

How can we get a RTK Fix result even under critical conditions?

Introducing an Efficient GPS RTK Solution

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This article introduces the latest iRTK4 GPS RTK System from the motherboard, the design, the functions and features of the instrument, as well as user experience. It also talks about iHand30 Handheld Controller and Hi-Survey Road software. We think it may offer some help to those decision-makers, and thus we share it here.

Thanks

 a lot for the support of Mr Sándor Stenzel and our Hungarian partner Mr Zoltán Varga from Geomentor Ltd.

FIG1



FIG2

Key Words :

GPS, GNSS, Land Survey

Solutions

- iRTK4 GNSS RTK System
- iHand 30 Controller
- Hi-Survey Road Software

A Simple but not Simplistic GNSS System — iRTK4 GNSS RTK System

The new iRTK4 integrated GPS receiver is smaller in size than its predecessor, the iRTK5. But that's not the only difference.

While iRTK5 has the BD990 board, the iRTK4 has a different, new board.

It is the UB4B0M board from Hi-Target and Unicore Communications, a part of the BDStar Navigation Group and founded in 2009.

***What makes this solution interesting?
The UGypsophila RTK processing technology.***

In this computing method, the rover includes in the initialization not only the satellites and frequencies for which it receives corrections from the base side, but also those that it tracks beyond them. This means that the positioning is more reliable and that the more advanced technical features of our instrument are not completely compromised by the shortcomings of a reference station that may be less capable.

Let's take a closer look at this newcomer.



FIG3

In the grey shockproof box in which it arrived, every part of the instrument configuration has been thoughtfully and fittingly placed. This explains the tiny size of the carrying case.

Taking the instrument out of it, the quality of the materials is decidedly good. For its size, the receiver's weight of around 1.2 kg is almost surprising. The magnesium alloy body can withstand a 2 m drop onto concrete. Dust and water resistance is IP68 (!).



FIG4

There are just one signal traffic and one satellite status LED in the user interface of the palm-sized and tasteful-looking receiver, with a colour OLED screen of about 2 cm x 1 cm wedged in between.

The power and function buttons are located at the bottom of the instrument panel. As well as a serial port for external peripherals (e.g. sonar), NMEA messages and external power supply.

The iRTK4 has an integrated UHF radio, 4G modem and battery. Accordingly, the bottom of the instrument has an SMA URH antenna output for RTK use in pairs (base rover), a nano-SIM card slot for network RTK, and a USB-C connector for charging the internal battery or for OTG data exchange. The integrated 6,800mAh battery also supports quick charge — you can charge it to 50% capacity in about 50 minutes.

The receiver talks, plays music, so there's even a speaker on the bottom.

The aforementioned GPS board is an 800+-channel, multi-constellation, multi-frequency board.

I read afterwards that it is also capable of satellite correction reception, this is Hi-RTP. However, this seems to work only in Asia for the time being.

There is also a **Web User Interface**, which can be addressed by any WiFi-enabled device with a fixed IP address, allowing you to configure your instrument to your liking.

The iRTK4 receiver has an IMU-based tilt sensor and compensator. The advantages of this are perhaps no longer necessary to explain today. It will prove useful in any field situation where keeping the pole vertical is difficult or even impossible. I have found a difference of only 2-2.8 cm in the positions measured by checking at the same points with the vertical and inclined pole positions.

A Professional Handheld Controller — iHand30 Handheld Controller

Now let's take a closer look at the other part of today's instrument combo, the Hi-Target iHand30!

It looks like this device has worked for the manufacturer, as it has been serving GPS receivers for quite some time.

And really, it does its job and does it well! It's a handheld with a physical numeric keypad, Android operating system, dual-SIM design.



FIG5

Of course, by putting a data card here (too), you can significantly increase the mobile data access capabilities of your rover in the field, when used with a network.

Incidentally, the card in the control unit not only serves as an alternative to the integrated receiver modem, but also allows online maps to continuously display on the display during work.

And speaking of the display, the iHand30's 3.7" multi-touch touchscreen is clearly visible in backlighting.

I was talking to a colleague about screens the other day. He said that for him it was important not only to be able to see the screen in sunlight, but also to be able to see it with polarised sunglasses. How right he is! I've been looking at this in controls ever since. I am happy to report that I could see this display perfectly well with sunglasses on!



FIG 6

IP67 dust and water-resistant iHand30 brings all the features you expect from a controller today: an L1 frequency GPS receiver, camera, a range of integrated sensors and a 5,200 mAh removable battery with 15 hours of working time. With the iRTK4, you can charge the battery via a USB-C connector.

For the NTRIP method, I used the multi-constellation real-time corrections provided by GeodétaNET.

So I could not really complain about the initialization and re-initialization times! None of the physically forced re-initialisations reached 10 seconds. I also only experienced a few centimetres of variation in the positions of the measured points due to the technology.

A Efficient Data Collecting and Processing Software — Hi-Survey Road

Let me say a few (good) words about Hi-Target's well-proven field application Hi-Survey Road.

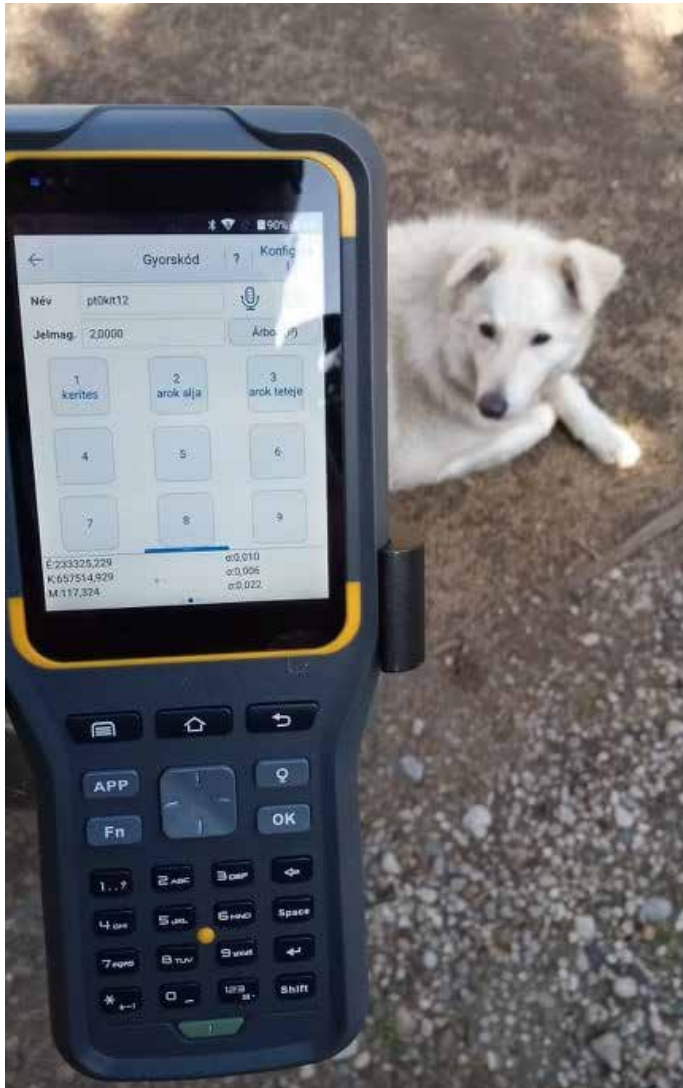


FIG7

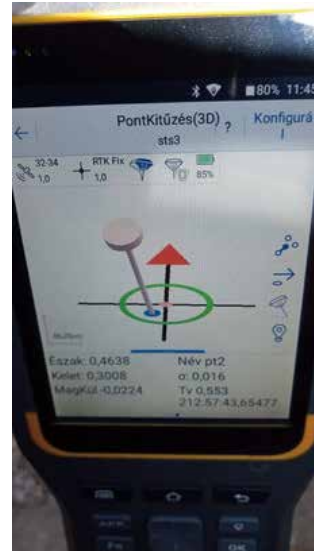
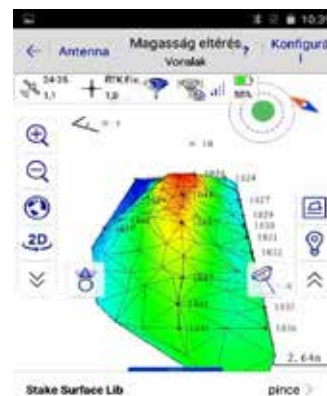


FIG8



It has a discreet appearance, but at the same time a very substantial toolbox. It is suitable for quick coding and line drawing during surveying, but it is also well equipped with coordinate geometry calculations such as area/volume calculations, various intersections and even temporary arc calculations. The descriptions and diagrams support the use of these functions well.

When taking measurements, a glance at the satellite number during GPS+GLONASS correction may make you feel cold for a moment: it seems too much. This is due to the UGypsophila RTK solution mentioned above, as Hi-Survey Road then displays all the satellites used, not just the one for which a correction is received.



FIG9



FIG10

By launching the elegant and perhaps unique "AR" solution, you can navigate and aim the rover with the help of a moving 3D compass on a real-time image from the camera on the back. Directional control and rough aiming are aided by the visual field graphics in the top right corner of the screen, reminiscent of combat video games.

Of course, all this is made possible by the iHand30's E-compass.

The electronic compass also offers the simple convenience of not orienting the map view to the north when measuring, but adjusting it to your movement, just like in-car navigation.

Well, that's the end of today's tour. Finally, I would like to thank Mr Zoltán Varga and Geomentor Ltd. for providing me with the instrument configuration for testing.

About Mr Sándor STENZEL

A professional and experienced Landsurveyor and land management engineer in Hungary. He works full time at UVATERV Zrt. as an expert associate.

He has a private enterprise, where he teaches and supports geodetic fieldtechnologies, brand independent way.

In the other hand, he runs the „GPS-t akarok!” (I want GPS) blog since 2011 in Hungary. This website (www.gpstakarok.hu) contains more than 70 own tutorial articles about GNSS receivers, total stations, scanners, etc.

About Mr Zoltan VARGA

Worked 10 years as land surveyor, then since 1990 trading instruments for land surveyors. He was the general manager of Sokkia Kft for 20 years. Established his present company, Geomentor Kft, in 2011. This company is official dealer of Hi-Target.



More information at <https://en.hi-target.com.cn/become-our-partner/>

About Hi-Target

Established in 1999, Hi-Target is the first professional high-precision surveying and mapping instrument brand to be successfully listed in China.

Hi-Target provides a wide range of surveying equipment including GNSS receivers, CORS stations, Total Station, 3D Laser Scanners, GIS Data Collectors, UAV/UAS, and Hydrographic products to offer complete commercial solutions for various industries.

As the leading brand in the geospatial industry, Hi-Target invests heavily in research and development, on top of collaborating with more than 100 universities globally to bring the latest positioning technology and innovation for product development.

For over 20 years, Hi-Target has approximately 3,300 employees worldwide, with an established network of 64 subsidiaries, 28 branches and more than 200 partners in over 60 countries to service and support our customers.

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