

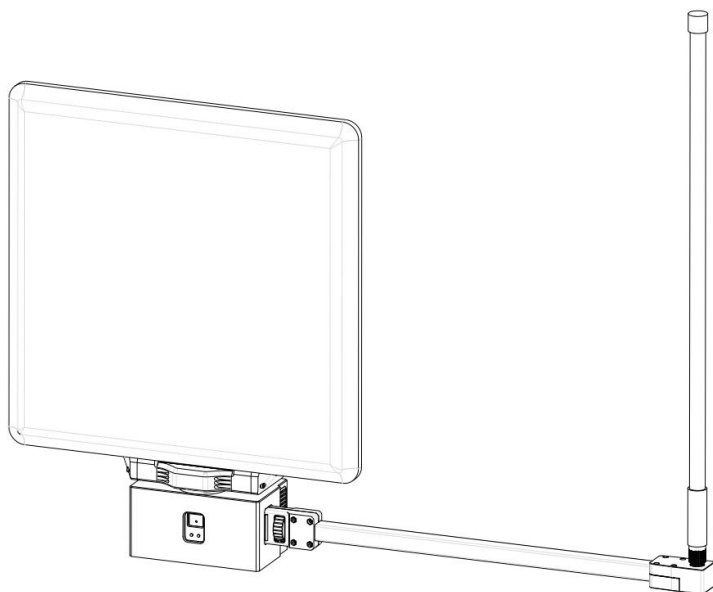
# V31

Data Video RC link

## Automatic Antenna Tracker (AAT)

User Manual

V1.0.2



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# Disclaimer

Thank you for choosing the V31PRO Data Video Transmission System and the Automatic Tracking System. Please adhere to local radio regulations and carefully read and accept this statement before use. Chinowing Technology Co., Ltd. is not liable for any consequences or losses resulting from improper user actions.

## Product Notices

1. V31 operates on DC12 - 24V (Lithium battery 3s - 6s). Ensure strict adherence to these specifications for module power supply.
2. Install antennas before powering up to prevent circuit damage.
3. Ensure unobstructed antenna usage, avoid bending, and keep them away from large metal structures to prevent communication blockages.
4. Do not disassemble or modify the V31. For any installation or usage issues, contact Chinowing or your authorized dealer.
5. Maintain appropriate distances between electronic devices during installation to minimize electromagnetic interference.
6. Before use, ensure all connections are secure and all components are functioning properly.
7. Check the surrounding environment before use to ensure no interference from other devices on the same frequency range, as it may severely impact V31 data transmission.
8. When using the tracker in a new environment, calibrate the magnetic compass.
9. Securely mount your antenna on the tracker. Avoid magnetic materials nearby to ensure the normal operation of the built-in compass.
10. If any questions, contact your supplier or visit our website: [www.chinowing.com](http://www.chinowing.com) for technical support.

# Introduction and Specifications

To effectively achieve long-distance results, It's necessary to be equipped with an automatic tracking system.

The tracker ensures high-gain signal reception for UAV systems, addressing challenges associated with maintaining optimal angles for directional antennas during flight.

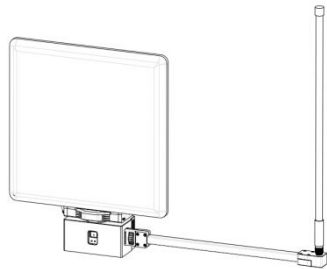
This system tracks UAVs by receiving MAVLink protocol data from the flight control, achieving effective and dynamic tracking.

## List of Items

### Main Modules

Tracker+V31 Ground unit

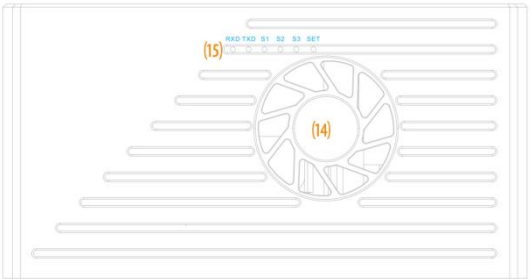
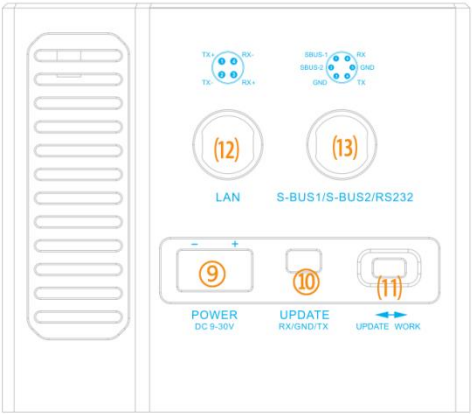
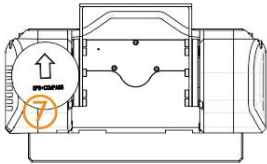
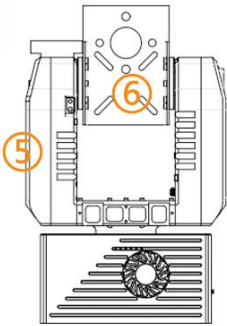
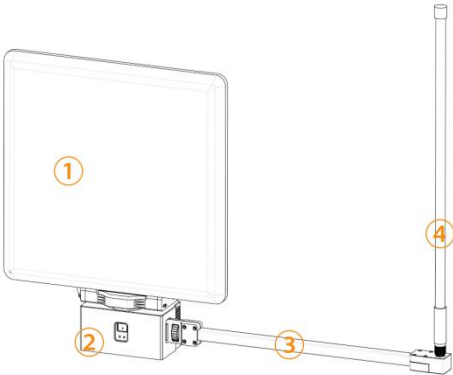
V31 Air unit    x 1



Accessories

<p>Power supply cable *1 (XT30)</p>	<p>RJ45 to 4Pin cable *2</p>	<p>GH4pin cable *2 GH3pin cable *4</p>
		
<p>Fiberglass antenna *1</p>	<p>SMA rod antennas *2</p>	<p>Charger 16.8V 6A</p>
		
<p>Aviation cable 6pin *1 Aviation cable 4pin *1</p>	<p>Firmware upgrade cable *1</p>	<p>Battery 16.8V 17000mha</p>
		

# Markings Introduction



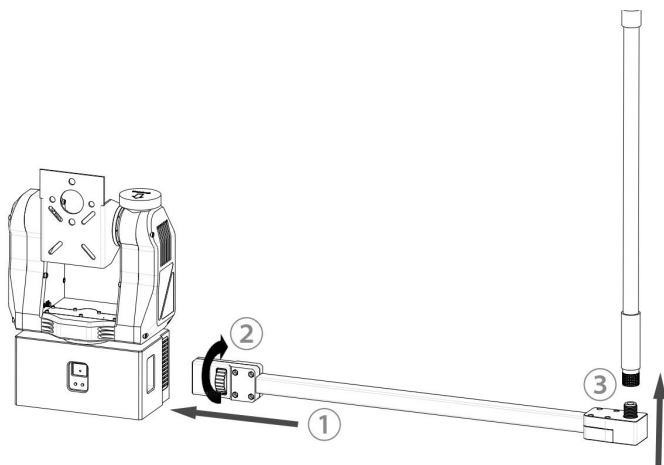
- ① Directional panel antenna
- ② Central control screen
- ③ Sub antenna connection shaft
- ④ Sub antenna
- ⑤ Tracker Yaw Axis
- ⑥ Tracker Pitch Axis
- ⑦ Compass with GPS (Keep away from metal objects during operation)
- ⑧ Tracker base, quick-Install-Release Latch
- ⑨ Power Input 9-30V
- ⑩ Firmware Upgrade Interface
- ⑪ Firmware Upgrade and Operating Mode Switch
- ⑫ V31 LAN port, connecting to T30,T40 or laptop Ethernet port
- ⑬ V31 SBUS input and serial port interface, connecting to T30, T40 Avionics 6-pin Interface
- ⑭ V31 Heat Dissipation Port
- ⑮ V31 LED instruction

## Installation and Operation

Install the tracker on the tripod. The tracker is equipped with a standard 1/4-20 tripod thread interface at the bottom. Please install it securely and tightly via slip-ring.



Sub antenna installation instruction:



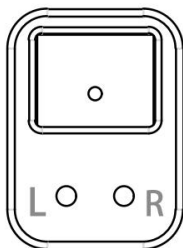
- ① Connect the sub antenna guide rail to the tracker;
- ② Tighten the knob upward
- ③ Install the Fiberglass antenna

The connection between tracker and T40 ground control station





## System Screen Operations



### Center Control Screen Buttons Introduction

Main interface key operation: long press requires  $\geq 1.5s$ , short press requires  $< 1s$

L: long press: enter menu

short press: tracking/offline mode switch.

The device stops tracking under offline mode

R: long press: common flight direction setting

short press: set current location as home

When setting the common flight direction mode, the tracker will limit the free rotation angle, and the rotation range:  $\pm 225$  degrees.

### Menu Button Operations

L: long press: return to the main menu

short press: roll down the menu column

R: short press: select the column

When open menu interface, the column selected by default is the current value of the relevant setting parameter. If not a parameter setting interface, that will be the column selected last time.

The following information will be displayed on the OLED screen:

GPS: 12 (Batt:12.1V)  
DIST:N/A  
Alt: N/A  
AZim: N/A  
VLink: 0%  
Dir: 0

Main Screen Descriptions	
Display Item	Description
GPS/LocalGPS Batt	GPS Satellites locked. If an external GPS is connected, GPS/LocalGPS will be displayed in 12/11 formation (GPS=12, Local=11) Batt (Voltage of the main battery) will be displayed alternatively here.
Dist	Distance of the plane (Not Available before SetHome)
Alt	Altitude of the plane (Not Available before SetHome)
Azim	Azimuth of the plane (Not Available before SetHome)
VLink/DLink	Video/Data downlink quality. (in %, ref to the "Downlink" chapter)
Dir/EDir	Current heading direction of the tracker. If an external compass is connected, EDir will be displayed alternatively

MAIN MENU Title

**YawTrim** The degree of horizontal and pitch trimming

Yaw: The degree of horizontal trimming. If the tracker is always pointing toward one side of the target, use this option to compensate. Positive number settings make the tracker point further to the right, and negative number settings make the tracker point further to the left. The limit of adjustment is +/- 20 degrees

Pitch: The degree of pitch trim. A positive setting makes the tracker raise its head more, and a negative setting makes the tracker lower its head further. The limit of adjustment is +/- 20 degrees

**HomePos** Recall historical home coordinates

UsePreHome

H1:D:800 The most recent home position, 800 indicates the drone's distance from this point is 800m. The screen alternately displays the latitude and longitude of this historical position. Selecting this option loads the corresponding coordinates as the current home coordinates.

H2:D:XXX Earlier home position than H1. The drone's distance from this historical position is XXXm.

H3:D:XXX Earlier home position than H2.

H4:D:XXX Earlier home position than H3.

H5:D:XXX Oldest recorded home position in history.

AutoLoad=N: Set to Y for the tracker to automatically load H1 as home coordinates upon startup; set to N means no.

Exit

**CalCompass** When enter the CalCompass menu, the calibration operation begins synchronously.

MIZ/X/Z/A : Internal parameters displayed (usually not relevant for users)

Exit

After performing the calibration operation. Please wait for about 20 seconds; the tracker will automatically rotate momentarily until the screen displays "OK".

Without an external compass, the calibration targets the internal compass.

With an external compass plugged in, the calibration targets the external compass.

Calibration data for both are saved independently. If the external compass is removed, the tracker will automatically use the internal compass and its previous calibration data.

After compass calibration, please restart the tracker, especially if selecting CompassMod=InitOnly mode (only initializes the compass during startup).

**MotorCurr** Set motor drive currents

Pitch: XXXX(mA) Default 4300ma Set to 0 then unable to move horizontally.

Yaw: XXXX(mA) Default 2000ma Set to 0 then unable to pitch.

AutoDetect: Automatically adjusts the current setting based on the current load. Please wait for the operation completion.

**CaliPitch** Calibrate pitch angle (Please plug out the external compass before calibration)

PitchUp Increase the tracker pitch angle (towards the sky).

PitchDown Decrease the tracker pitch angle (towards the ground).

Save L-Pos: Save the tracker lowest point position.

Safe H-Pos: Save the tracker highest point position. Before saving, ensure the tracker has rotated beyond 90 degrees (overhead), for example, at 110 degrees.

Safe&Exit: Complete the save, calculate relevant parameters, and exit. Only choose this option to save the calibration results.

Exit: Exit without saving the results.

**CompassMod** Compass usage mode settings

InitOnly: Using the compass only when powered on.

Power on and wait for 3 seconds, a three-beep sound initiates horizontal initialization rotation, setting the pitch angle to 0.

Always: Continuously references the compass.

Power on and wait for 1 second, a three-beep sound initiates, setting the pitch angle to 0. Generally recommended only when an external compass is used.

Never: Never uses the compass.

After a 3-second wait, a three-beep sound initiates horizontal rotation. Requires manual alignment of the tracker base to true north, setting the pitch angle to 0.

Exit

**Baud Rate setting**

115200

57600

38400

19200

9600

1200

Exit

## FlightInfo

Lon: EAST/WEST Target east/west longitude  
DD.DDDDDD longitude  
Lat: SOUTH/NORTH Target south/north latitude  
DD.DDDDDD Target latitude  
ASL: XXXm Target altitude above sea level  
BARO: XXXm Target barometric altitude  
HOME Lon:E/W Home east/west longitude  
DD.DDDDDD Home longitude  
HOME lat:N/S Home south/north latitude  
DD.DDDDDD Home latitude  
H\_ASL: Home altitude above sea level  
EXIT

## PayloadSel Payload selection

Light  
Medium  
Heavy  
UltraHeavy  
Exit

## OSDLevel OSD

Brightness  
Level: 0~100 Relative brightness of OSD simulated video signal screen overlay  
Exit

## VBISetting Video decoding protocol version

VBI Level

VBI V1/V2 The version of the VBI communication protocol need to be consistent with the flight controller/TeleFly module.

INC/DEC/Volt/Cnt:AutoTune: Currently supports only automatic adjustment

Exit

#### **Protocol** Tracking protocol

ALT=BARO/GPS Select the appropriate option based on the communication protocol. For example, for the MAVLink protocol, choose GPS if using local GPS; otherwise, choose BARO.

**LNK=DIGIT/ANALOG** Use digital/analog link. Choose DIGIT if using data transmission; choose ANALOG if using VBI video tracking.

#### **TrackerID**

TrackerNo. Reserved for FlightTogether functionality.

Exit

#### **SysInfo** System information

Ver.: X.XXX Version number

Ignore other parameters please.

Exit

#### **Factory:** Engineering menu

Test

YawTest: Automatically test yaw rotation

PitchTest: Automatically test pitch rotation

AllTest: Simultaneously perform pitch and yaw tests

CoreData: Display underlying data.

RX: Number of bytes received via the serial port. Accumulates data received by the tracker, even if the baud rate is incorrect. An increase in this data can indicate whether the tracker hardware is reading external data streams.

POS/OTH/ORE: Please ignore

EXIT

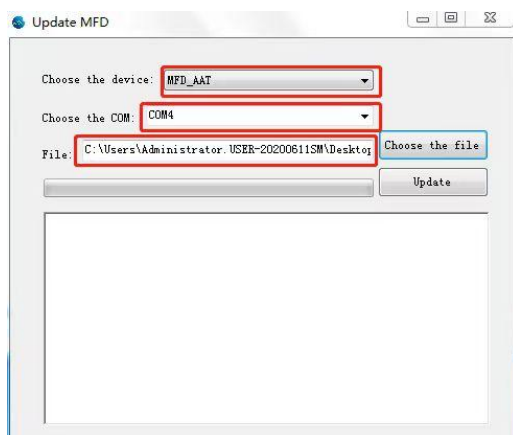
## Calibrating the Compass

After mounting the tracker on a tripod, power it on and select CalCompass. Restart the tracker after 'OK'.

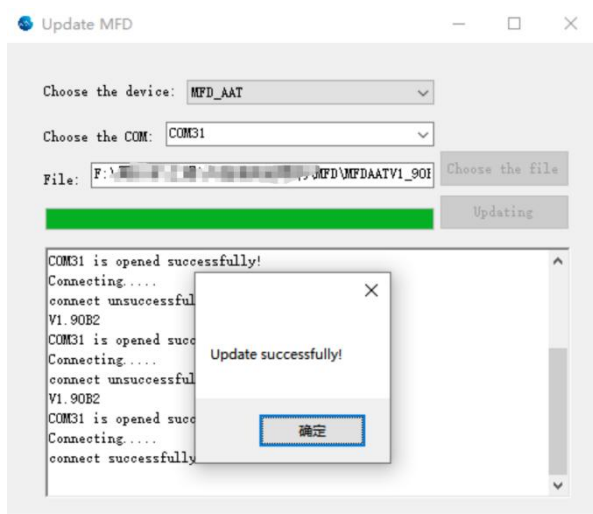
After calibration, use APP to compare the main display's ExDir azimuth angle to see if it's within 10°. If the error exceeds 10° and the ExDir azimuth angle fluctuates in static conditions, there may be electromagnetic interference from the metal nearby. In this case, need to change the takeoff site and recalibrate.

## Firmware Upgrade

1. Power the tracker and set UPDATA mode.
2. Select a baud rate of 38400 bps for the tracker.
3. Run MFD\_update.exe program (download the upgrade software from our official website [www.chinowing.com](http://www.chinowing.com).)
4. Select "MFD\_AAT" in the dropdown list, choose the correct COM port (each system assigns a different number). Choose the file and update.



5. Click update and select "YES" and wait for its completion.



6. Check after firmware upgrade

1. Set the Baud rate.
2. Check the MotorCurr menu to verify the current settings for both motors. Usually, both can be set to Pitch: 4300mA, YAW: 2000mA.
3. CalCompass compass calibration.



# Frequently Asked Questions

1: The tracking is inaccurate

Please do CalCompass compass calibration, away from metal, personnel, phones, etc.

2: Compass ExDir data statically fluctuates

Please change the site after interference, then recalibrate CalCompass compass.

3: Interference with two or more trackers started simultaneously

Please ensure each set has a unique Key. Set different Key to avoid interference.

4: Severe packet loss and high video transmission delay

- a. Check if the antennas are properly connected
- b. Verify that module versions are consistent
- c. Check if wireless settings on the modules are consistent
- d. Check other devices, connection cables, and computer interfaces for normal operation.
- e. Verify video player settings or try another video player software.

# Specifications

Category	Item	Specification
Tracking Performance	Max Horizontal Rotation Speed	300 degrees/second
	Max Pitch Rotation Speed	60 degrees/second
	Max Horizontal Rotation Angle	Unlimited
	Max Pitch Rotation Angle	-15 ~ +135 degrees

	Horizontal Tracking Error	<0.5 degrees (optical encoder mode)
	Pitch Tracking Error	<0.1 degrees
	Max Pitch Drive Torque	300N.m
	Average Power Consumption	<20W
Antenna Specification	Frequency band	1427MHz ~ 1467MHz 806Mhz~ 826Mhz
	Gain	Main antenna 17dbi Sub antenna 10dbi
	VSWR	≤1.8
	Polarization	Vertical polarization
	Half Power Beamwidth	65°±5°
	Dimensions	Directional antenna 445*445*40mm Omni antenna 1 meter
	Operating Humidity	10% ~ 95%
	Antenna Cover Color	White
	Antenna Cover Material	ABS
Interface	Power supply	1 pcs, XT60, Input power 9-30V
	Antenna interface	2 pcs, for V31
	LCD	1 pcs, display the menu
	Interface	Aviation plug 4pin and 6pin, SBUS *2 RS232*1 GH1.25 3pin firmware upgrade cable*1
		2 for menu operations

## Version Update History

Date	Version	Description	Author
2023-12	V1.0	Original version	HZY
2023-12	V1.0.2	Published version	HZY
