

# **“Using Both GLONASS & GPS Under Tree Canopy”**

**A Presentation**

**By Jon Aschenbach:**

**Resource Supply, LLC**

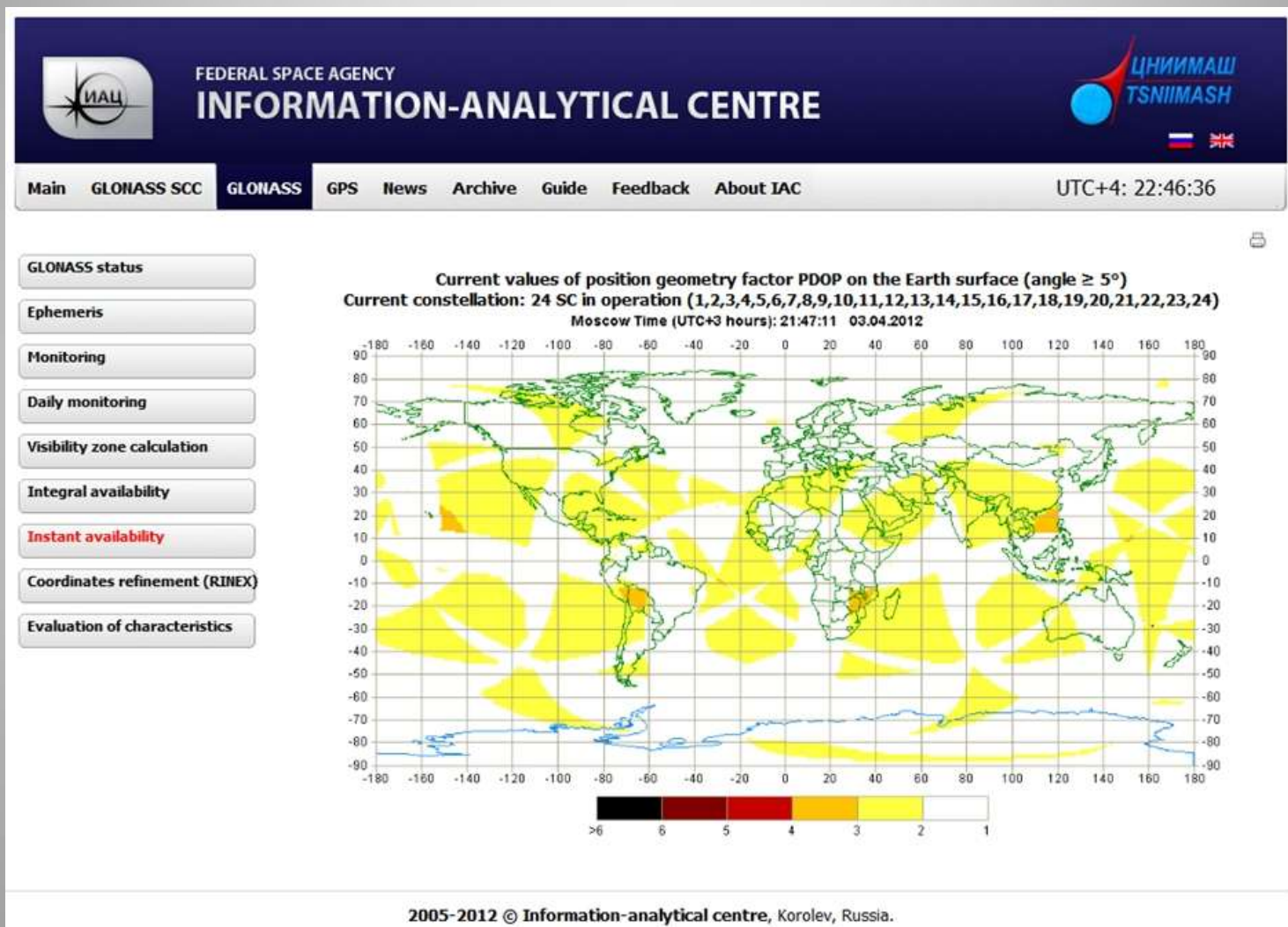
**11607 SW Winter Lake Dr**

**Tigard, OR 97223**

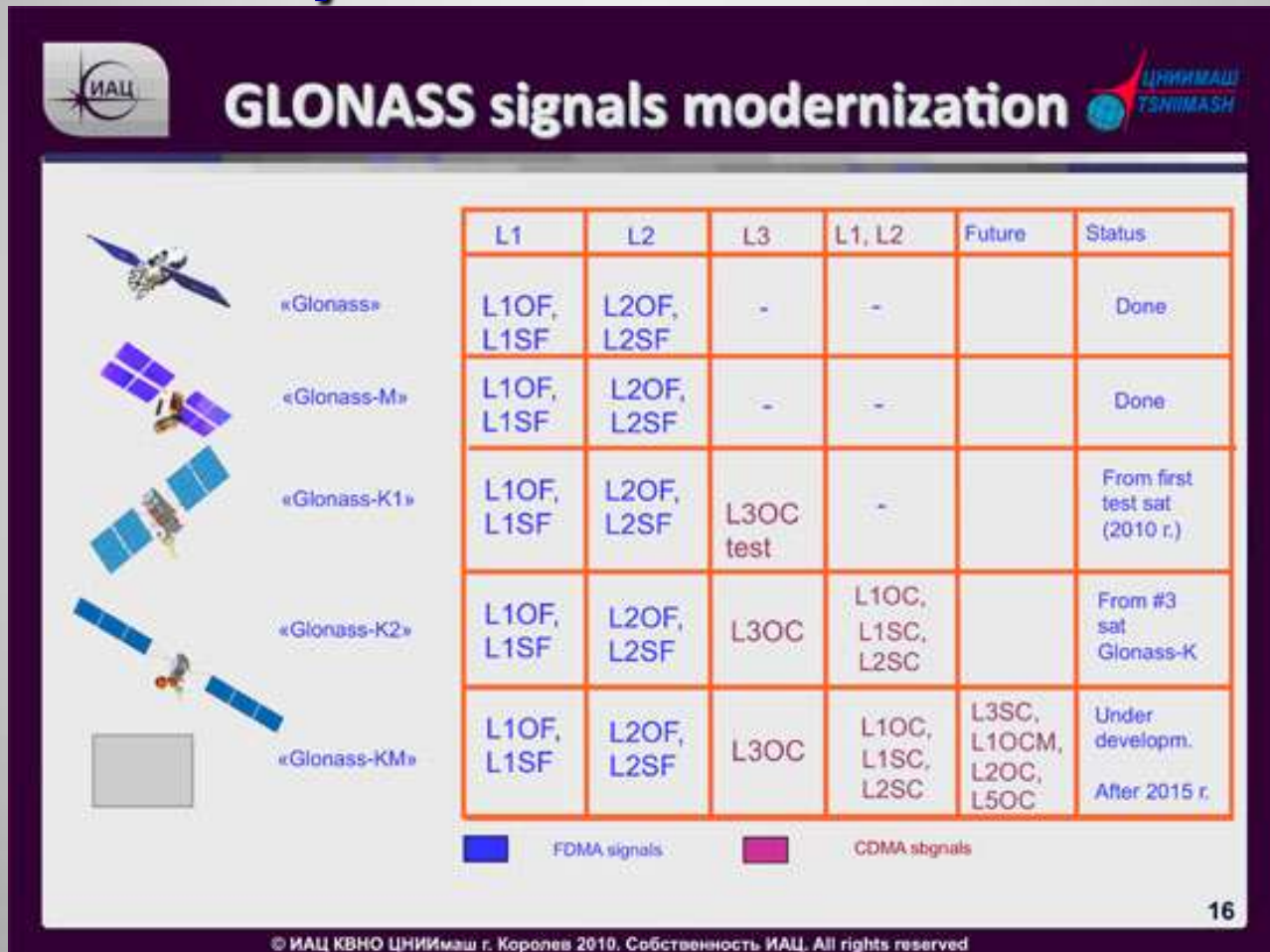
**503-521-0888**



# What Is GLONASS? What Parts of the World Does it Cover?



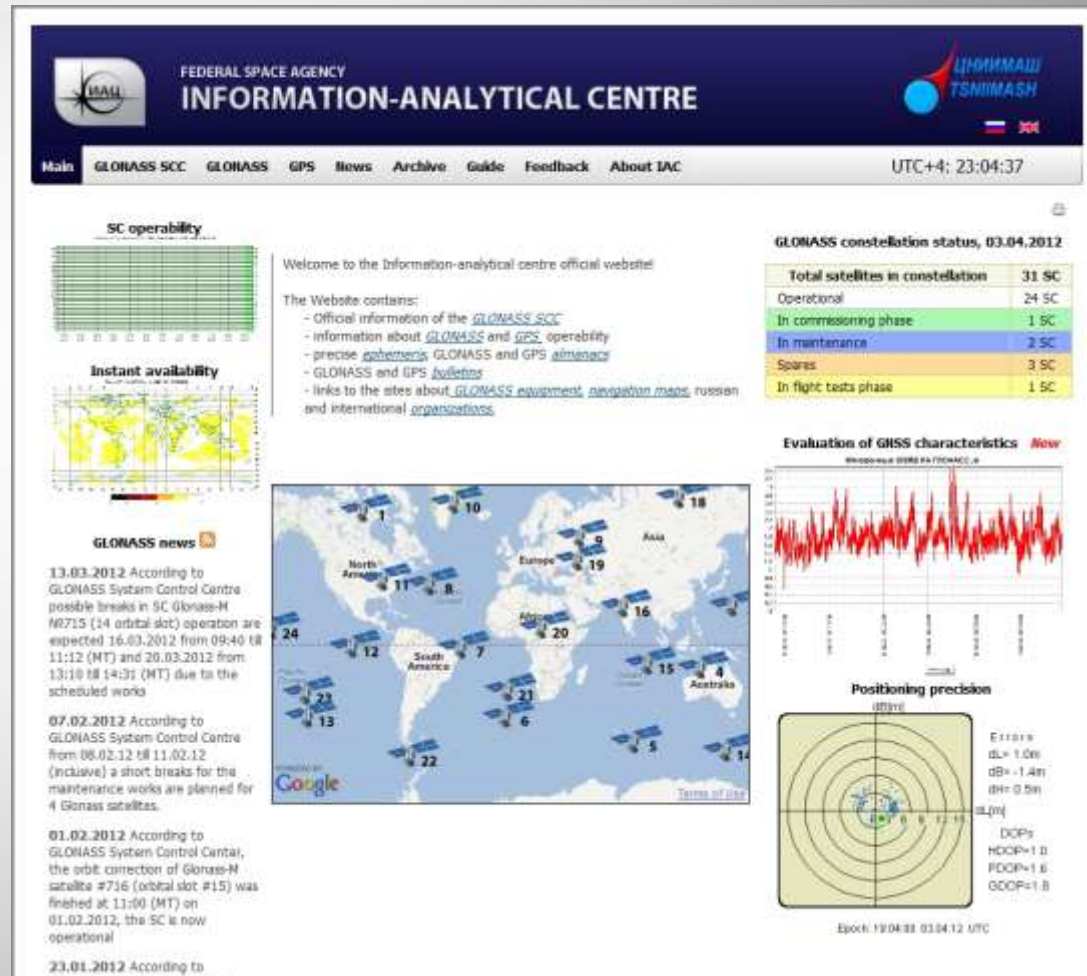
# GLONASS – Mediocre in the Past. Very Good Now





# GLONASS Info – Directly From the Russians

## Federal Space Agency



# Why use GLONASS?

1. It simply works better under tree canopy to track US and Russian satellites
2. Lower PDOP
3. Better Accuracy
4. No More Waiting to get Satellites



# GPS Units that Track GLONASS

- Ashtech MobileMapper 100
- Trimble GeoExplorer6000
- Topcon GRS-1



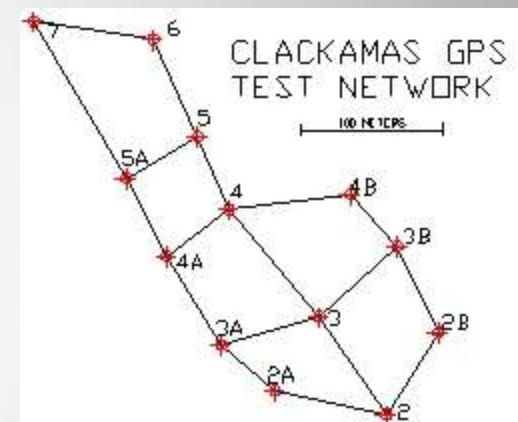


# Testing GLONASS at Clackamas



# The Clackamas GPS Test Course

- Trees 35 to 40 inch DBH
- Tall (170 feet plus)
- 70 Miles East of PDX
- I test the southern 9 points
- Tests run 2 to 3 times





# **“Miles the GPS Dog”: Jon’s Test Assistant**



# Antenna Options:



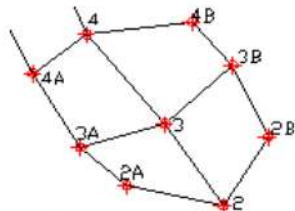
- Internal Antenna
- External Antenna
  - GLONASS Capable
  - No Different than Internal antenna at Clackamas

# Clackamas Test Results

## US FOREST SERVICE - CLACKAMAS GPS TEST COURSE

MobileMapper 100 With Glonass, Internal Antenna (2 runs completed 08-05-2010)

Using WAAS Only (internal antenna)



Clackamas Points 2-4B



MobileMapper 100 Tracking 17 Satellites

| Point Number | MM100 Run 1-Int Meters | MM100 Run 2-Int Meters | MM100 AVE Meters |
|--------------|------------------------|------------------------|------------------|
| 2            | 1.49                   | 0.55                   | 1.02             |
| 2A           | 1.72                   | 3.97                   | 2.84             |
| 2B           | 1.71                   | 2.16                   | 1.93             |
| 3            | 1.26                   | 1.53                   | 1.40             |
| 3A           | 0.62                   | 4.39                   | 2.50             |
| 3B           | 1.61                   | 4.79                   | 3.20             |
| 4            | 4.06                   | 0.27                   | 2.16             |
| 4A           | 1.75                   | 3.33                   | 2.54             |
| 4B           | 3.80                   | 1.07                   | 2.44             |
| AVE          | 2.00                   | 2.45                   | 2.23             |

| Model            | Price as tested | Correction Method |
|------------------|-----------------|-------------------|
| MobileMapper 100 | \$4,595.00      | WAAS Only         |
| SXBlue II GPS    | \$4,294.00      | WAAS only         |
| MobileMapper 6   | \$1,095.00      | WAAS Only         |

| Clackamas test course Ave. error in meters |
|--|
| 2.23                                       |
| 3.25                                       |
| 7.08                                       |



# Conclusion:

- GLONASS Significantly improves Accuracy
- Time waiting for satellite signals under dense tree canopy is minimal
- “Difficult” GPS areas aren’t so difficult anymore
- You ain’t seen nothing yet!

# The Future of GNSS

- US GPS System (31 satellites now)
- GLONASS (Russia – 24 satellites now)
- Galileo (Europe – 24 satellites coming)
- Compass (China – 24 satellites coming)
- Stronger signals, open source signals, consumer grade GPS units will use it all

# Thanks!

**For all your GPS Work, May your:**

- PDOPS be low**
- Satellites be High in the Sky**

