

“How To Collect The Best Resource Grade GPS Data Under Tree Canopy”

An Update

A Presentation

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Timber Measurement Society - 2014

Presentation Contents

- GPS Equipment Review
 - New GPS units/Smart Phones/Tablets
 - GLONASS and the “New Kids: Galileo, BDS”
- Procedures
 - Know the basics of GPS to collect the best data
- Imagery
 - The future is Half-Meter Resolution
- Conclusion

GPS Units that Work Under Trees

- SiRF Star GPS Engine gives 2 to 5 meter accuracy (New Models Coming Soon)
- Sub-meter GPS accuracy available with many GPS units
- Add Sub-meter to your Phone, iPad (NEW)
- Test under tree canopy.

New GPS Units With GLONASS

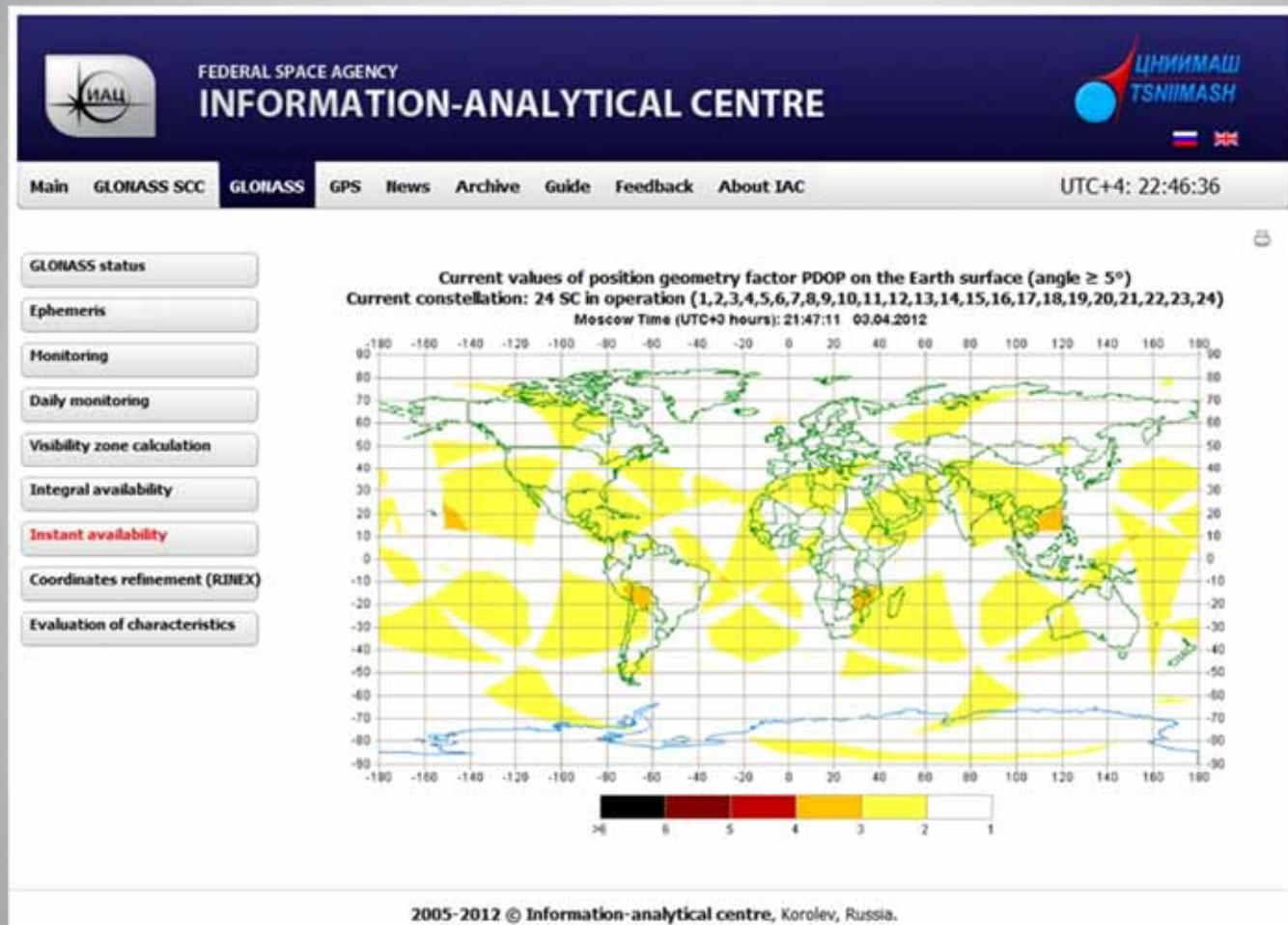
- Trimble Geoexplorer 5T (MobileMapper 120)
- iSXBlue II GNSS - NEW
- Garmin GLO (Bluetooth only, with GLONASS) →
- Apple iPhone 4S/5



The New "GPS" is called "GNSS"

- *Global Navigation Satellite System*
- *"GNSS refers collectively to the world-wide positioning, navigation, and timing (PNT) determination capability available from one or more satellite constellations."*
 - US GPS Satellites, Russian GLONASS, European Galileo, and BDS (Chinese) satellites

What Is GLONASS? What Does it Cover?



The Future In Resource Grade GNSS is Very Near – SP80 can read m' all

- **GPS** [L1C/A, L1P(Y), L2P(Y), L2C, L5] (US)
 - **GLONASS** [L1C/A, L2C/A] (Russia)
 - **BeiDou** [B1 (phase 2), B2] (China)
 - **Galileo** [E1, E5a, E5b] (Europe)
 - **QZSS** [L1C/A, L2C, L1SAIF, L5] (Japan)
 - **SBAS** [WAAS/EGNOS/MSAS/GAGAN) L1C/A
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- 240 Channels
 - Survey Grade



Why use GLONASS, Galileo, BDS?

1. Better Accuracy, especially under trees
2. Very low PDOPs
3. No More Waiting for Satellites
 - SP80 has a two second initialization time

The Future of GNSS

- US GPS System (31 satellites-current)
 - L1, L2, L5
- GLONASS (Russia) (24 + 3 available now)
- Galileo (Europe) (27 + 3 satellites-2015)
- BDS (China-2020)

	GPS	GALILEO	GPS+ GALILEO
Satellites	24+3	27+3	51+6
Avg # in View	8	12	20
RAIM Integrity	Fair	Fair	Excellent
Coverage	Good	Good	Excellent

L5 – A New Satellite Signal

L5 is a new satellite signal that will be broadcast from US, European, and Chinese satellites. (not from Russian satellites)

It is available on new satellites being put into orbit.

“L5 - Why It Will Change The World”

- L5 signal is 4 times as strong as L1
- “Open Source” – Everyone can use it
- Garmin, Magellan, and others will be players
- We will have a full set of usable L5 satellites in 2016
- Smart phones and tablets will be able to use it

Post Processing With The Base Station Within ¼ Mile

Sub-decimeter accuracy potential with a Sub-meter GPS unit and Post Processing.



X90-OPUS



GPS Procedures – Basics Review!

- Update almanac (track in open 15 minutes
 - Do this twice a month at least
- Track 2 to 5 minutes in open before start
- Keep GPS unit on at all times
- Use averaging (10 to 60 readings/point)
- Hold em high (for best satellite view)
- Use external antenna if appropriate
- Take GPS offsets if appropriate

Imagery – “Getting Better and Better”

- 2012 NAIP imagery for OR, 2013 for WA/ID
 - One meter resolution for OR & WA
 - ½ meter resolution for ID (NEW)
 - CCM (compressed county mosaic)
 - 5 to 25 counties per storage card
- 2014 Oregon (Half Meter?)
- Eagle Digital Imaging

Conclusion

- We will soon have four sets of satellites available (US, GLONASS, Galileo, BDS)
- New Satellites mean You Need New Equipment ☹️
- L5 signal will be useable in 2016, somewhat in 2015
- We may be able to do the “unattainable”, lay out thinning skyline corridors with GPS

Thanks!

For all your GPS Work, May your:

- PDOPS be low
- Satellites be High in the Sky

For data collection:

**May your handheld never crash
May your batteries last all day**



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