

# RTK

# High-Accuracy positioning for Spatial

Manual



## **Table of Contents**

What's in the case?	3
Features	3
What else is needed?	3
Pre-purchase RTK test	3
This Manual	4
Set-up	5
Cabling	5
Spatial configuration	6
Bluetooth	9
NTRIP client	10
Installation	10
Screenshots	11
Remote Control	13
Processing	15
Reference	16
Is your Spatial RTK capable?	16
Camera Firmware update	18
Remote control update	19
Tablet upgrade	19
Specifications	20
Support	21

### What's in the case?

1x Custom-made data-cable with Bluetooth dongle for the NTRIP RTK correction signal.

#### **Features**

- Replaces the cameras standard data cable
- Has a Bluetooth adapter for the RTK correction data by NTRIP
- Powered by the camera
- Works with the OBD2 adapter for the wheel signal
- Cable length: 5 m

#### What else is needed?

- A mobile phone with LTE and Bluetooth.
- RTCM 3 correction data by NTRIP
- Free Levebure NTRIP client for Android (from the Android Play Store)

#### **Pre-purchase RTK test**

Please check that the RTCM 3 correction signal is available to you:

- 1. Please download the free <u>Lefebure NTRIP client</u> to your Android phone.
- 2. Find a NTRIP provider. Sign up if needed, or ask for a free test account.
- 3. Set it up in the free Lefebure NTRIP client and verify it works for you in your area.

## This Manual

#### This manual covers aspects specific to RTK only.

You should already be familiar with the Camera and the Remote Control.

Other manuals of interest:

- <u>Remote Control</u> manual.
- <u>Camera</u> manual.
- Car Mount manual.

## Set-up

### Cabling

Unplug the standard data-cable from the Camera. It's a bayonet plug. You first need to rotate the fastener of the plug: Top towards the camera. Then carefully unplug it.

Plug in the new RTK data-cable.It's a Bayonet plug.You first need to rotate the fastener of the plug: Top away from the camera.Then plug it in with the marker (inside the plug) pointing down.Then secure by rotating the fastener, top towards the camera.

#### The remaining of the set-up is the same as it is with the standard data-cable:

Connect the Spatial to the new RTK data-cable by aligning the red points of the Plug and the Spatial.

Connect the antenna to the Spatial by hand. No tools are needed.

Connect the OBD2 adapter to the new RTK data-cable by hand. No tools are needed.

For best accuracy and robustness it is highly recommended to always use the OBD2 adapter.

### **Spatial configuration**

We like to get the position and direction of the streetview. Streetview means the center of the camera-head.

For this the offsets

- from the Spatial to the GPS antenna
- from the Spatial to the camera-head

need to be entered into the Spatial.

#### Spatial to GPS antenna:

These values can be entered with the free <u>Spatial Manager</u>: Spatial Manager -> Configuration - Alignment

In this example the Antenna is

- 1.30 m behind the Spatial
- 0.40 m to the left of the Spatial
- 0.95 m above the Spatial

Alignmer Roll Offse	nt Offse	t 0.000	Degrees	Odomete	er Offset	Metre
	a atu	-0.000	Degrees	A Offset	0.000	IVIELIE
Pitch Off:	SEL			Y Offset:	0.000	Metre
Pitch Off: Heading	sei: Offset: Zero Cu	0.000 urrent Orientation	Degrees	Y Offset: Z Offset:	0.000	Metre Metre
Pitch Off: Heading	Offset: Zero Cu tenna C	0.000 urrent Orientation	Degrees	Y Offset: Z Offset: External [	0.000 0.000 Data Offset	Metre
Pitch Offs Heading GNSS An X Offset:	Constant Offset: Zero Cu tenna C -1.300	0.000 urrent Orientation	Degrees Metres	Y Offset: Z Offset: External I X Offset:	0.000 0.000 Data Offset 0.000	Metre Metre
Pitch Offs Heading GNSS An X Offset: Y Offset:	Constant Offset: Zero Cu tenna C -1.300 -0.400	0.000 urrent Orientation	Degrees Degrees Metres Metres	Y Offset: Z Offset: External I X Offset: Y Offset:	0.000 0.000 Data Offset 0.000 0.000	Metre Metre Metre

#### Spatial to camera-head:

These values can be entered with the free <u>Spatial Manager</u>: Spatial Manager -> Configuration -> Reference Point Offset

In this example the camera-head is

- 0.10 m in front of the Spatial
- In line with the Spatial. (No left/right offset.)
- 1.45 m above the Spatial

X Offset:	0.100	Metres	X Offset:	0.000	Metres
Y Offset:	0.000	Metres	Y Offset:	0.000	Metres
Z Offset:	-1.450	Metres	Z Offset:	0.000	Metres
Heave Po	int 3 Offset		Heave Po	int <mark>4 Off</mark> set	
X Offset:	0.000	Metres	X Offset:	0.000	Metres
Y Offset:	0.000	Metres	Y Offset:	0.000	Metres
		. Adaptar	7 Offset	0.000	Metres

### Bluetooth

Connect the phone by Bluetooth to the BT dongle of the RTK data-cable. The device is always named **Firefly-...** 



#### The password is: 1234

-		*	マ 4G ⊿ 4G	🖌 78% 📋 12:23	ê 🗖	* 🐨	4G 🖌 4G 🖌 78% 📋 12:23
<	← Pair new device				Blue	tooth	
	Pair	with Fire	eFly-9BAA	?		On	•
	1234	٩)		- 1		Visible as "CUBOT	_NOVA" to other devices
×	Usual	y 0000 or 12	234	mhala		Paired devices	
		PIN Contai	ins letters or s	Indois		Palled devices	<b>`</b>
×	You r on th	nay also ne e other dev	eed to type th /ice.	nis PIN	* (	FireFly-9BAA	) 🗢
C		Allow acce call history	ess to your cor ⁄	ntacts and	+	Pair new device	
			CANCEL	ок		Device name CUBOT_NOVA	
						Received files	
	1	2	3	-	(i)	Phone's Bluetooth	address: 7C:B9:60:2E:DE:
	4	5	6	<u> </u>	0	25	
	7	8	9	$\langle \times \rangle$			
	,	0		<ul> <li>✓</li> </ul>			
		$\bigtriangledown$	0			< ⊂	

## **NTRIP client**

#### Installation

Download and install the free **Lefebure NTRIP client** from the Google Play Store. We tested with version **2018.09.07**.



### Screenshots

### Main screen

Display	Settings
---------	----------



### **Receiver Settings**

### **NTRIP settings**

Please use a **NTRIP service** available to the recording area. This is just an example.

<b>≉</b> 😤 "⊯ 77% 🖬 11:07	≉ இ.∉ 77%∎ 11:07
Receiver Settings	NTRIP Settings
Receiver Connection External via Bluetooth	Network Protocol NTRIP v1.0
Bluetooth Device FireFly-FE87	Caster IP 62.225.76.202
Bluetooth Connection Method Insecure (Default)	Caster Port 2101
Auto-Enable Bluetooth Automatically switch bluetooth on/off	Username
Auto-Configure Receiver No Auto-Config	Password
Antenna Height No Offset	Data Stream VRS_3_2G_HE
Save GPS Data to File /NTRIP/GPS-YYYY-MM-DD.txt	Reported Location Get from External Receiver
Save NTRIP Data to File	Saved Profiles

Hint: Save your NTRIP settings as a profile.

## **Remote Control**

EC	AS RC	v2.6.7	Help		anguage	Setting
Hardware						
Connecte	d to cam	era: camera				
Positionin	g Device	: Spatial				
Recording	in relea	se mode: Dist	tance: 1 m			
SSD: Avai	lable					
OBD2 ada	pter: Cor	nected				
Storage						
Data-sets	: 209					
Storage u	sed: 72 G	BB (32 %)				
Storage re	emaining	: 151 GB				
Distance I	emaining	g: 50.30 km				
Position	-					
Position F	ix: RTK F	ixed GNSS				
Position:	Lat: 50.0	01616, Lon: 8	.649255, Alt	: 174.6		
Spatial: M	lagnetic I	Heading activ	e			
Dilution o	f Precisio	on: H: 0.870 n	n, V: 1.130 m	E.		
Standard	Deviatior	n: Lat: 0.043 r	n, Lon: 0.043	m		
Number o	f satellite	es: 17, GPS: 8	, Glonass: 9,	Galileo	0, Beidou: 0,	SBAS: 0

#### Map tab

For a customized overlay to show RTK data: Settings -> Custom fields



## Processing

There is no change in processing.

Processing footage recorded with the Spatial and RTK works exactly the same way as without RTK.

## Reference

#### Is your Spatial RTK capable?

A Spatial with Hardware Version **7.0** is needed.

#### 1) Check the label



In case there is no label, Install the <u>Spatial Manager 4.5</u> program to your Windows 10 PC. It is a Java program. You might have to install Java first.

Connect the Spatial to your PC using the **USB-to-Spatial** cable you have received with the Spatial:



Connect with one of the COM ports listen. Try them one-by-one if more than one COM ports are listed.

#### When connected open **View -> Device Information**.



If the Hardware Version is **7.0** your Spatial is RTK capable.

#### **Camera Firmware update**

Ensure the camera and the tablet are fully charged.

On the **Help** screen of the Remote Control you can see which version of the firmware your camera has:

			<b>%</b>	🗊 📶 57% 🖥 11:46
Applied Streetview App v2.6.1	Help	📑 La	anguage	7.37 / 6.23 / 4.1 com <b>2nd toid gys</b> temu
About:				
APPLIED STREETVIEW				
Camera name: camera				
Camera serial number: 201002334				
Camera firmware version: 20170702135714-V0.25p				
Camera IP address: 169.254.7.58				
Application version: 2.6.1				

If your camera has 0.25 firmware, upgrade it to Firmware V0.25p, if necessary. If your camera has 0.26 firmware, upgrade it to Firmware V0.26k, if necessary. DO NOT try to upgrade from 0.25 to 0.26 firmware! It will <u>NOT</u> work.

These are two slightly different versions to cover for minor hardware differences only.

If necessary download and then copy the new firmware onto the Android tablet.

In **Settings -> Firmware update** update your camera with the Remote Control Android App. **Follow the on-screen instructions.** 

After rebooting of the camera, check the new version of the camera's firmware on the Remote Controls **Help** tab to confirm that the update has worked.Remote Control update

#### **Remote control update**

After the cameras firmware has been updated, update the Remote Control to at least release:

Download: AS-2.6.9.apk

Or check this page for the newest Remote Control release: <u>http://www.applied-streetview.com/programs/remote-control/</u>

### Tablet upgrade

Right now we ship the **Huawei Mediapad M3** with the camera. Before that we shipped the Samsung Galaxy Tab S3. It works fine. If you still use the ASUS tablet provided years ago, please update.

For all-day recording make sure to provide an additional power supply. Either by a USB adapter to the cars cigarette lighter. Or use a 20.000 mAh USB power bank.

### Specifications

According to the Spatial manufacturer:

Horizontal Position Accuracy, with RTK	0.02 m
Vertical Position Accuracy, with RTK	0.03 m
Horizontal Position Accuracy, GNSS only	2.5 m
Vertical Position Accuracy, GNSS only	3.0 m
Supported Satellite Systems	GPS, GLONASS, BeiDou
Update Rate	10 Hz
Cold Start Sensitivity	-148 dBm
Tracking Sensitivity	-160 dBm
Hot Start First Fix	1 s
Cold Start First Fix	26 s
Operating Temperature	-40 °C to 85 °C

## Support

Support is available in **English language** only.

Contact	
Helpdesk:	support.applied-streetview.com
E-Mail:	support@applied-streetview.com
Skype ID:	applied-streetview
Phone:	+49 6103 - 372 7494

Streetview Technology GmbH Pittlerstr. 53 63225 Langen Germany