Head Office of Geodesy and Cartography
Department of Geodesy, Cartography and GIS

ASG-EUPOS reference system

Last year activities and future plans

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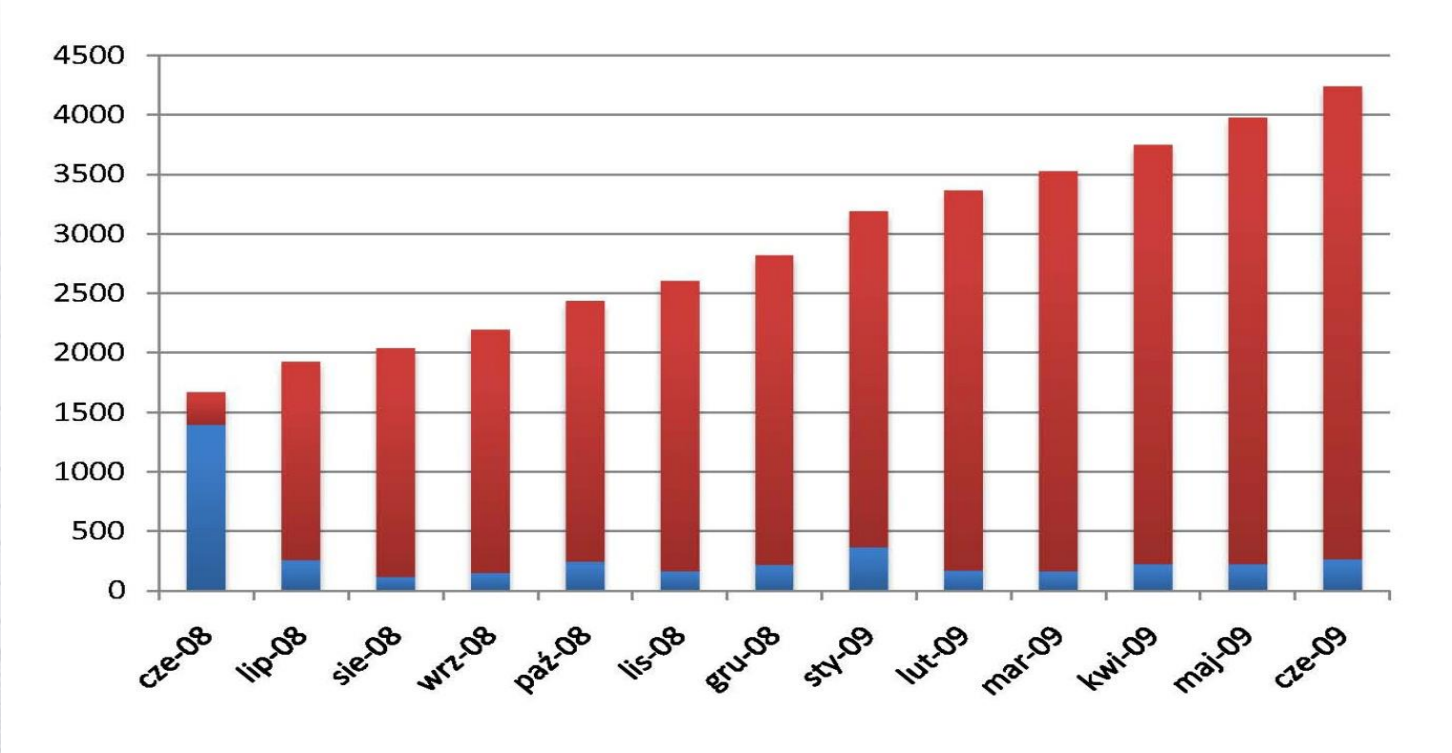
5th EUPOS® Council and Technical MeetingTallinn, 14-15.11.2018

10th anniversary of ASG-EUPOS

- ✓ ASG-EUPOS system was opened for users in 2008 as a first nation-wide reference station network in Poland.
- ✓ At the beginning services was provided from only from NAVSTAR GPS and stations included to EPN network was equipped with GPS and GLONASS hardware
- ✓ Number of users almost tripled during first year



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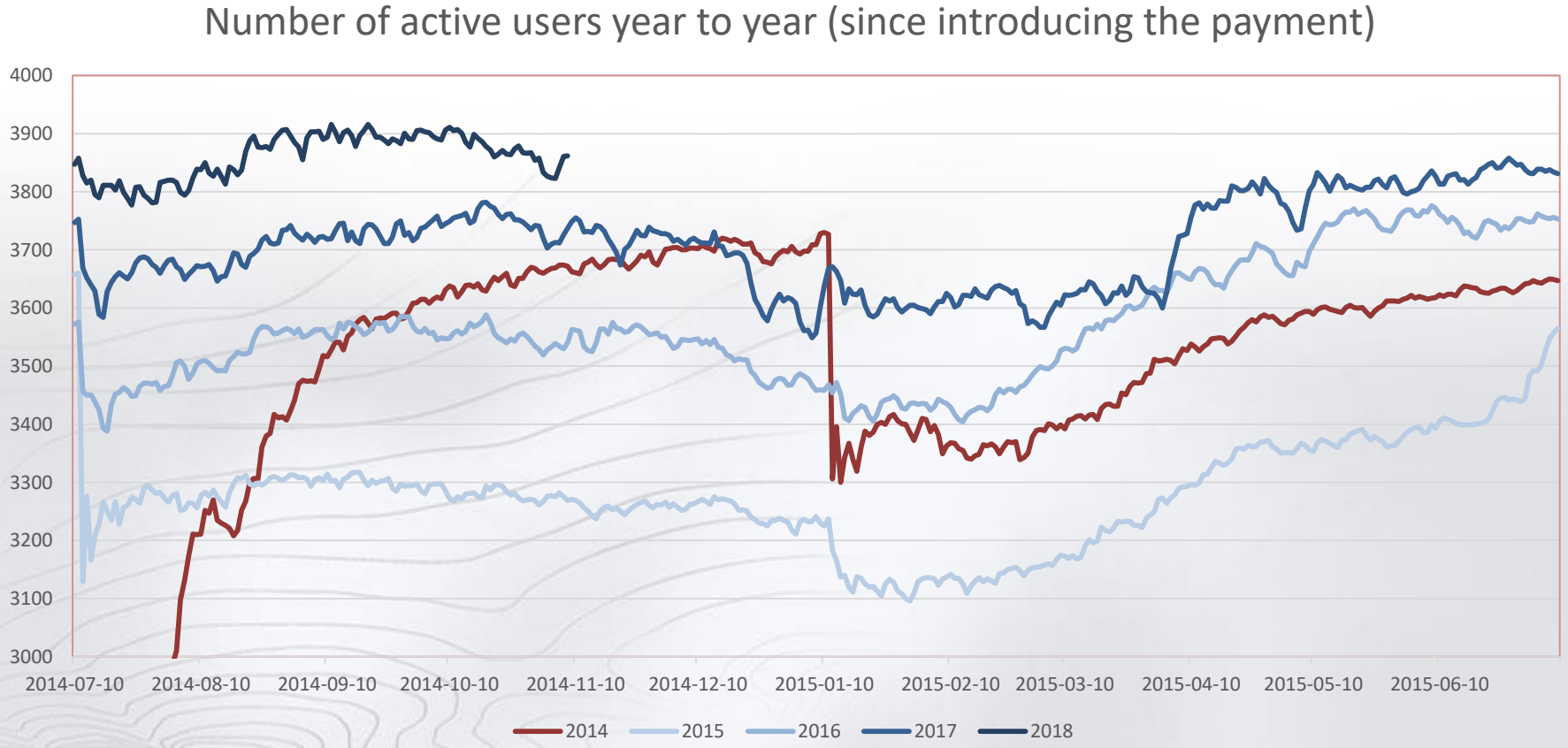
- ✓ During next years 5 additional ground augmentation systems have been established in Poland :
  - MSPP (Malopolskie Voievodship) – regional,
  - NadowskiNet (Nadowski) – regional, commercial,
  - SmartNet (Leica Geosystems) – commercial,
  - TPINet Pro (Topcon) – commercial,
  - VRSNet (Trimble) – commercial.
- ✓ All the systems are distributing GPS and GLONASS corrections over whole or significant part of the country and some of them released services including Galileo and Beidou system.
- ✓ Due to changes in law regulations in 2014 system ASG-EUPOS became payable.

ASG-EUPOS system

- ✓ After payment implementation Almost 600 users has moved to comercial networks, but still ASG-EUPOS is the biggest player in the RTN market.
- ✓ Year by year number of user is increasing.



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Status of network :

101 ref. stations established in Poland by GUGiK, universities and research centres

26 ref. stations working in neighbouring countries

2 independent management and processing centers located in Warsaw and Katowice

Source: http://www.asgeupos.pl

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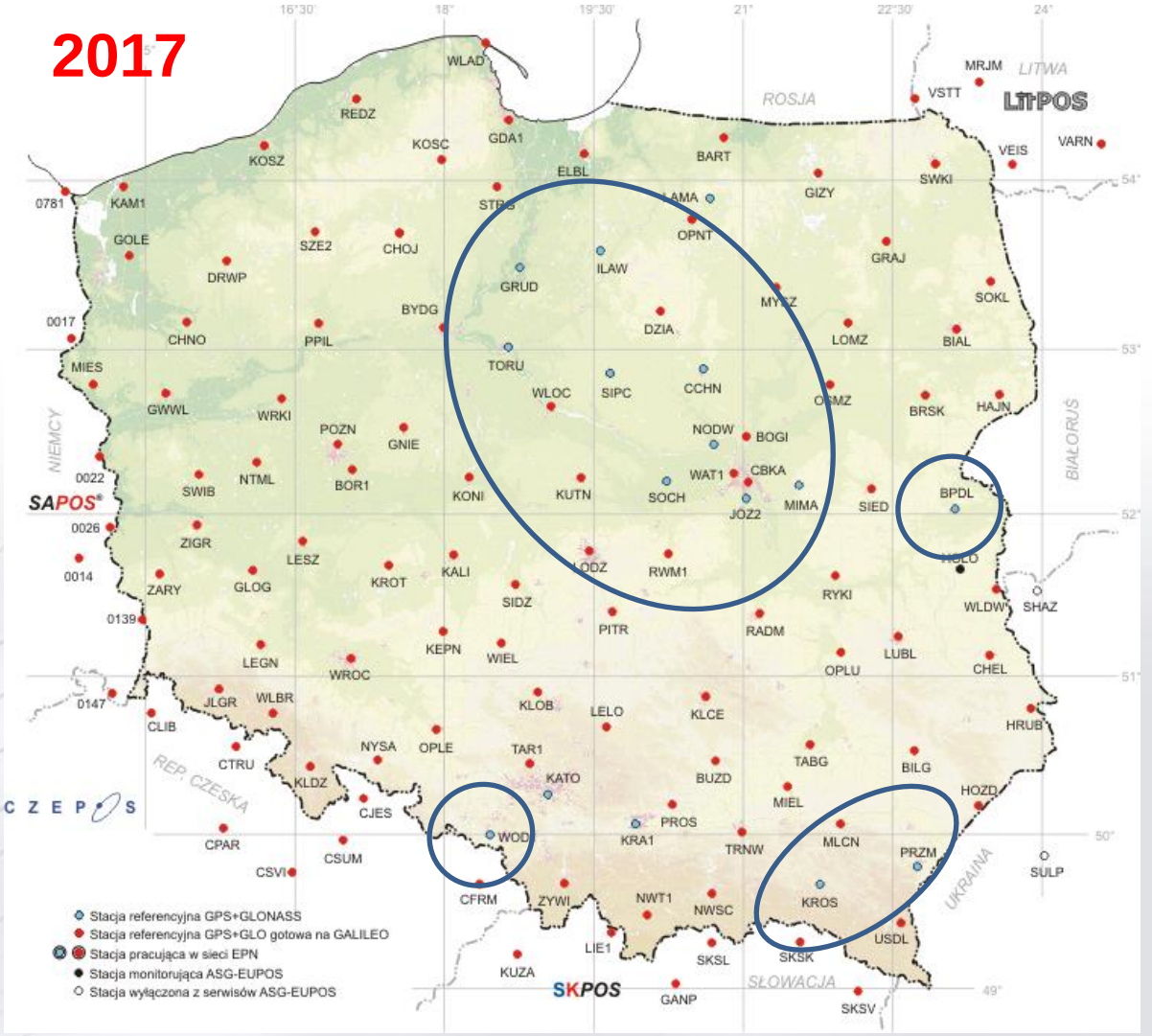
Status of network :

- 12 reference stations with Trimble NetR5 (GPS+GLONASS)
- Equipment purchased in 2017 but without individual calibration
- Leica GR10 was not fully supported in Trimble Pivot Platform.
- Trimble Pivot Platform without option for generation network correction data from Galileo and beidou signals
- Maintenance contract for Trimble Pivot Platform has finished

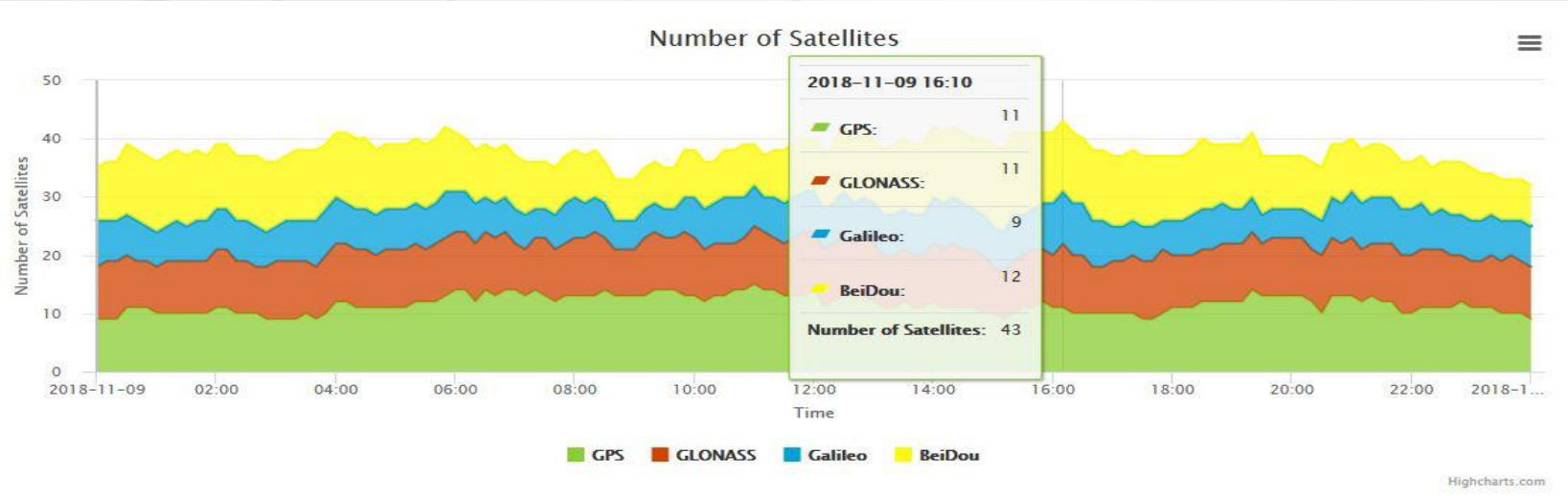


Source: http://www.asgeupos.pl

ASG-EUPOS system

Aims for 2018:

1. **Exchange equipment on 12 reference stations**
2. **Prepare equipment on all stations owned by GUGiK to track Galileo and Beidou**
3. **Setup stations to provied Single Station and RINEX files from 4xGNSS systems**
4. **Upgrade software in MC to provide network correction data from 4xGNSS systems**
5. **Purchase maintenace conract for software in MC**



Source: http://trimble.com

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Ad. 1:Exchange equipment on 12 reference stations:

- **Individual calibration need to be performed:**
- **Robot calibration or chamber calibration**
- **Robot: Geo++ - not fully prepared for Galileo and Beidou calibration (can store the data, but procedure will be finished later in 2018 (price: 2400EUR)**
- **Chamber: University of Bonn – all signals including Galileo and Beidou (price: 600EUR)**
- **Tender is realesed for chamber calibrations**

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Ad. 2: Prepare equipment on all stations owned by GUGiK to track Galileo and Beidou:

Part 1: Upgrade 36 pieces of Leica GR10 to Leica GR30 or to alternative receiver

Part 2: Upgrade 22 pieces of Trimble NetR9 to track Beidou or supply alternative receiver

Part 1 and Part 2 won Leica Geosystems.

Task is finished.

Prices per receiver:

Suplier	Part 1	Part 2
Leica Geosystems	4200 EUR	5400 EUR
Geotronics Dystrybucja (Trimble)	6400 EUR	7500 EUR

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Ad. 2: Upgrade software in MC to provide network correction data from 4xGNSS systems:

- **Upgrade exisiting or supply with new software with opened option for Galileo and Beidou network RTK correction data generation**
- **Upgrade to the latest version + at least 1 year meintenance for software updates**

Tender finished. Openning of offers was last week.

Suplier	Offers
Geotronics Dystrybucja (Trimble)	ca. 166 000 EUR
Leica Geosystems	ca. 683 000 EUR

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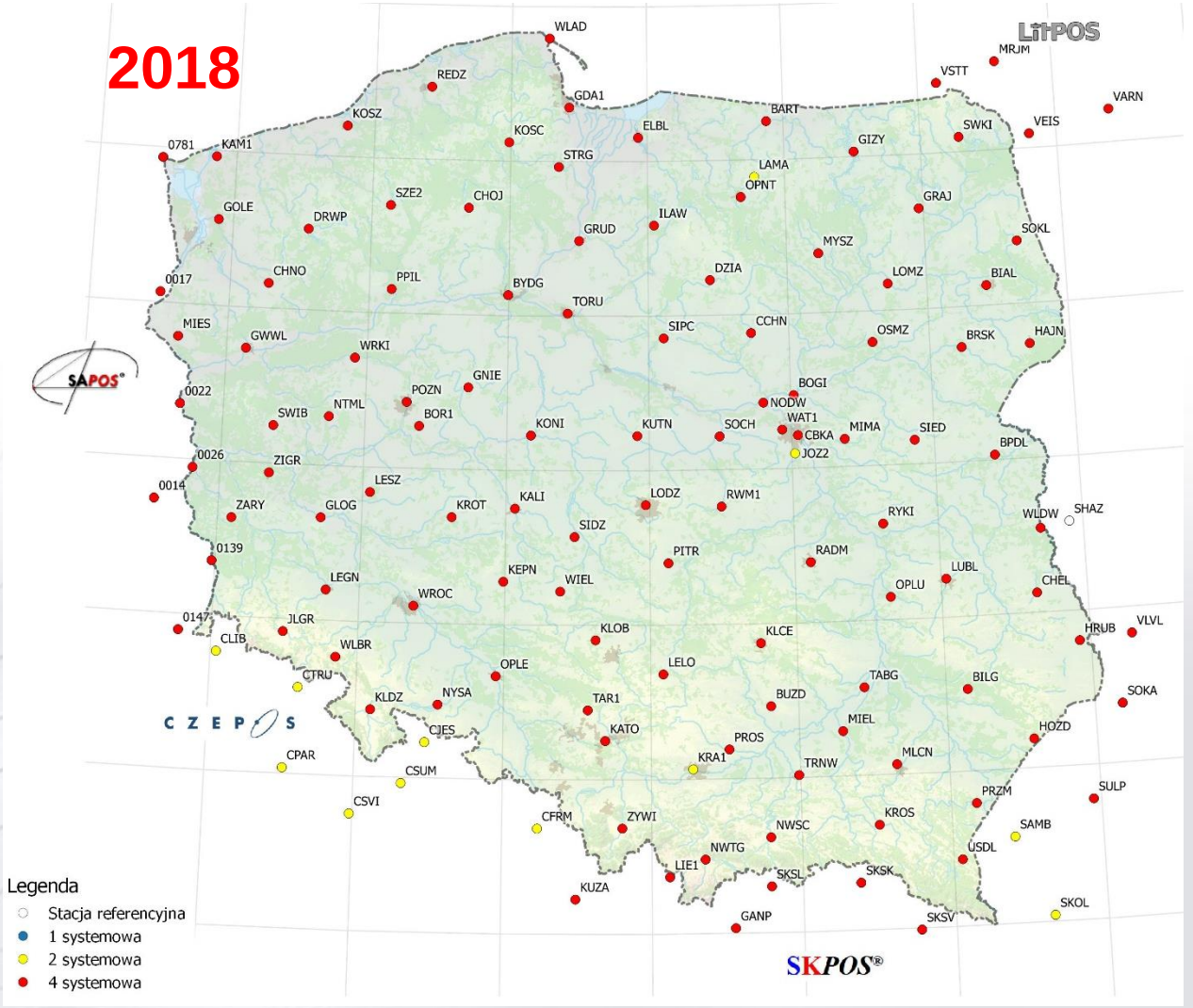
Status of network at the end of 2018:

Almost all reference staions with tracking Galileo and Beidou

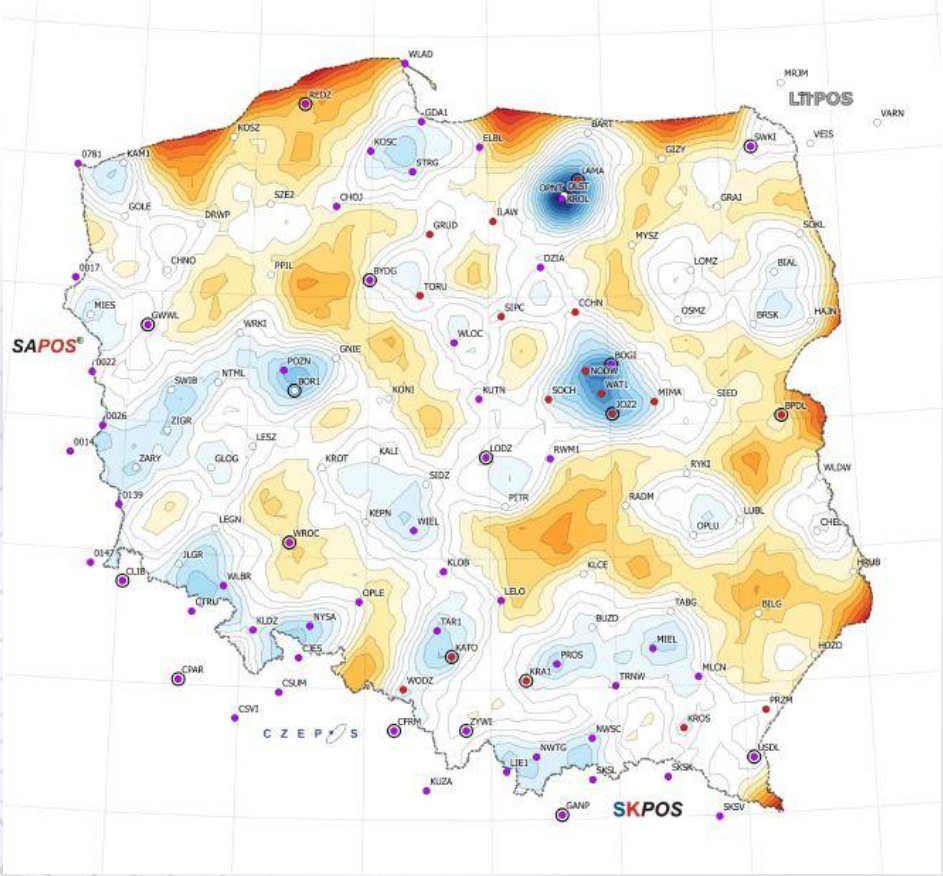
Software prepared for full implementation of RTN correction data from 4xGNSS signals.



Source: http://www.asgeupos.pl

Future plans

- ✓ **Densification of the network in places where distances between stations are the highest.**
- ✓ **This year sites for new stations were chosen and formally prepared for installation.**



Future plans

- ✓ **Exchange the hardware in MC:**
- **One set of network hardware (switches and router) to Katowice MC**
- **New servers for databases**
- **Upgrade of data storage array**
- **Reorganization in MC (removal of old servers)**

Galileo implementation

- ✓ **RTCM 10403.3 standard does not include all methodes for transmition of Network RTK correction data.**
- ✓ **Leica Geosystems uses i-MAX and Trimble uses VRS for RTN correction data provision.**
- ✓ **Robot calibrations at the moment are not prepared for calibration in range of Galileo and Beidou.**
- ✓ **Only chamber calibrations are possible in scope Galileo and Beidou, but results from this two metods cen differ.**
- ✓ **There is early stage of Galileo and Beidou orbit calculation (MGEX project).**
- ✓ **There is not enough experience what is the best set of correction data messages (MSM3, MSM5 or MSM7).**

Thank for your attention …

www.eupos.org

www.asgeupos.pl

www.gugik.gov.pl

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