RTK F9P

Centimeter-Level GNSS Module

14+

Contents

1. Introduction

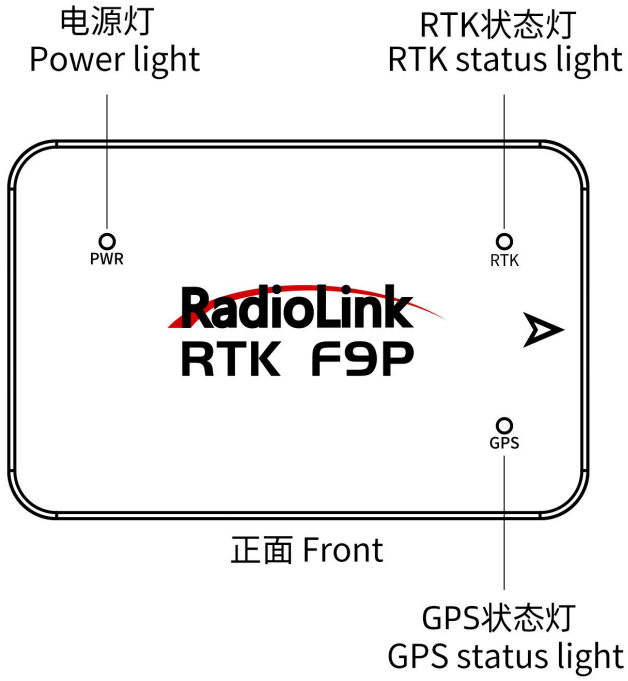
High-precision navigation: Many drone applications require higher accuracy than traditional GNSS, such as drone mapping, drone measurement, and high-precision takeoff and landing.
RTK F9P is a four-star Real Time GNSS system from RadioLink, using two RTK F9P modules, one for the aircraft and the other for the base station.

2. Technical Parameters

Receiver type	RTK F9P
GNSS	BeiDou, Galileo, GLONASS, GPS/QZSS
Number of concurrent GNSS	4
GNSS Bands	GPS L1C/A L2C, GLONASS L1OF L2OF, GALILEO E1B/C E5b, BDS B1I B2I, QZSS L1C/A L2C
Navigation update rate	Up to RTK 20 Hz
position accuracy	RTK 0.01M+1ppm CEP
RTK Surveyin-time	RTK<10S
Acquisition	Cold starts 24 s
	Assisted starts 2 s
	Reacquisition 2 s
Sensitivity	Tracking & Navigation: –167dBm
	Cold starts: –148dBm
	Hot Starts: –157dBm
	Reacquisition: –160 dBm
Anti-jamming	Active CW detection and removal Onboard filter
Anti-spoofng	Advanced anti-spoofing algorithm

Interface	
Serial	2 UARTs
USB	1
Antenna Type	Multi-satellite multi-frequency antenna
Time Pulse	Configurable from 0.25hz to 10mhz
Protocols	NMEA、UBX binary、RTCM 3.x
Other Information	
Operating voltage	4.5 V to 6 V
Operating temperature	–40 °C to +85 °C
Size	31.5 * 48.5 * 9.3 MM
Weight	13g

3. LED & Interfaces



RTK light

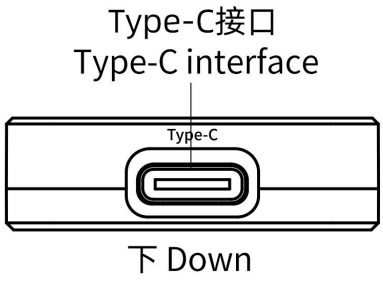
Off：No access to RTK

Flashing: RTK fixs

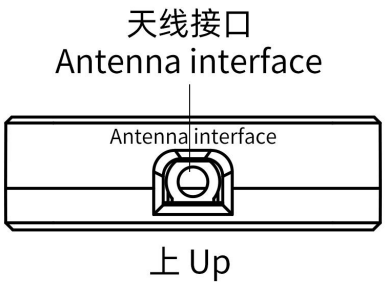
GPS light

Always bright: No fixs

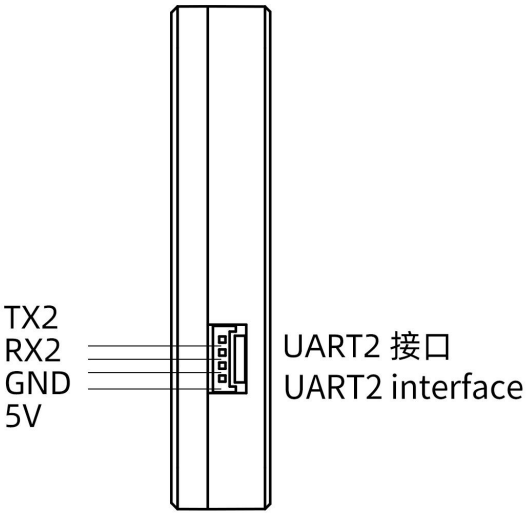
Flashing: GPS positioning succeeded



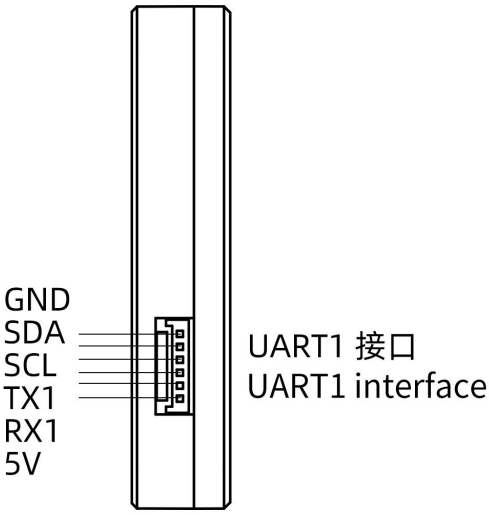
下 Down



上 Up



左侧 Left



右侧 Right

4. Hardware Connection

4.1 RTK base hardware connection

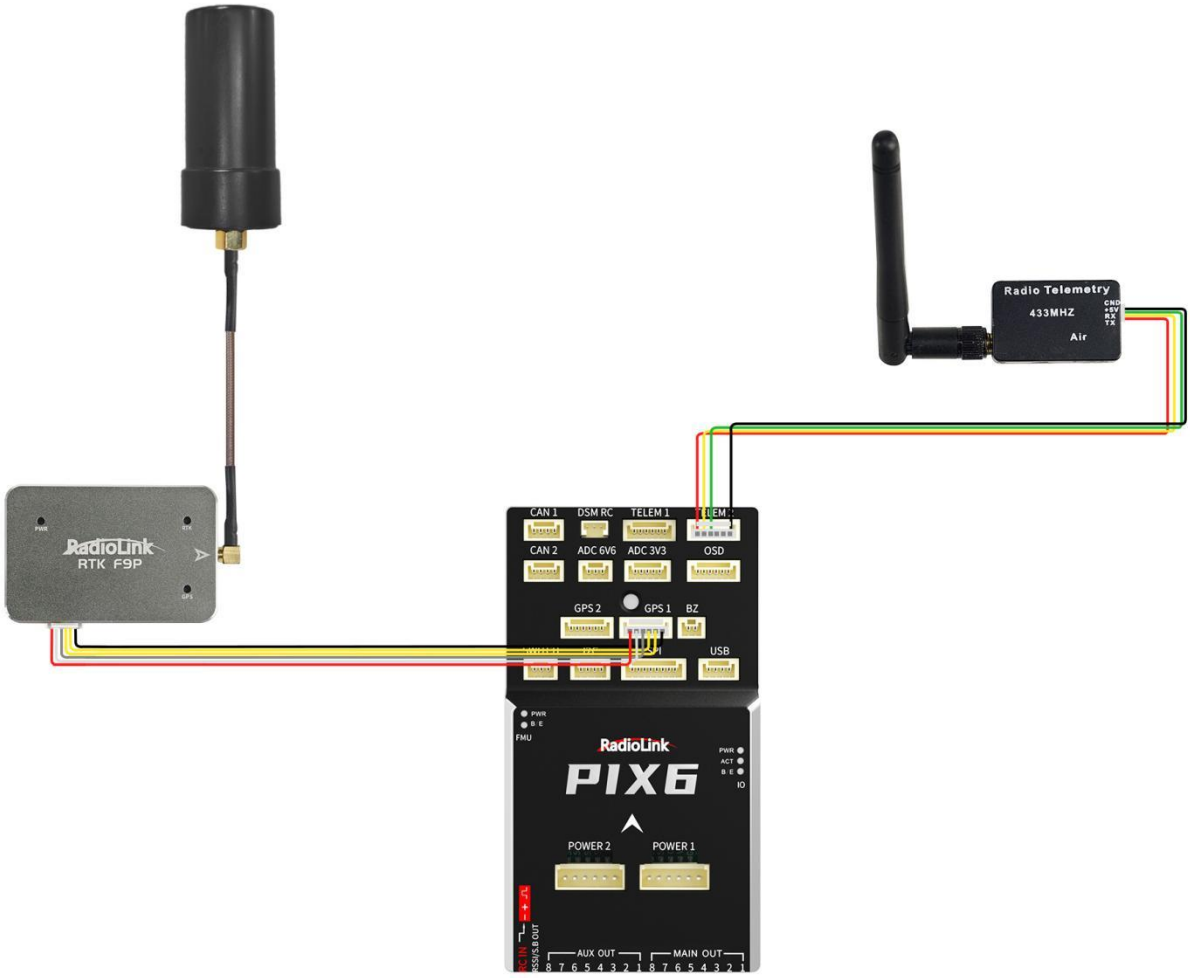
The base station module is connected to the computer via a type-C cable; the ground end of the data transmission module is connected to another USB port on the computer. As shown below:

Note: Please place the base station module outdoors in an environment with sufficient sky coverage to obtain a good satellite search signal. Place the base station on a stable and elevated platform, such as a tripod.

You need to set RTK base in Mission Planner. For more details, please refer to 5. Set RTK base in Mission Planner

4.2 Rover hardware connection

Connect to PIX6:



Pinouts

Pinout	UART1
1	5V
2	GPS_RX(UART1_RX)
3	GPS_TX(UART1_TX)
4	SCL
5	SDA
6	GND

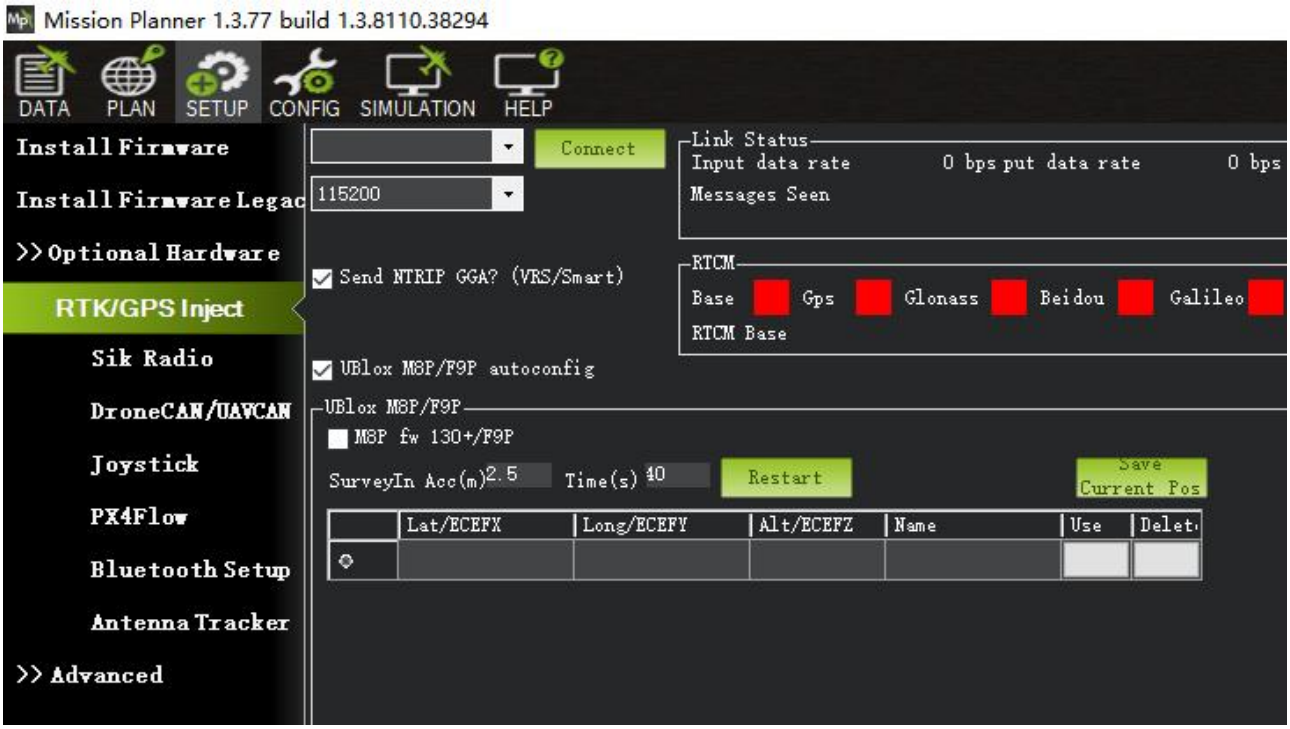
5. Set RTK Base in Mission Planner

5.1 Build an RTK base station

If you use Ardupilot firmware to build an RTK differential system, you need to configure the base station positioning and forward data in Mission Planner. During the positioning configuration of the base station, there is no need to start the mobile station and drone.

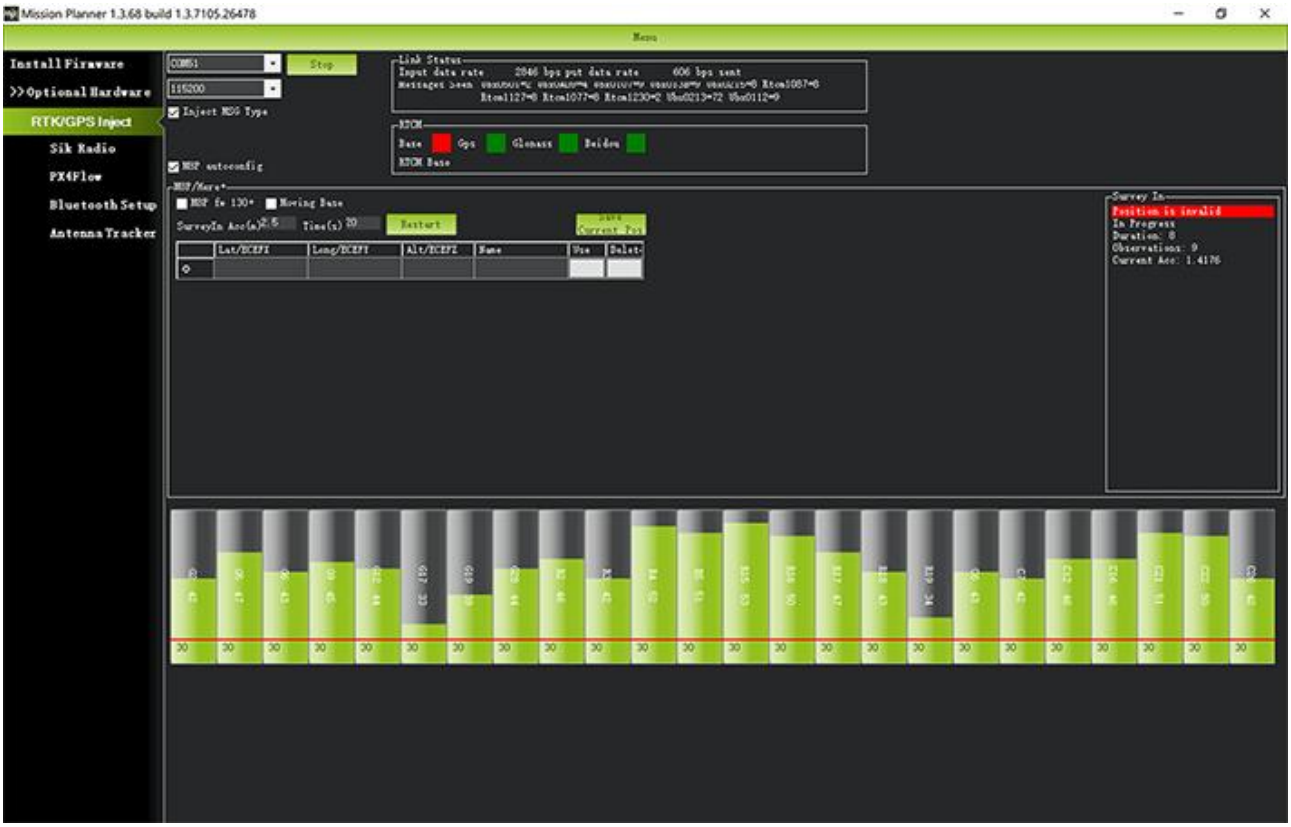
- Open Mission Planner
- Enter the initial setup
- Click on Optional Hardware
- Click on RTK/GPS Inject, you will see the following page:

(Note: If RTK/GPS Inject is not available in your Mission Planner, please update Mission Planner to the latest version.)



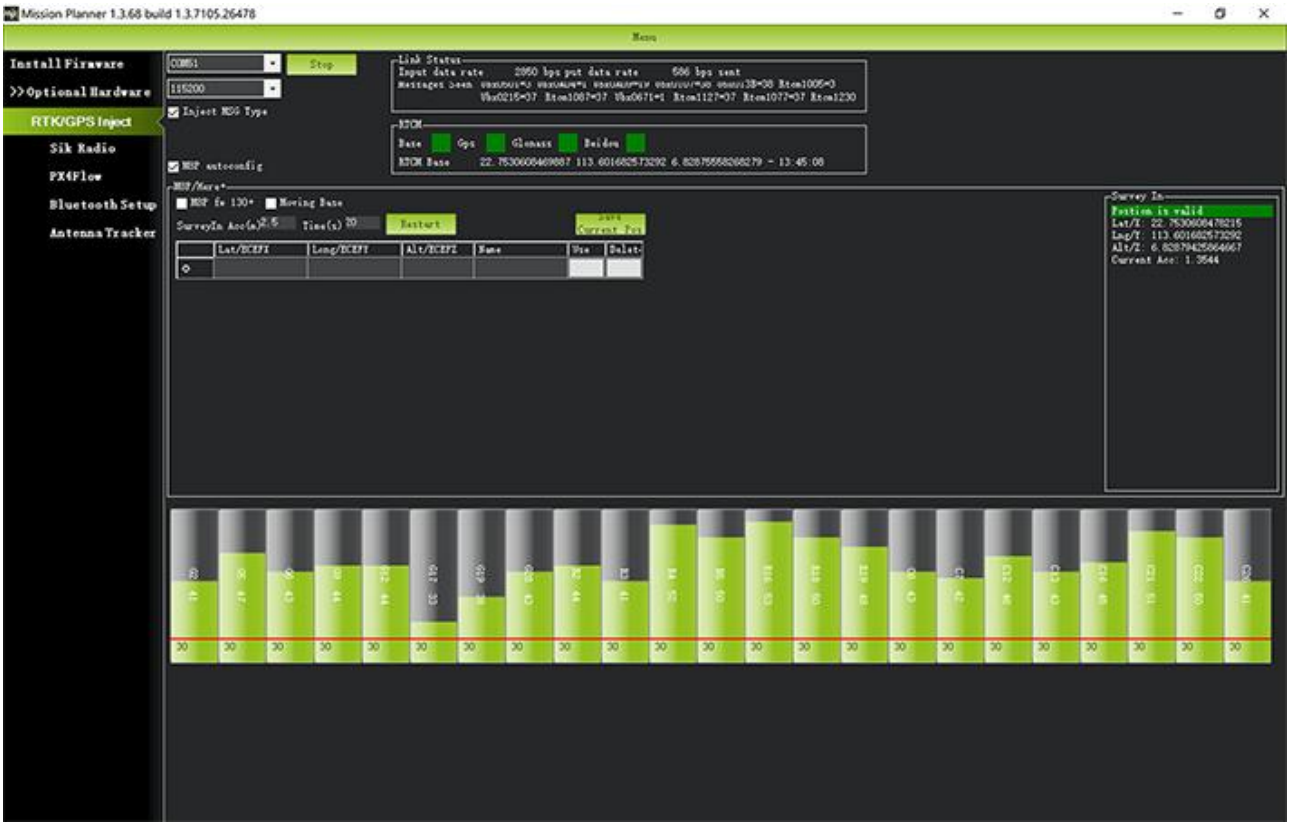
- Set the base station port in the upper left corner
- Click connect
- Check "M8P/F9P autoconfig"
- Click Restart (Mission Planner will transfer the data you input to the RTK base station, and the base station will start a new round of satellite search and positioning)

You will see the following page:



- Position is invalid: The base station has not yet reached a valid location;
- In Progress: Search satellite is still in progress;
- Duration: The number of seconds the current search star has been executed;
- Observation: the number of observations obtained;
- Current Acc: The absolute geographic accuracy that the current base station can achieve. The green vertical bar below Mission Planner shows the satellite and satellite signal strengths currently searched by the base station. The base station requires a certain amount of convergence time to meet your desired accuracy requirements. If you need higher absolute accuracy, it may take longer.

Tip: In general, you can set Surveyin=2.5~3.0. The smaller the value, the longer the waiting time. Even if the base station accuracy is 2.5 meters, centimeter-level positioning accuracy can still be obtained after the mobile station solves. After the RTK base station is successfully configured, Mission Planner will display the following page:



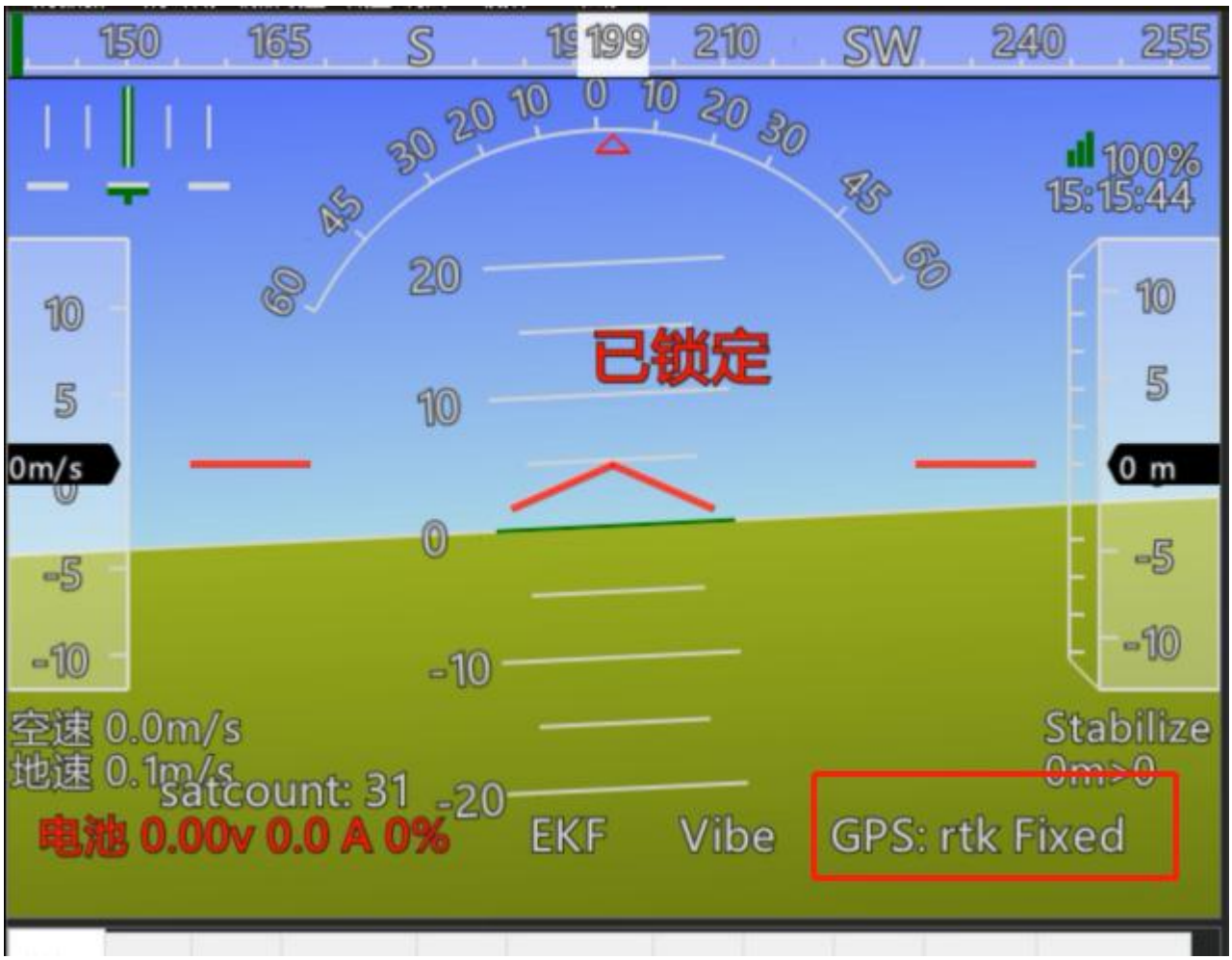
The indicator light showing the status of the base station is green, and the status of GPS, Glonass, Beidou, and Galileo satellite systems are also green. The box on the right shows the status "Position is valid" and displays the current longitude and latitude.

5.2 RTK positioning status

Using the paired digital transmission module to connect to the same Mission Planner, the data of the base station will be transmitted to the RTK mobile station on the drone through the data transmission module. In Mission Planner, you can see that the current GPS status of the drone is displayed as RTK Float/RTK Fixed/3D RTK, indicating that the positioning of the drone has entered the RTK state.

- RTK Float is a floating point solution.
- RTK Fixed is a fixed solution.

RTK Fixed has higher accuracy and is extremely environmentally demanding. Positioning can only enter the RTK Fixed state when the signal is good enough. 3D RTK is the unified display method for RTK Float/RTK Fixed in the Chinese version of Mission Planner.


150
165
S
199
210
SW
240
255
100%
15:15:44
已锁定
0m/s
0 m
空速 0.0m/s
地速 0.1m/s
satcount: 31
电池 0.00v 0.0 A 0%
EKF
Vibe
GPS: rtk Fixed
Stabilize