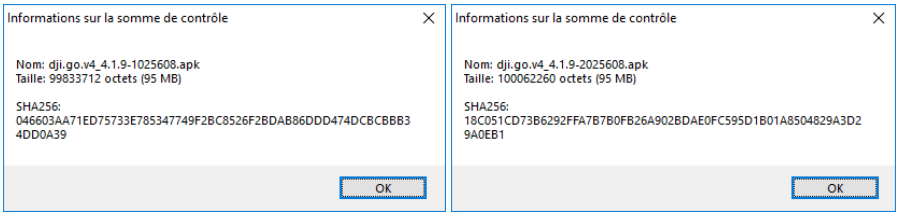


There are two variants of the apk, one is for phones (variant 1025608) the other is for tablets (variant 2025608)

Download the file on your PC

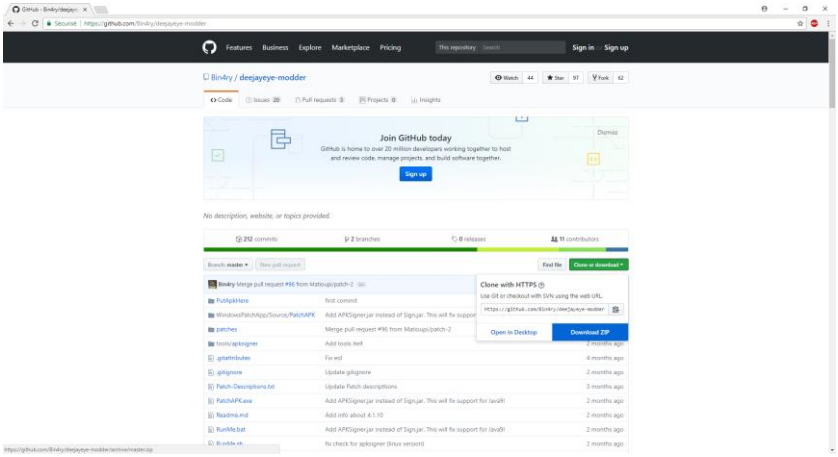
If you want to check downloaded file integrity the properties are:





Get the patching software

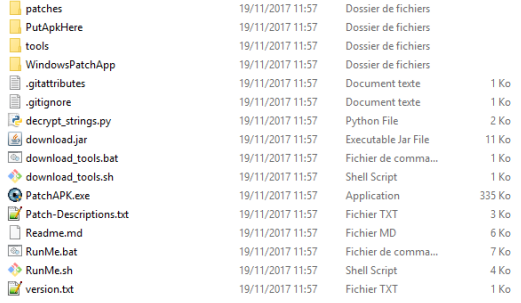
Go to https://github.com/Bin4ry/deejayeye-modder



Select the green button “Clone or download” and select Download ZIP (make sure the selected branch is “Master”)

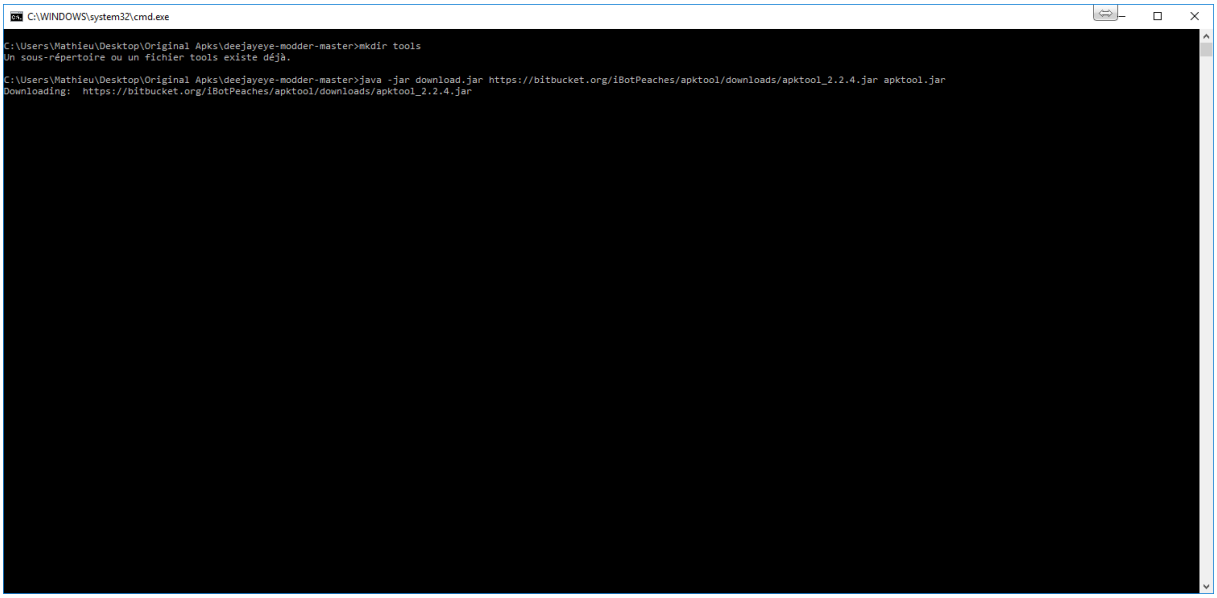
This will download a file named **deejayeye-modder-master.zip** on your computer

Unzip it to a new directory. You should have the following files :



Double click the download_tools.bat file

This will open a console windows such as the one below



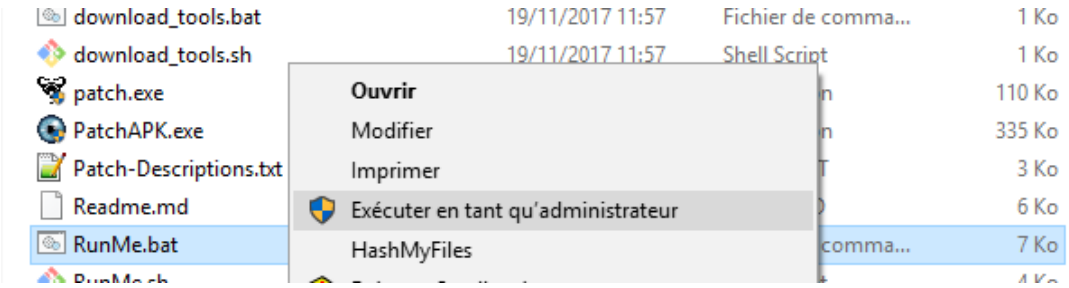
It will automatically download some external software pieces and put them in the “tools” subdirectory.

Your are now ready for patching

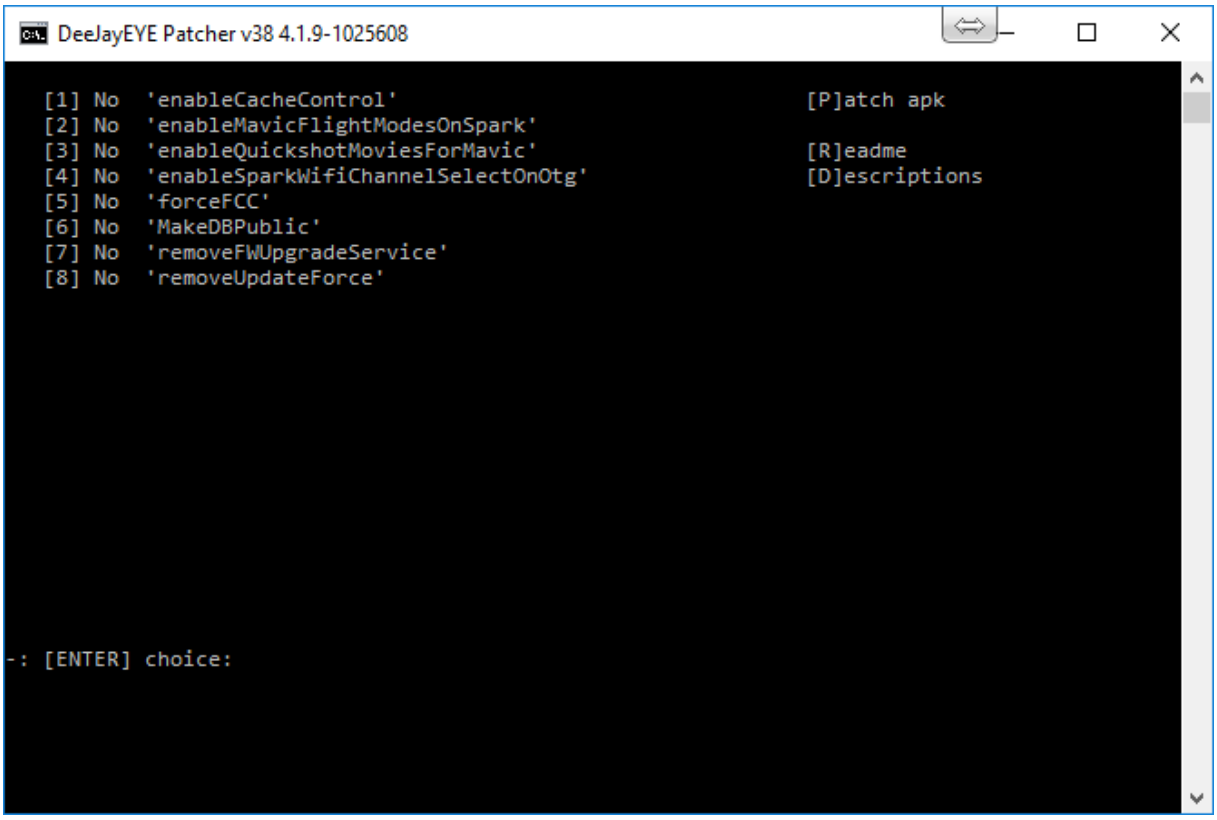
Copy the 4.1.9 apk file that match your device (phone or tablet) to the “PutApkHere” subdirectory

Rename the file you just copied to “orig.apk”

Right click the RunMe.bat file and select “Run as administrator”.



It will open a windows such as the one below :



At time of writing this tutorial, there are 8 patches available and that you can enable or disable by typing their number and pressing enter key

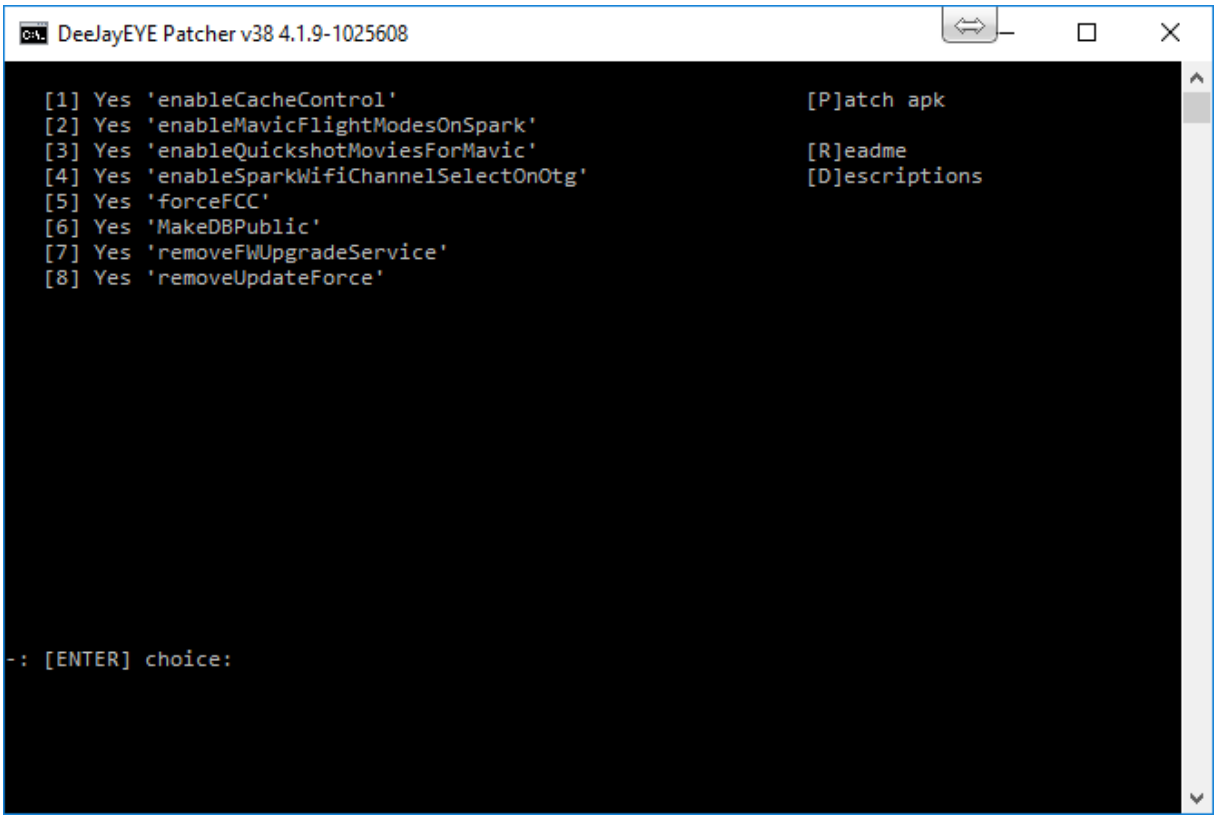
If you want some detailed description of the patches, type D and press enter key

The patches required for enabling waypoint missions are :

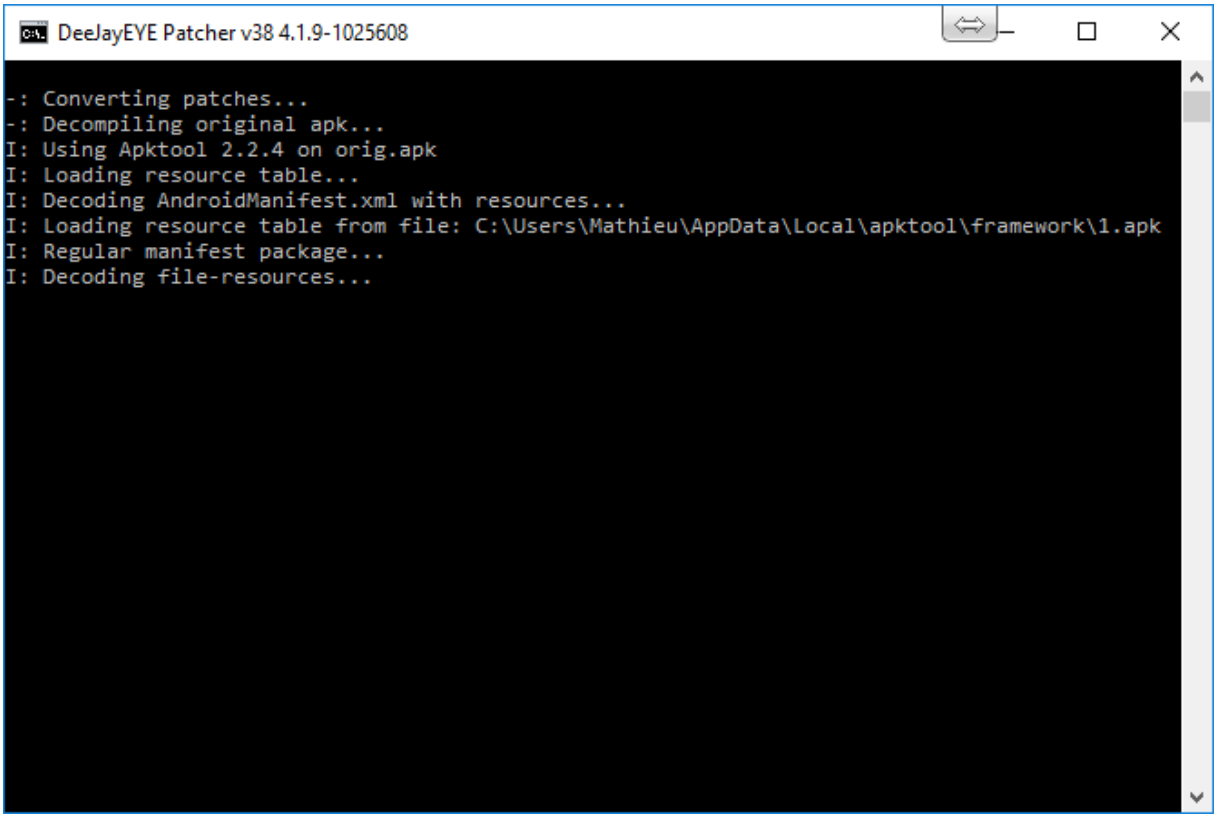
enableMavicFlightModesOnSpark. This patch will enable additional intelligent flight modes to be selected from DJI GO 4, including Waypoint missions and orbits.

MakeDBPublic. This patch will move the database where DJI GO 4 stores some info like the recorded missions from the private app storages to some public storage area, allowing you to access this database from a non rooted device.

If you enable all patches, the windows will look like :



When ready, type P + press enter key and the software will start patching the apk:



On my machine, I use bitdefender anti-virus and it triggered with patch.exe and bspacth.exe.

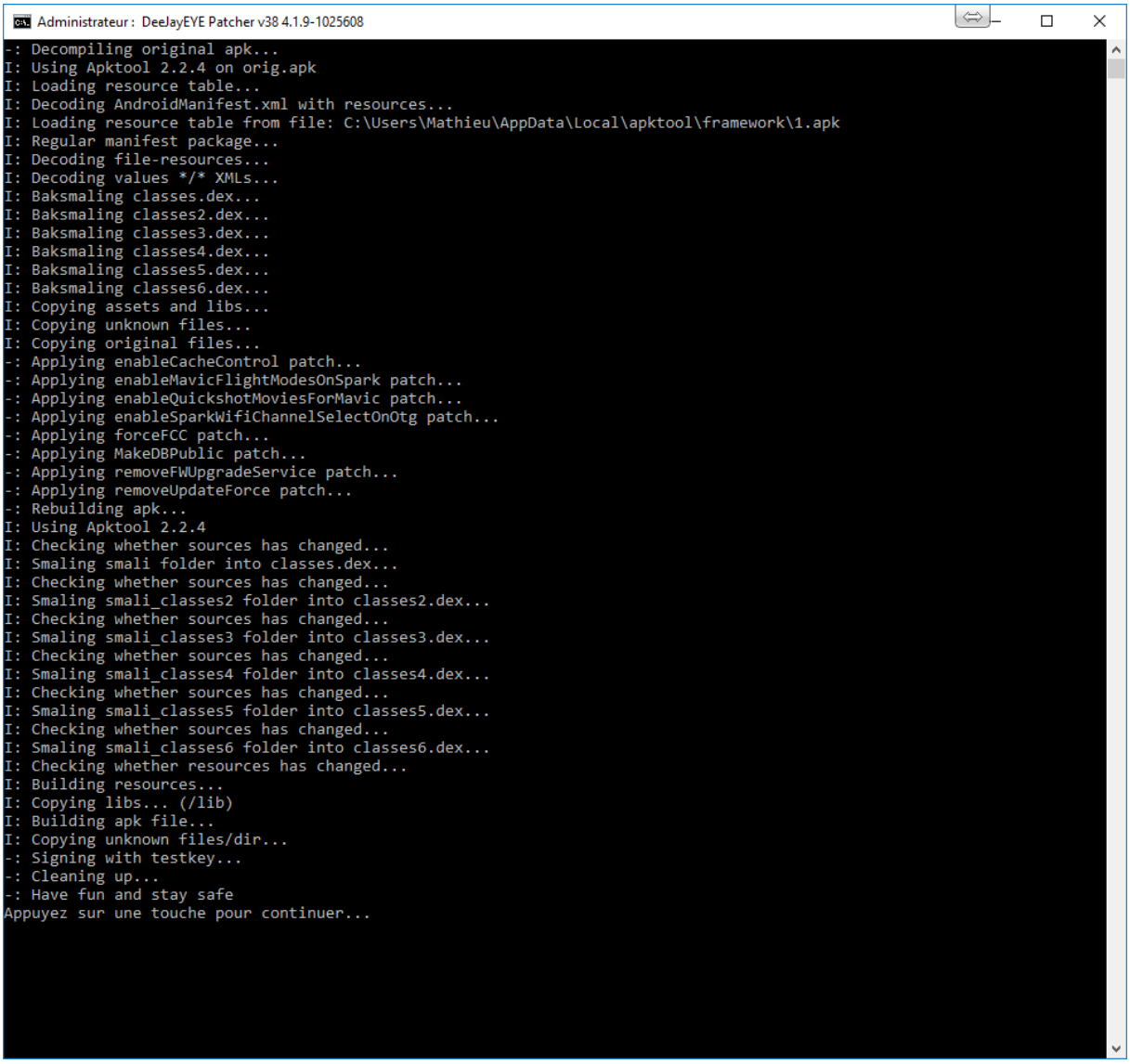
I tested both files on virustotal website :

https://www.virustotal.com/#/file/32a4664e367a5c6bc7316d2213e60086d2813c21db3d407350e4aca61c1b16a1/detection

https://www.virustotal.com/#/file/efc277fe48cadd8f5014d499f2b9484f668bd917db47a699baace407f0a52f13/detection

and this strongly suggest a false positive. You may have to setup your antivirus to allow those 2 executables (white list, exception, etc. depending on the software you are using)

It will take a few minutes and if everything goes smoothly, you should see outputs such as the one presented below.



At the end of the process you'll find a file named mod-38.apk (the number may change according to the version of the patcher). This is the patched apk that we will now install on your phone.

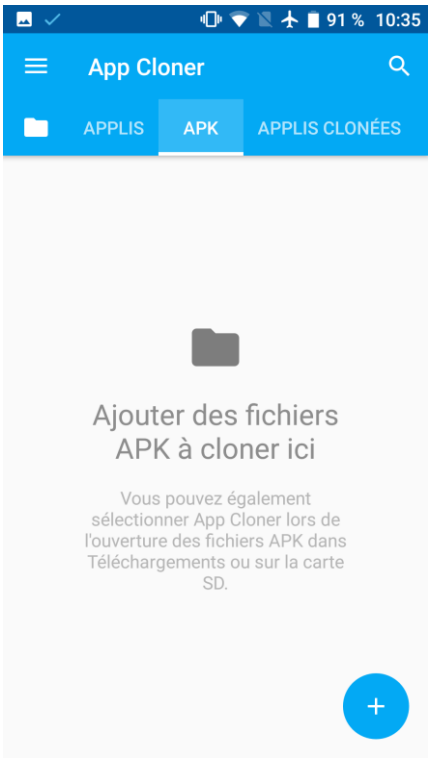
Transfer it to your Android device (you can e-mail it as attachement, use some dropbox, ftp, …)

If you want to install this together with official DJI GO 4 app, DO NOT INSTALL it now.

Cloning patched Apk

If you only want to use patched DJI GO 4 app, you can skip this step, but you have to go through if you want to use patched and genuine versions together.

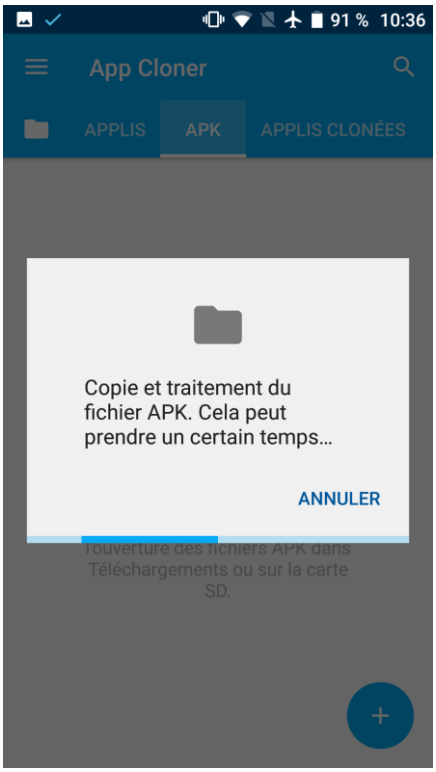
Start Apk Cloner App and go to the APK tab.



Press the big “+” inside blue circle on the lower right corner.

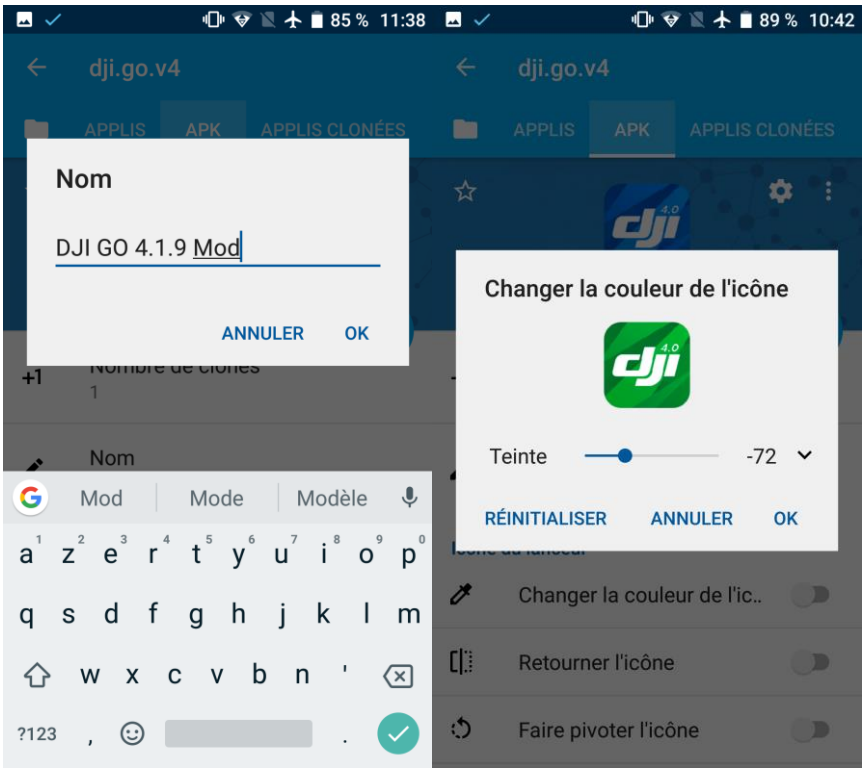
Navigate to the location where you stored your modded apk on the phone.

Apk Cloner will make a copy of the apk and prepare its own stuff to work on it. This takes up to 10-15 minutes

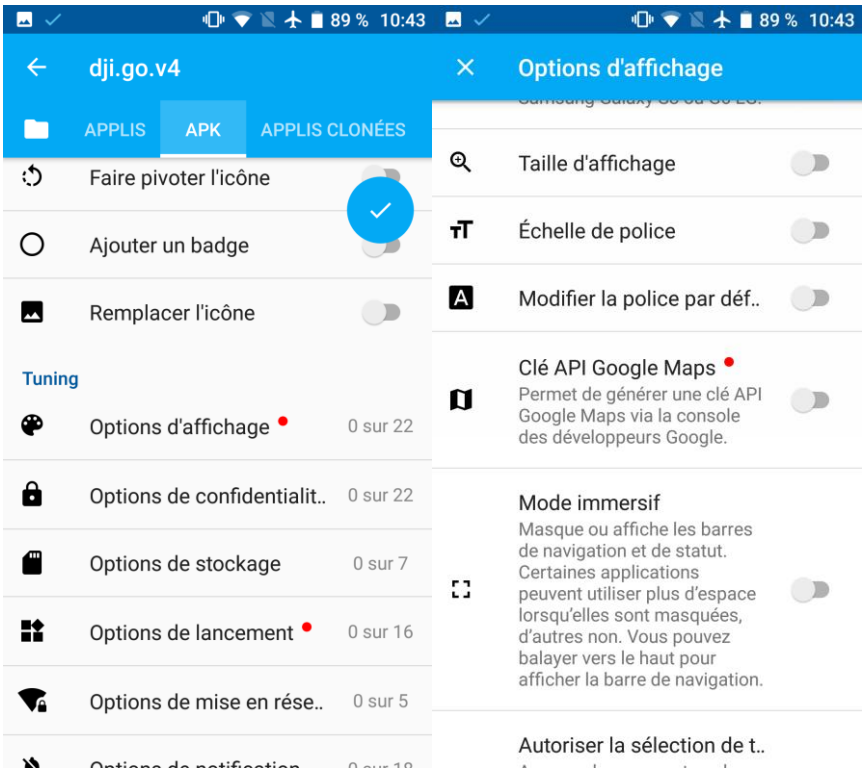


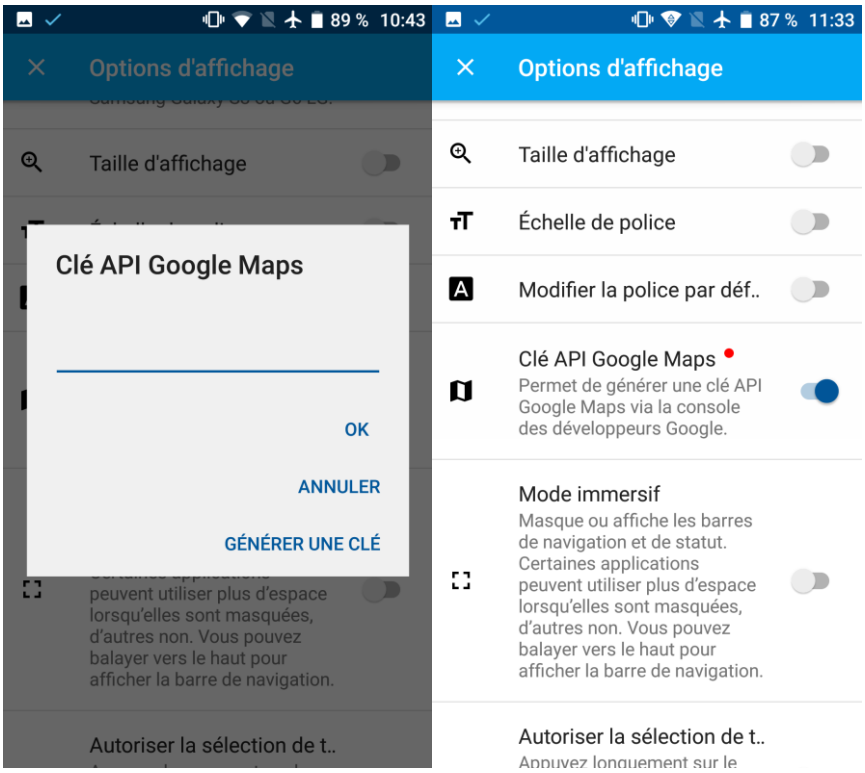
When ready you'll get to a screen like this :

And from there you'll be able to "edit" your clone, change the name of the App, change the color of the icon…



In the “display option” section, you need to enable the Google Map API key option

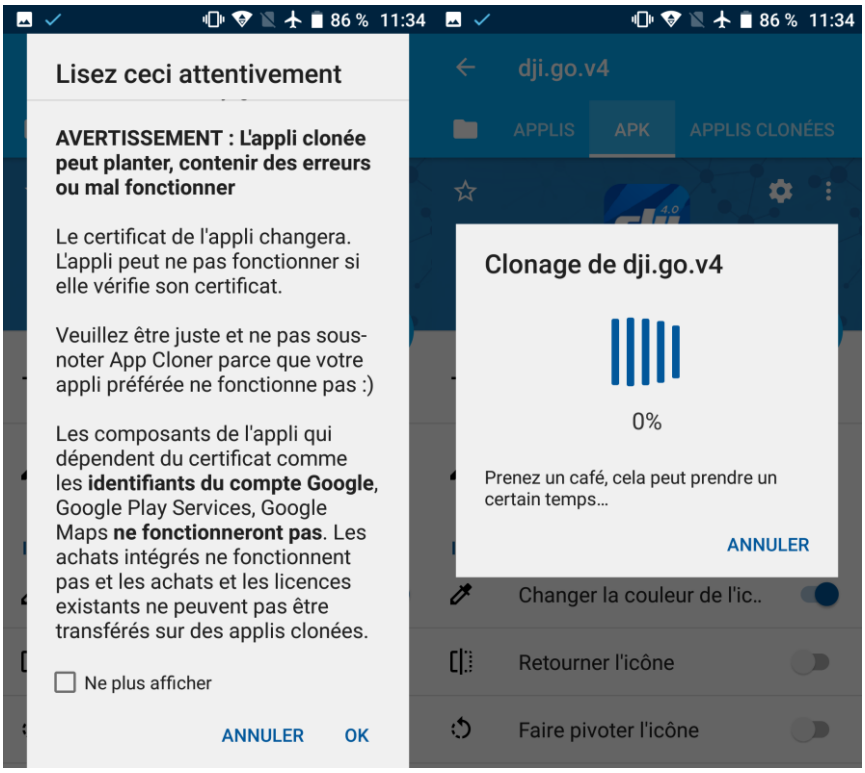




This will open windows where you have to enter a valid Google Map API key. If you don't already have one, click "Generate" and follow the process to get one. It is pretty straightforward and at the end, you'll be able to copy your key (keep it safe somewhere for future reference)

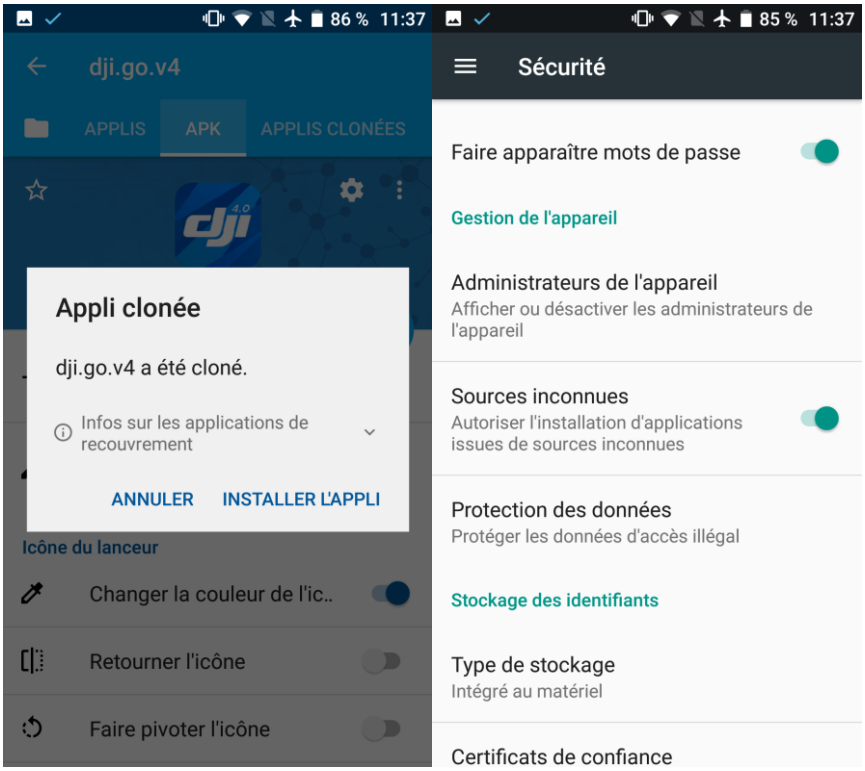
Juste come back to the screen above and paste it.

Close the "display option screen" (the cross on top let) and then click the blue tick mark to start generating the clone.



This will go though a disclaimer and then a cloning screen that take a while again (5-15 minutes). Your are kindly offered to take a break and go for a coffee 😊

Once ready, the Cloner App warns you that the clone is ready and that you can install it. You may first have to allow unknown sources in the security settings of Android



Once completed, you'll get your Cloned Modded DJI GO 4 app (with custom icon color). You can install the official App next to it, as shown above.

When you are on the field, you have to make sure that only one of the 2 is running at the same time… (you may need to force close the other one)

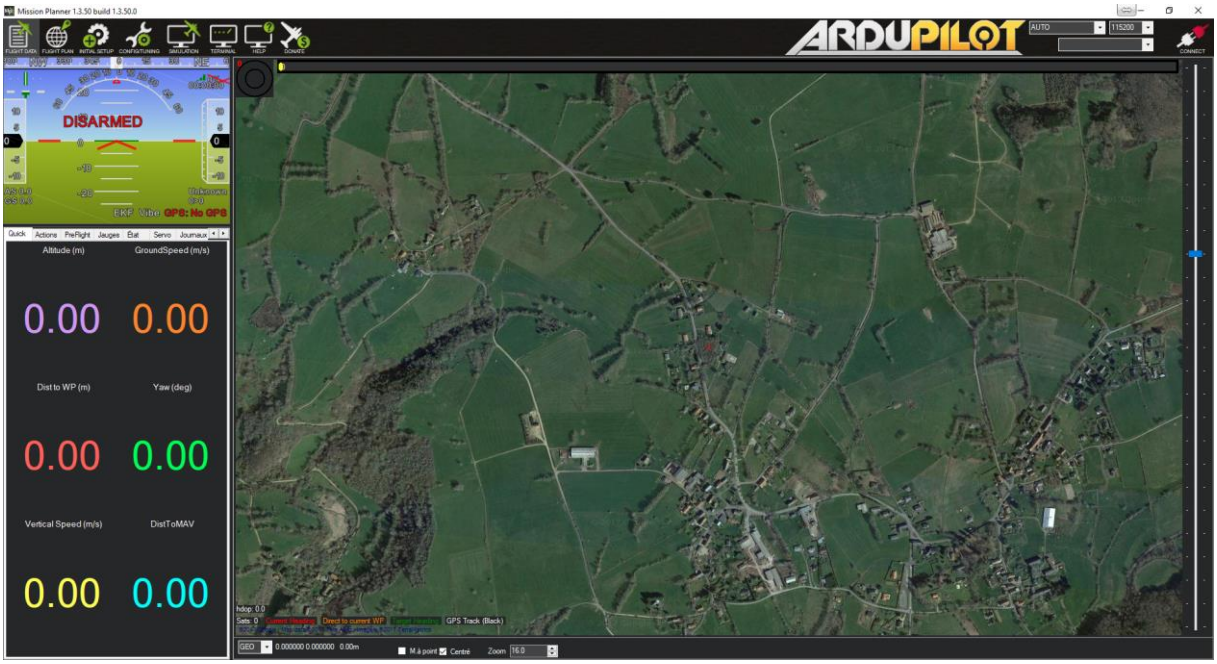
Offline designing and loading a waypoint mission.

Install the Mission Planer software. You can also go for the tower App :

https://play.google.com/store/apps/details?id=org.droidplanner.android

which is an android port. I prefer the desk PC version…

At first launches, just dismiss all choices as we will only use the planning feature and not the control features that are only for other brand/types of drones.



Click the flight plan button (top left) and the screen will turn to this (no head up display style area)

I'm not sure if you have to go for a first flight plan or if it can be done straight after install, but you need to add the Spark camera definition to the cameras.xml file that can be find in your documents folder, subfolder Mission Planner

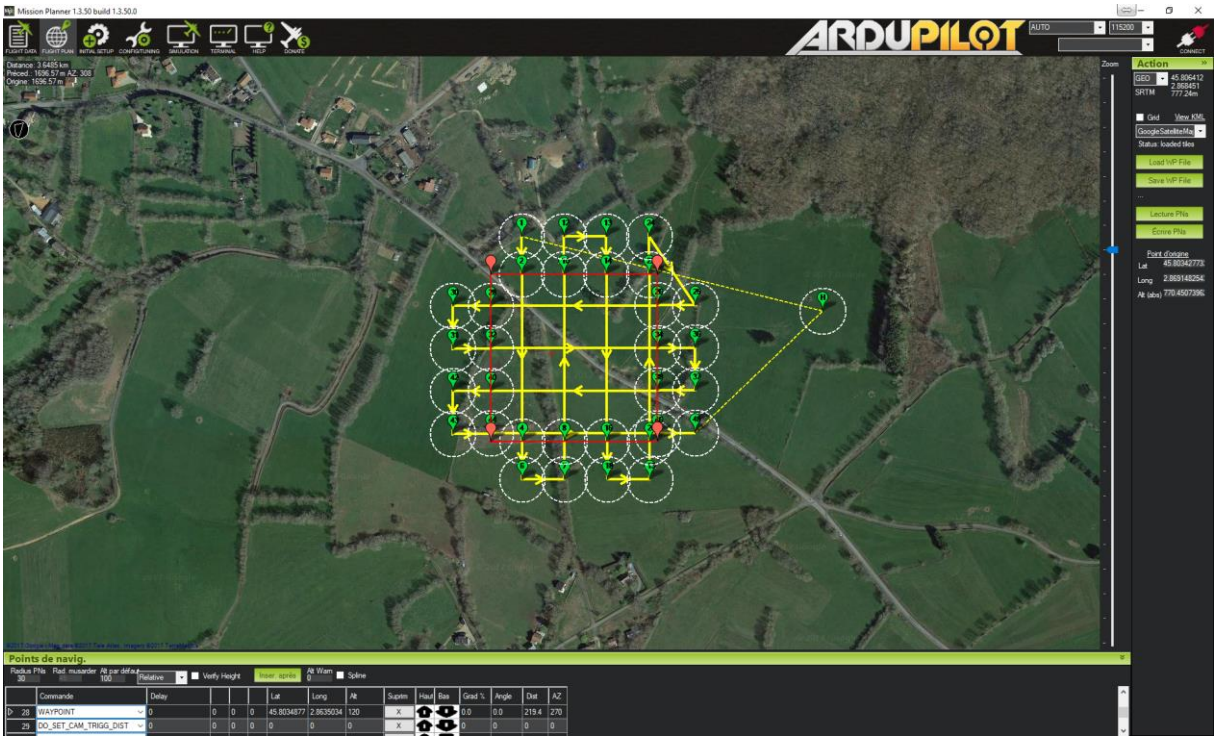
Just add an entry with following values for the FC1102 sensor that is fitted on the Spark

```
<Camera>
      <name>FC1102</name>
      <flen>3.96</flen>
      <imgh>2976</imgh>
      <imgw>3968</imgw>
      <senh>4.56</senh>
      <senw>6.17</senw>
</Camera>
```

The tool is pretty easy to use, you can draw or import a survey area boundary (right click)

When you have a survey area defined, you can use some Auto WP generation tool (Survey Grid) from predefined overlaps etc. You can also go for a fully “manual design” flight plan. You can also manually adjust an auto-designed flight plan. The tool is quite versatile.

Click accept when the settings are ok



On the top left corner, you'll get the path length in km. Check that it's compatible with the Spark capabilities.

Click the Save WP File to generate a your_mission_name.waypoints file

You now need to convert the .waypoints format file in order to import it inside DJI GO.

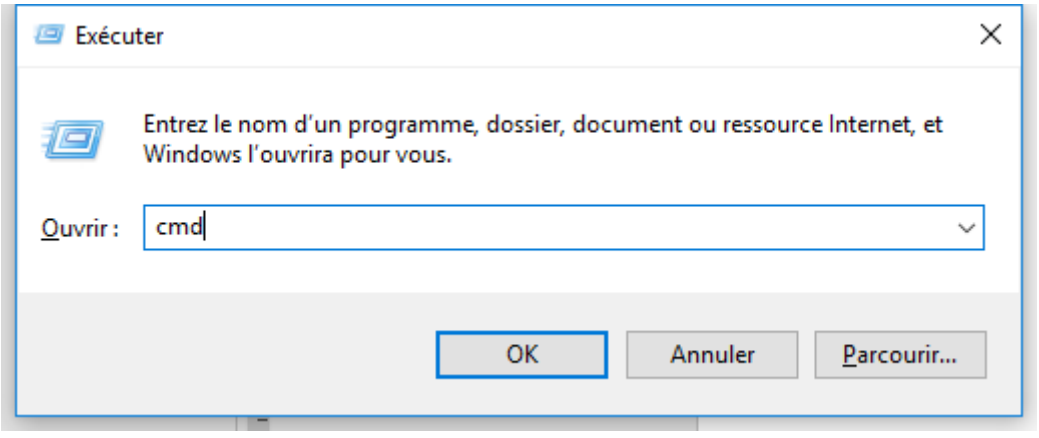
I wrote a small command line utility for that, available here :

https://www.dropbox.com/s/h7g6x7ftda1ubgy/ArduMissionToDJISQL.zip?dl=0

Once you get the zip file, put the exe in the same directory where you are storing your .waypoints mission files. The other .cpp field is the source code in case you want to enhance it.

You need to call ArduMissionToDJISQL.exe from a console windows

Windows + R, type cmd



Navigate to the directory where you store the ArduMissionToDJISQL.exe and your .waypoints mission file. (cd new_subforlder to enter a subfolder from where you are, or cd.. to get up one level in the folders tree)

The syntax of the tool is (3 arguments) :

```
ArduMissionToDJISQL.exe your_mission_file.waypoints
converted_filename.sql autoAddFlag
```

Where:

`your_mission_file.waypoints` is the name of the file you saved from Mission Planner

`converted_filename.sql` is the name of the file to be generated, that we will load in DJI GO database

`autoAddFlag` is an integer (enter 0 by default) that match one of the fields of DJI database, but I don't know yet the effect.

The .sql file is a text file that should begin with :

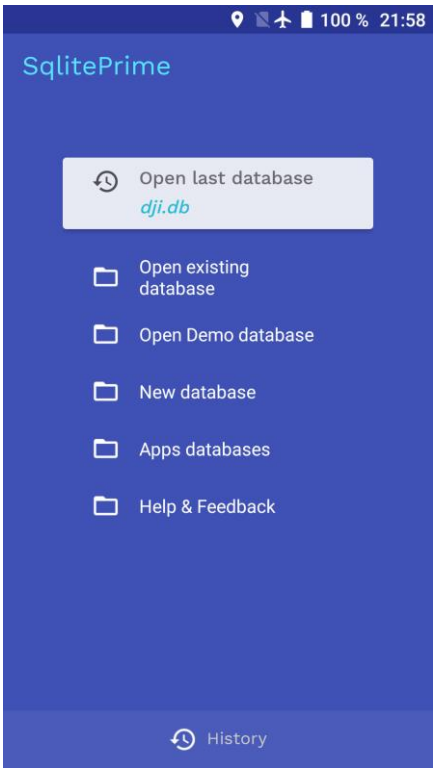
```
INSERT INTO
dji_pilot_dji_groundstation_controller_DataMgr_DJIWPCollectionItem (
distance, pointsJsonStr, autoAddFlag, createdDate )

VALUES (…
```

You now need to transfer this .sql file back to your android device (once again, use your preferred method)

Done for the PC side…

On your android device

Open SqlitePrime

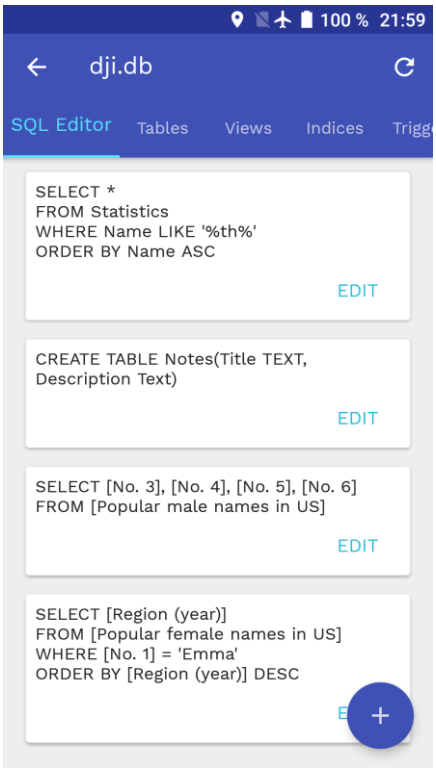


If you are using the app with MakeDBPublic patch (wich allow doing this on a non rooted device), choose Open existing database and go to the /DJI/dji_public.db file

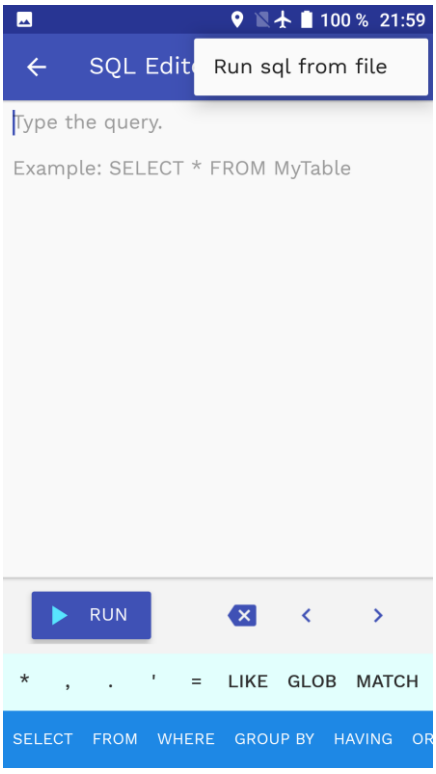
If you are on a rooted device, you can go to the App Database for DJI GO 4 directly (so this enable the feature for other DJI drones that have the waypoint feature on regular App, but you'll need a rooted device)

If the database table `dji_pilot_dji_groundstation_controller_DataMgr_DJIWPCollectionItem` is not already there, you need to first go once in the field and use the waypoints feature without pre-planning. There are some video tutorials on youtube for this, for example : https://www.youtube.com/watch?v=0Wsa7g-nPg4

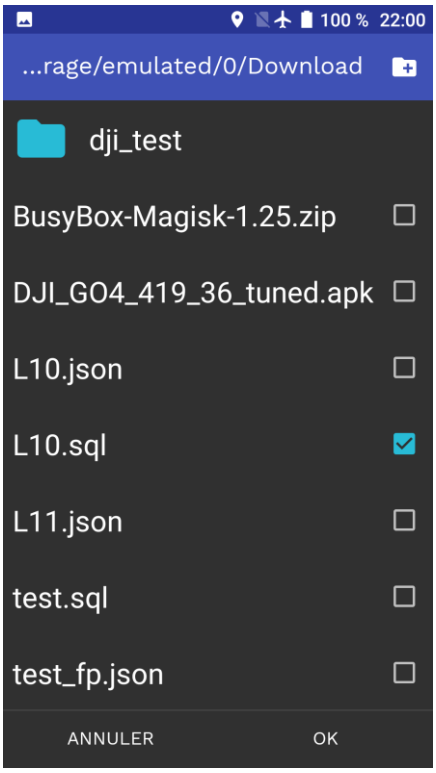
Once you used the feature once, the database table will be there and you can now add a mission for external file instead of needing to fly it once in the field before being able to replay it.



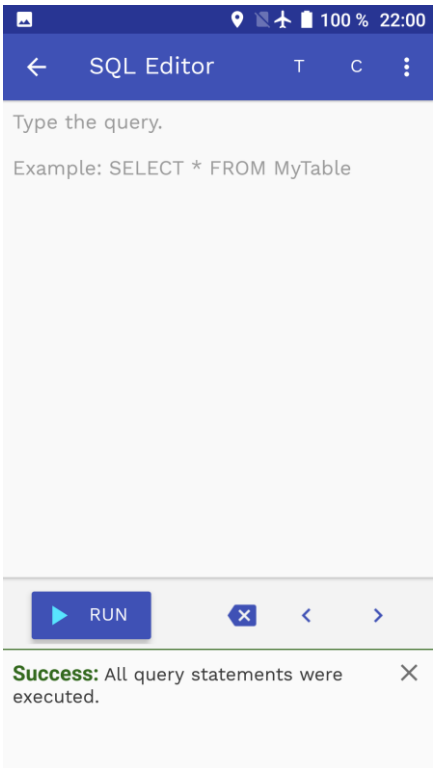
Go to the SQL_Editor tab and press the large “+” at bottom right corner



Click the 3 vertical dots at top right corner and choose “Run sql from file”



Navigate to the mission file you need to load select it and click Ok



You'll get informed that everything was executed. You can check that the mission was added to the table:

When I was trying to have this feature of offline planning working, I noticed that there where never more than 5 entries in the table. It is possible that DJI GO 4 does not handle things properly when there are more than 5 records but I have not been able to do extensive testing at this stage. All comments are welcomed! This means it may be needed to first delete some records before adding new ones.

That said, you can exit SqlPrime. Everything is ready for flight.

When you will be in the field, the DJI GO 4 intelligent mode will have a new waypoints mode (as shown on the YouTube videos).

When you will select “saved missions”, you will be able to select the offline designed mission as if it had been created by flying it once. You can set the flying speed, the end of mission action (hover or RTH) and the heading mode (mission record, consistent with route or free)

The waypoint mode will be accessible only when Spark is already in the air.

Have fun ! And help everyone understanding the feature better by publishing your experiences !