

# User manual T-Drop

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**SKYINNOV**

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# Installation :

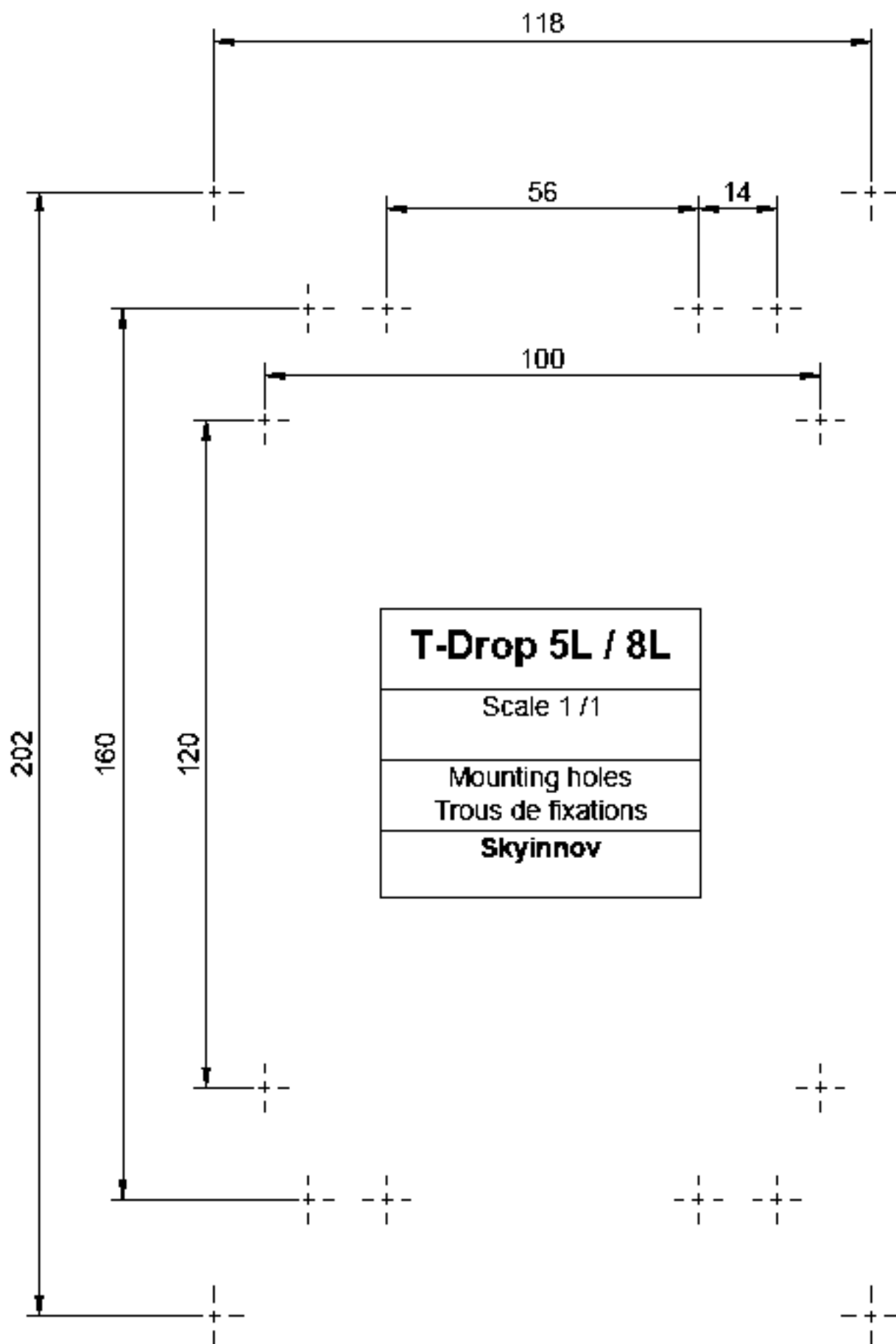
The T-Drop is mounted using the M3 spacers supplied with it.

Two lengths (15 and 30 mm) are supplied to adapt to the height available under your multirotor and the space between is feet.

Don't tight too much the spacers in the T-Drop tank, use medium threadlocker.

If you need to drill mounting holes under your drone or make an adapter plate, you can use the drilling template on page 4.

***"You can print out the drilling plan, take care to set the printout to 100% scale, check a measurement before drilling."***



# Connection :

Your T-Drop comes with an extension cable with servo plugs at one end, if you wish to use another type of plug, you can replace them.



ARM	Brown	Ground (signal)
	Yellow	Arming command Optional (PWM or I/O)
DROP	Brown	Ground (signal)
	Yellow	Release command (PWM or I/O)
FEED	Brown	Ground (signal)
	Yellow	Release feedback Optional (I/O)
POWER	Brown	Ground (power)
	Red	5V power supply (2A mini)

***"The Socket can be mounted through a bulkhead or plate on your drone, simply drill a 12mm diameter hole and secure it with the nut provided."***

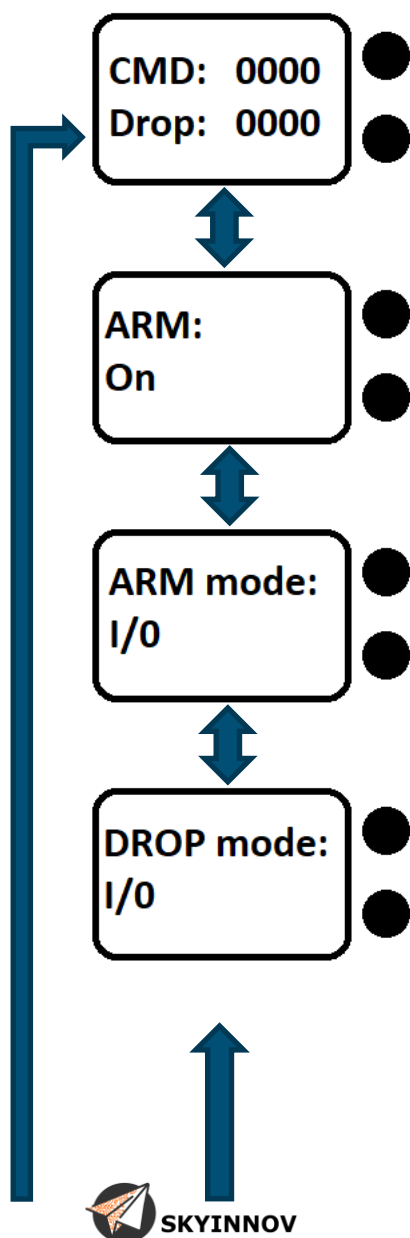
# Menu :

When you start your T-Drop the screen displays the Skyinnov logo for a few seconds and then you arrive on the counters page.

To navigate in the menu use the two buttons:

- Long press up button => next page
- Long press down button => previous page

## Menu structure :



### **Counter page :**

The "CMD" counter displays the number of release orders received. The " DROP " counter displays the number of drops actually made. To reset the counters to zero, simply press and hold both buttons simultaneously.

### **ARM page :**

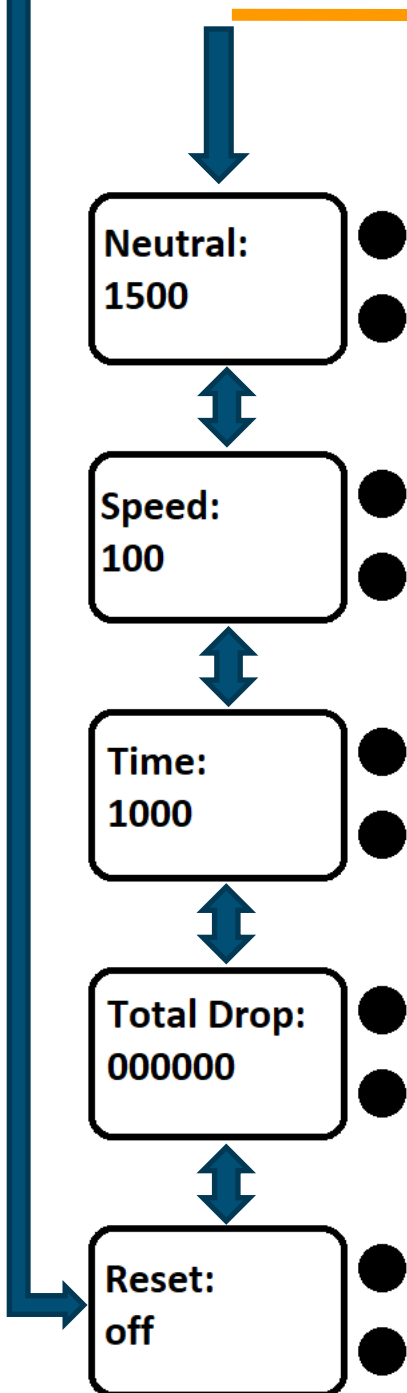
Allows you to choose whether you want to use the arming command or not. This allows you, for example, to switch off the spreader when you pass over a road. A short press on one of the buttons will change the value.

### **ARM mode page :**

Allows you to choose whether the arming signal sent to the T-Drop is a PULSE (I/O) or a PWM signal. A short press on one of the buttons will change the value.

### **DROP mode page:**

Allows you to choose whether the drop signal sent to the T-Drop is a PULSE (I/O) or a PWM signal. A short press on one of the buttons will change the value.



#### **Neutral page :**

Allows you to set the neutral position of the T-Drop motor. If your T-Drop motor is running at rest, change this value until it stops.  
A short press on the up button to increase the value,  
a short press on the down button to decrease it.

#### **Speed page :**

Allows you to change the speed, but also the torque of your T-Drop motor.  
You should not change this value unless you have been asked to do so by your dealer.

#### **Time page :**

Allows you to change the length of a release cycle for your T-Drop.  
You should not change this value unless you have been asked to do so by your dealer.

#### **Total Drop page:**

Displays the total number of drops of your T-Drop since it came into operation.  
No action possible on this page.

#### **Reset page:**

Allows you to reset all the settings of your T-Drop to their original configuration.  
A long press on both buttons simultaneously will trigger the Reset.

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# Setup:

To operate your T-Drop requires at least a 5v (2A) power supply and a Drop command signal,

You then have the choice of using an ARM command and a Feed signal.

***"The T-drop uses 3.3V logic voltages for its ARM and DROP inputs and FEED output.  
(Never exceed 5V as this will damage the device!)"***

You will first have to set up your T-Drop according to your choice  
(See Menu page 6).

## **In our example :**

ARM = ON

ARM Mode = PWM

DROP Mode = I/O

You will then need to configure your drone to match the T-Drop setting.

## **In our example we will use :**

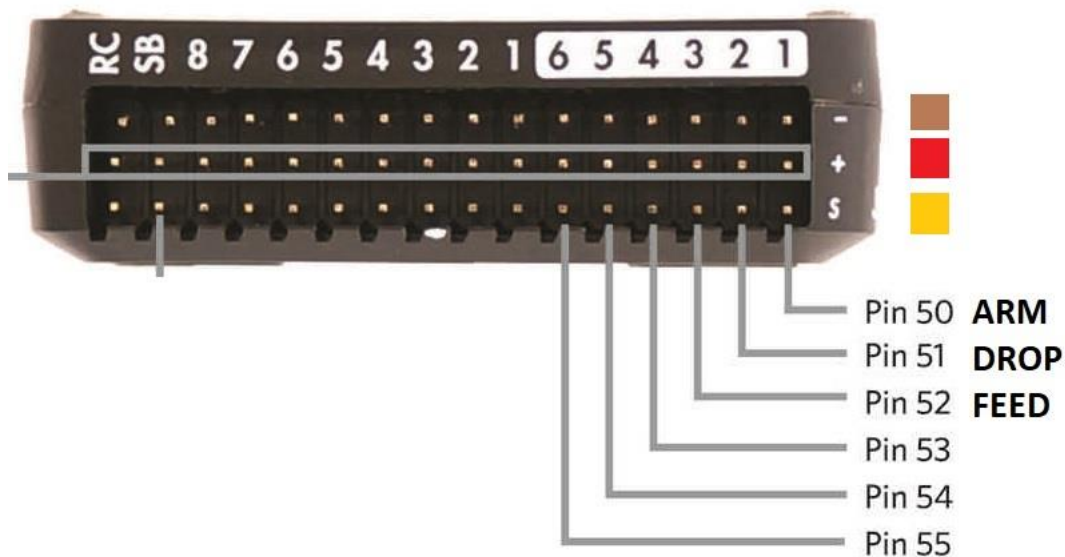
A Pixhawk with the mission planner software.

ARM radio switch: CH7

DROP radio switch: CH9



## Connection:



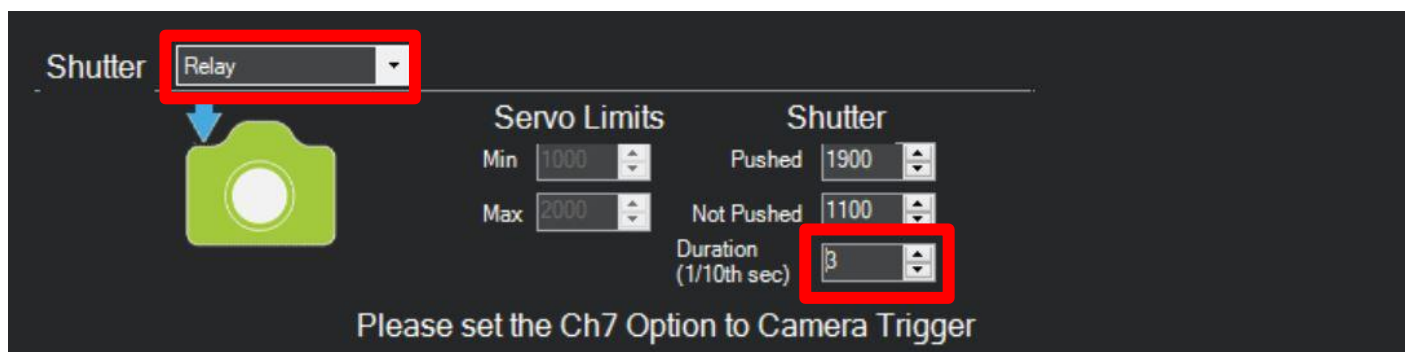
**ARM** : aux1 / pin50 / servo9

**Drop** : aux2 / pin51 / servo10

**Feed** : aux3 / pin52 / servo11

## DROP setup :

Go to : setup / optional hardware / camera gimbal



The trigger type is set to "Relay" to have a control pulse (I/O mode) and a pulse duration of 3/10 of a second.

Then go to: config / extended tuning

The screenshot shows the 'config / extended tuning' interface. The 'RC9 Opt' dropdown menu is highlighted with a red box and set to 'Camera Trigger'. Other visible settings include Throttle Accel (P: 0.50, I: 1.000, D: 0.000, IMAX: 80), Throttle Rate (P: 5.000, Tune: None, Min: 0.000, 1000), Altitude Hold (P: 1.000), WPNV (cm's) (Speed: 500, Radius: 200, Speed Up: 250, Speed Dn: 150, Loiter Speed: 1250), Filter Logs (Mask: None, Options: 0), RC6 Opt, RC7 Opt, RC8 Opt, and RC10 Opt.

Here we set RC9 to "Camera Trigger" since our radio switch for the DROP is on channel 9.

Go to : config / full parameter list    search.: RELAY

Command	Δ	Value	Units	Options	Desc	Fav
RELAY_DEFAULT		0		0:Off 1:On 2:NoChange	The state of the relay on boot.	<input type="checkbox"/>
RELAY_PIN		51		-1:Disabled 49:BB Blue GP0 pin 4 50:AUXOUT1 51:AUXOUT2 52:AUXOUT3 53:AUXOUT4 54:AUXOUT5 55:AUXOUT6 57:BB Blue GP0 pin 3 113:BB Blue GP0 pin 6 116:BB Blue GP0 pin 5 27:BBMini Pin P8.17 101:MainOut1 102:MainOut2 103:MainOut3 104:MainOut4 106:MainOut5 106:MainOut6 107:MainOut7 108:MainOut8	Digital pin number for first relay control. This is the pin used for camera control.	<input type="checkbox"/>
RELAY_PIN2		-1		-1:Disabled 49:BB Blue GP0 pin 4 50:AUXOUT1 51:AUXOUT2 52:AUXOUT3 53:AUXOUT4 54:AUXOUT5 55:AUXOUT6 57:BB Blue GP0 pin 3 113:BB Blue GP0 pin 6 116:BB Blue GP0 pin 5 65:BBMini Pin P8.18 101:MainOut1 102:MainOut2 103:MainOut3 104:MainOut4 106:MainOut5 106:MainOut6 107:MainOut7 108:MainOut8	Digital pin number for 2nd relay control.	<input type="checkbox"/>

Load

Save

Write Params

Refresh Params

Compare Params

All Units are in raw format with no scaling

3DR\_Iris+\_AC34

Load Presaved

Reset to Default

Search RELAY

Modified

RELAY\_PIN is set to "51" since the DROP cable is connected to aux2 / pin51.

## ARM setup :

Go to : config / full parameter list search : SERVO9

Command	Value	Units	Options	Desc	Fav
SERVO9_FUNCTION	57		-1:GPIO 0:Disabled 1:RCPassThru 6:MountPan 7:MountTilt 8:MountRoll 9:MountOpen 10:CameraTrigger 12:Mount2Pan 13:Mount2Tilt 14:Mount2Roll 15:Mount2Open 22:SprayerPump 23:SprayerSpinner 27:Parachute 28:Gripper 29:LandingGear 30:EngineRunEnable 31:HeliRSC 32:HeliTailRSC 33:Motor1 34:Motor2 35:Motor3 36:Motor4 37:Motor5 38:Motor6 39:Motor7 40:Motor8 51:RCIN1 52:RCIN2 53:RCIN3 54:RCIN4 55:RCIN5 56:RCIN6 57:RCIN7 58:RCIN8 59:RCIN9 60:RCIN10 61:RCIN11 62:RCIN12 63:RCIN13 64:RCIN14 65:RCIN15 66:RCIN16 73:ThrottleLeft 74:ThrottleRight 75:TiltMotorFrontLeft 76:TiltMotorFrontRight 81:BoostThrottle 82:Motor9 83:Motor10 84:Motor11 85:Motor12 88:Winch 90:CameraISO 91:CameraAperture 92:CameraFocus 93:CameraShutterSpeed 94:Script1 95:Script2 96:Script3 97:Script4 98:Script5 99:Script6 100:Script7 101:Script8 102:Script9 103:Script10 104:Script11 105:Script12 106:Script13 107:Script14 108:Script15 109:Script16 120:NeoPixel1 121:NeoPixel2 122:NeoPixel3 123:NeoPixel4 124:RateRoll 125:RatePitch 126:RateThrust 127:RateYaw 129:ProfileLED1 130:ProfileLED2 131:ProfileLED3 132:ProfileClock 133:Winch Outch 134:SERVOOn_MIN 135:SERVOon_TRIM 136:SERVOon_MAX	Function assigned to this servo. Setting this to Disabled(0) will setup this output for control by auto missions or MAVLink servo set commands. any other value will enable the corresponding function	<input type="checkbox"/>
SERVO9_MAX	1900	PWM	800 2200	maximum PWM pulse width in microseconds. Typically 1000 is lower limit, 1500 is neutral and 2000 is upper limit.	<input type="checkbox"/>
SERVO9_MIN	1100	PWM	500 2200	minimum PWM pulse width in microseconds. Typically 1000 is lower limit, 1500 is neutral and 2000 is upper limit.	<input type="checkbox"/>
SERVO9_REVERSED	0		0:Normal 1:Reversed	Reverse servo operation. Set to 0 for normal operation. Set to 1 to reverse this output channel.	<input type="checkbox"/>
SERVO9_TRIM	1500	PWM	800 2200	Trim PWM pulse width in microseconds. Typically 1000 is lower limit, 1500 is neutral and 2000 is upper limit.	<input type="checkbox"/>

We set SERVO9\_FUNCTION to "57" since our radio switch for ARM is on channel 7 and the cable is connected to aux1 / servo9.

## FEED setup:

Go to : config / full parameter list search : CAM

Command	Δ	Value	Units	Options	Desc	Fav
CAM_AUTO_ONLY		0		0:Always 1:Only when in AUTO	When enabled, triggering by distance is done in AUTO mode only.	<input type="checkbox"/>
CAM_DURATION		3	ds	0 50	How long the shutter will be held open in 10ths of a second (i.e. enter 10 for 1second, 50 for 5seconds)	<input type="checkbox"/>
CAM_FEEDBACK_PIN		52		-1:Disabled 50:AUX1 51:AUX2 52:AUX3 53:AUX4 54:AUX5 55:AUX6	pin number to use for save accurate camera feedback messages. If set to -1 then don't use a pin flag for this, otherwise this is a pin number which if held high after a picture trigger order, will save camera messages when camera really takes a picture. A universal camera hot shoe is needed. The pin should be held high for at least 2 milliseconds for reliable trigger detection. See also the CAM_FEEDBACK_POL option.	<input type="checkbox"/>
CAM_FEEDBACK_POL		1		0:TriggerLow 1:TriggerHigh	Polarity for feedback pin. If this is 1 then the feedback pin should go high on trigger. If set to 0 then it should go low	<input type="checkbox"/>
CAM_MAX_ROLL		0	deg	0 180	Postpone shooting if roll is greater than limit. (0=Disable, will shoot regardless of roll).	<input type="checkbox"/>
CAM_MIN_INTERVAL		0	ms	0 10000	Postpone shooting if previous picture was taken less than preset time(ms) ago.	<input type="checkbox"/>
CAM_RELAY_ON		1		0:Low 1:High	This sets whether the relay goes high or low when it triggers. Note that you should also set RELAY_DEFAULT appropriately for your camera	<input type="checkbox"/>
CAM_SERVO_OFF		1100	PWM	1000 2000	PWM value in microseconds to move servo to when shutter is deactivated	<input type="checkbox"/>
CAM_SERVO_ON		1900	PWM	1000 2000	PWM value in microseconds to move servo to when shutter is activated	<input type="checkbox"/>
CAM_TRIGG_DIST		0	m	0 1000	Distance in meters between camera triggers. If this value is non-zero then the camera will trigger whenever the position changes by this number of meters regardless of what mode the APM is in. Note that this parameter can also be set in an auto mission using the DO_SET_CAM_TRIGG_DIST command, allowing you to enable/disable the triggering of the camera during the flight.	<input type="checkbox"/>
CAM_TRIGG_TYPE		1		0:Servo 1:Relay 2:GoPro in Solo Gimbal	how to trigger the camera to take a picture	<input type="checkbox"/>

Load

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SDR\_Inst+\_AC34

Load Presaved

Reset to Default

Search  
CAM

Modified

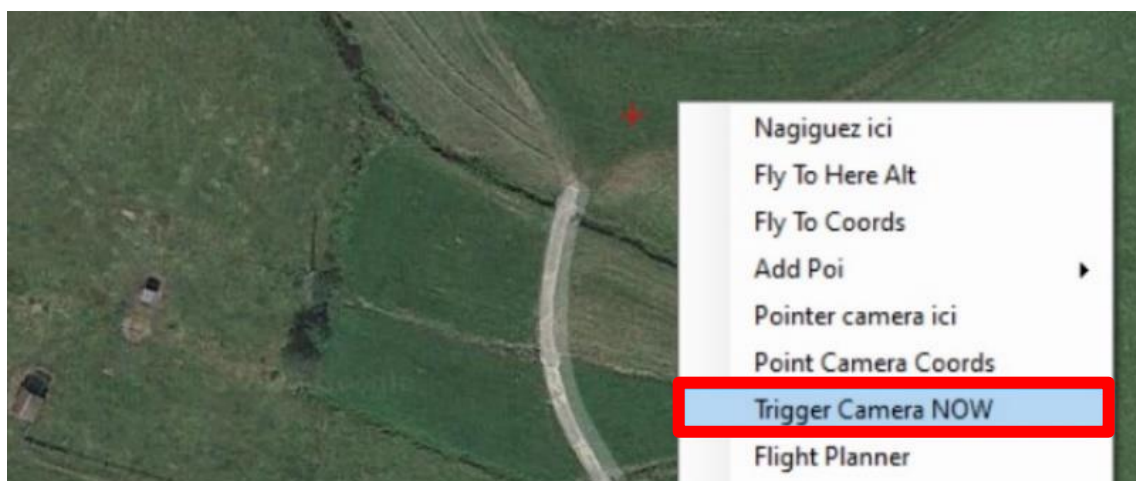
CAM\_FEEDBACK\_PIN is set to "52" since the FEED cable is connected to aux3 / pin52.

CAM\_FEEDBACK\_POL is also set to "1" since the T-Drop returns a high state when a ball fall.

## Test :

Check that your configuration works:

- With your radio (manual drop) switch on ARM (if used) then activate the inter DROP, if your configuration is correct, the T-Drop should turn once.
- From mission planner (auto drop) switch on ARM (if used) then on the mission planner map, right click and click on : Trigger Camera NOW, if your configuration is correct, the T-Drop should run once



- If your feedback configuration (FEED) is correct, the green pictogram of a camera should appear on the map when a ball passes the T-Drop cell (for this you need a GPS fix).



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## Advice for use :

- Before each plot, reset the counters to zero, this will allow you to know the number of beads dropped in the plot, a significant difference between the number of drops requested and the number of beads actually dropped should alert you to a problem during the flight (empty spreader, blockage...).
- Do not overload the tank of your spreader, if you force to bring in a few extra logs it may cause a blockage of your spreader and eventually a premature wear of its engine.
- Regularly clean the infrared cell at the outlet of the T-Drop. This cell manages the spreader to a large extent, during use it becomes clogged (particularly when using cellulose beads), which causes the spreader to malfunction (counting problems, multiple drops, etc.). It is advisable to clean the cell at least once a day with air (dry air can, portable dust blower...).
- Check that the T-Drop is properly attached before each take-off.
- Before sending your drone on an AUTO mission, manually release a bead to check that your T-Drop is working properly.

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# Mission planner :

You received with your T-Drop a camera file containing the settings for the use of the T-Drop in auto mission as well as a plugin allowing you to display the feedback of your spreader on the main page.

## Camera file:

- If you do not have any custom cameras you can simply replace the "cameras.xml" file in the mission planner folder.

The folder installation path is : **C:\Users\Documents\Mission Planner**

- If you already have custom cameras you will need to edit the "cameras.xml" file to add the T-Drop without losing your other cameras.



Open the "cameras.xml" file provided with the T-Drop with a text editor.

```
<senw>4.8</senw>
</Camera>
<Camera>
  <name>AeroHawk_8MP</name>
  <flen>3.039</flen>
  <imgh>2464</imgh>
  <imgw>3280</imgw>
  <senh>2.76</senh>
  <senw>3.674</senw>
</Camera>
<Camera>
  <name>T-Drop_10M</name>
  <flen>100</flen>
  <imgh>100</imgh>
  <imgw>100</imgw>
  <senh>333</senh>
  <senw>500</senw>
</Camera>
<Camera>
  <name>T-Drop_20M</name>
  <flen>200</flen>
  <imgh>100</imgh>
  <imgw>100</imgw>
  <senh>333</senh>
  <senw>500</senw>
</Camera>
<Camera>
  <name>T-Drop_30M</name>
  <flen>300</flen>
  <imgh>100</imgh>
  <imgw>100</imgw>
  <senh>333</senh>
  <senw>500</senw>
</Camera>
</Cameras>
```

**Copy the cameras named "T-Drop"**

Open the file "cameras.xml" on your computer with a text editor.

The folder installation path is : **C:\Users\Documents\Mission Planner**

```
<senw>4.8</senw>
</Camera>
<Camera>
  <name>AirPhen_8mm</name>
  <flen>8</flen>
  <imgh>960</imgh>
  <imgw>1280</imgw>
  <senh>3.6</senh>
  <senw>4.8</senw>
</Camera>
<Camera>
  <name>T-Drop_10M</name>
  <flen>100</flen>
  <imgh>100</imgh>
  <imgw>100</imgw>
  <senh>333</senh>
  <senw>500</senw>
</Camera>
<Camera>
  <name>T-Drop_20M</name>
  <flen>200</flen>
  <imgh>100</imgh>
  <imgw>100</imgw>
  <senh>333</senh>
  <senw>500</senw>
</Camera>
<Camera>
  <name>T-Drop_30M</name>
  <flen>300</flen>
  <imgh>100</imgh>
  <imgw>100</imgw>
  <senh>333</senh>
  <senw>500</senw>
</Camera>
</Cameras>
```

**Paste the T-Drop cameras at the end of your file and save.**

**Check that there is :**

**</Camera>**

**<Camera>**

**Between two cameras**

**And that your file ends with :**

**</Camera>**

**</Cameras>**



Restart mission planner, you should now see the T-Drop "cameras" at the bottom of the drop down menu:



***"The cameras are designed to work with 70% / 80% overlap  
Always check that the distance between the lines and between the drops  
corresponds to your needs (here 10m / 10m)"***

## Plugin :

To install the provided plugin you just have to copy the two provided files (without modifying or renaming them):

- **T-Drop.cs**
- **T-Drop.png**

In the mission planner plugin folder

The folder installation path is : **C:\Program Files (x86)\Mission Planner\plugins**

After restarting mission planner, you should see the plugin appear on the main screen:



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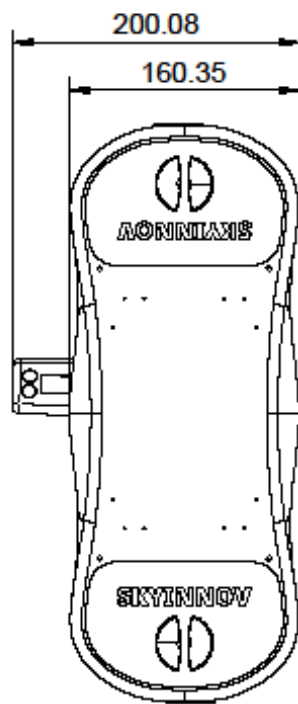
The plugin counter automatically resets to zero when you arm your drone.



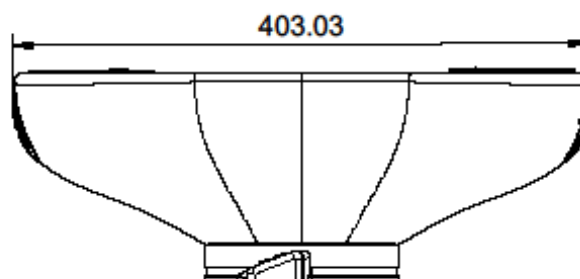
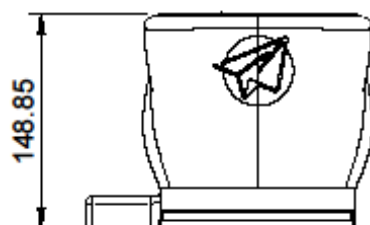
**Actual ball release counter**

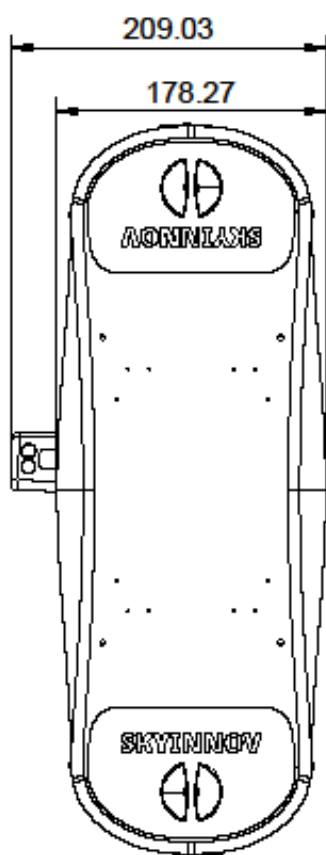
**In AUTO mode only, the plugin displays an alarm if during the mission there has been no drop for more than 10 seconds. (The message disappears as soon as a ball is dropped)**

## General views:



T-Drop 5L
Skyinnov





T-Drop 8L
Skyinnov

