
# POTENTIAL APPLICATIONS OF E-GNSS FOR MARITIME AND INLAND WATERWAYS SERVICES

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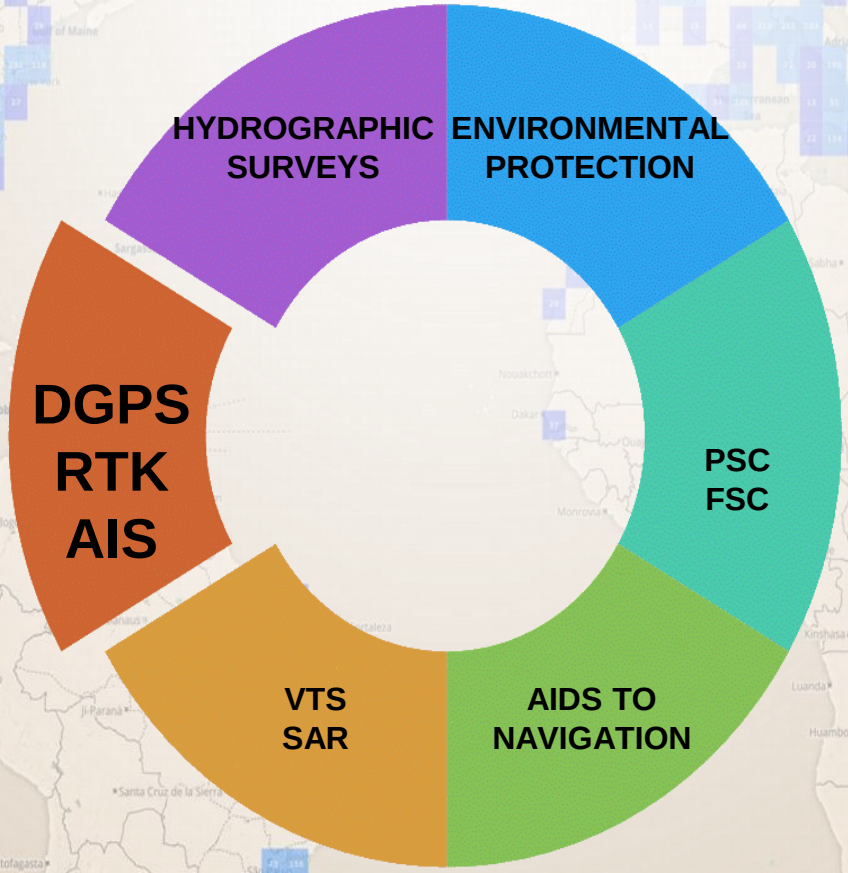
# GNSS CRUCIAL FOR MARITIME INFRASTRUCTURE

- **VTMS** (Swinoujscie-Szczecin) - (1999) - Vessel Traffic & Management System ;
- **VTS** (Bay of Gdansk) - (2000) - Vessel Traffic System
- **SWIBZ** - (2004) - Maritime Safety Information Exchange System;
- **SSN** - (2005)– European VTM Directive 2002/59/EC;
- **KSBM** - (2008) - National Maritime Safety System;
- **RIS** - (2013) - RIS Lower Oder - River Information Services;
- **NSW** - (2015) - National Single Window - Reporting Formalities Directive 2010/65/EU);

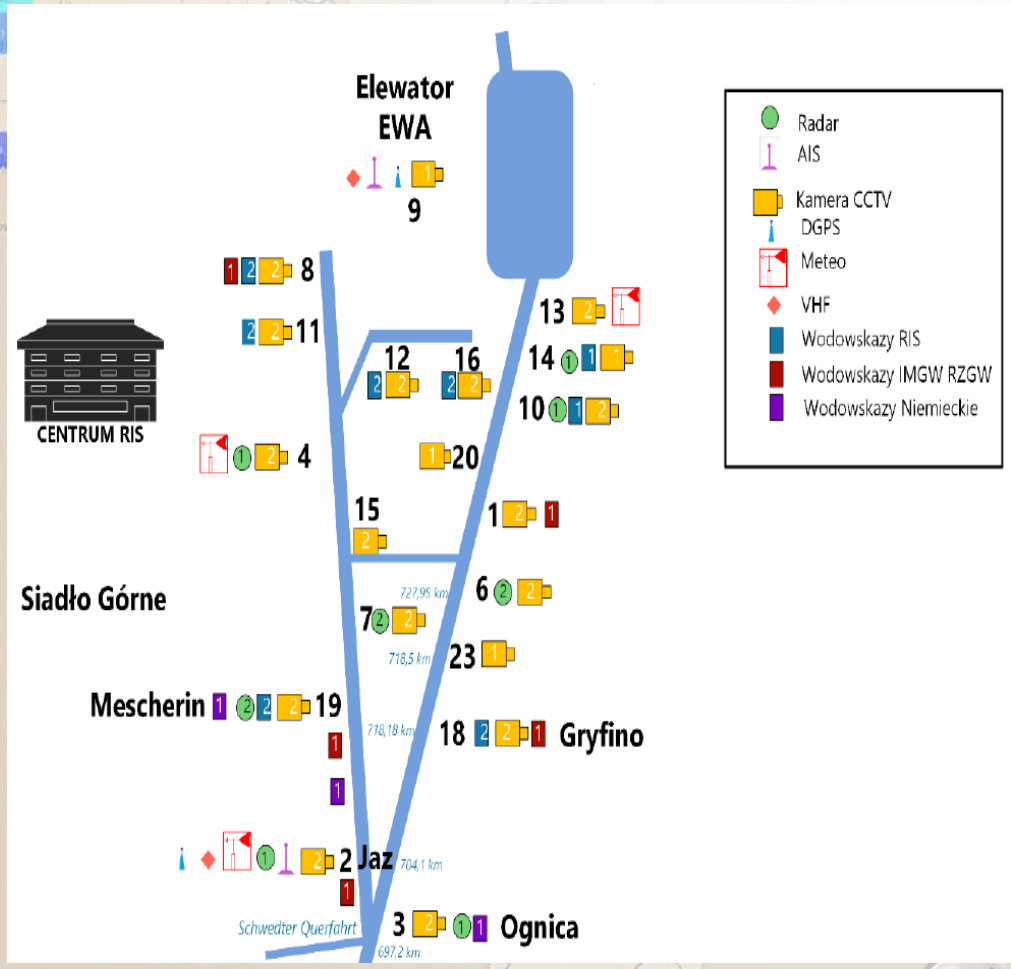
# USE OF GNSS BY INLAND AND MARITIME AUTHORITIES

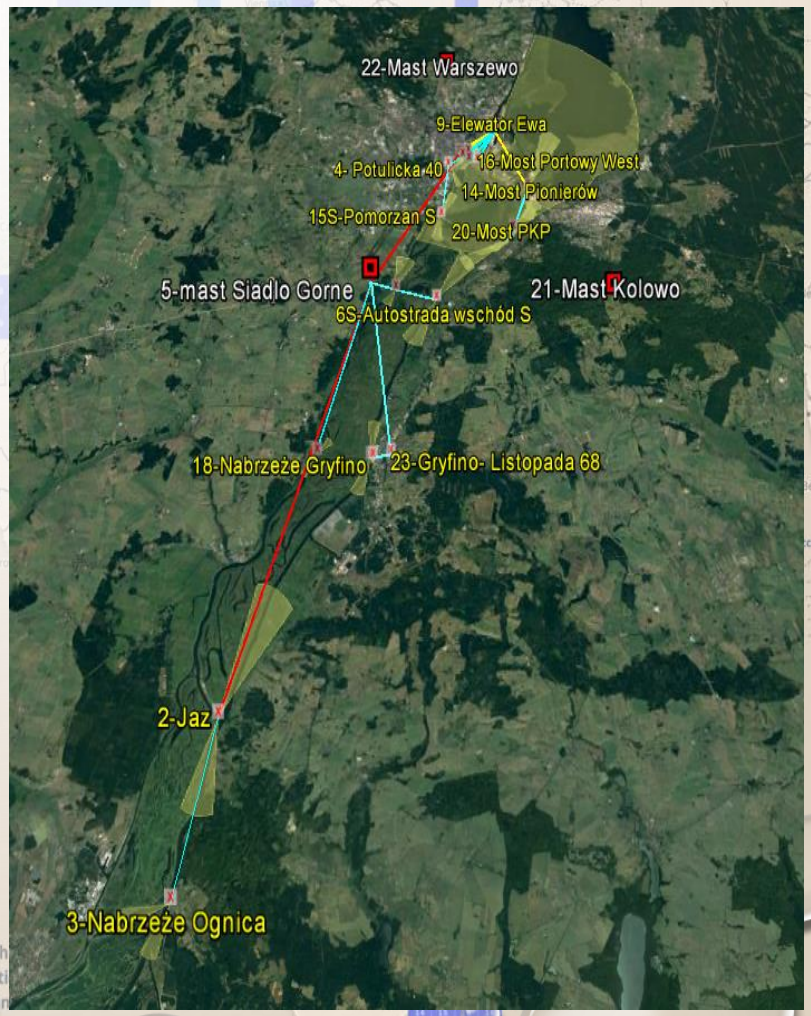


# DIFFERENTIAL CORRECTION SERVICES

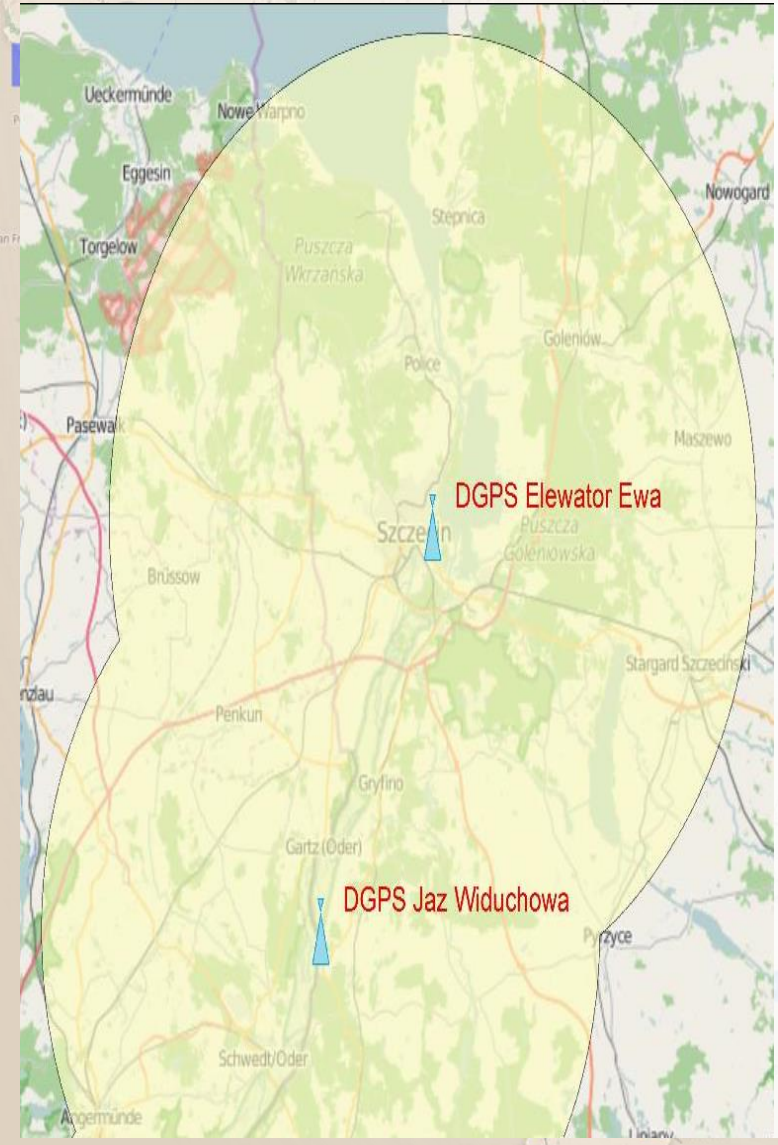
- **RTK** – Real-Time Kinematic stations – accuracy up to 1-3 cm:
  - **Hel** 434,25mhz (range 18km);
  - **Gdansk** 449,075 MHz (range: 45km);
- **DGPS** – Differential GPS stations – accuracy 1-10m:
  - **Dziwnów** 283,5khz (range: 200km);
  - **Rozewie** 301,0khz (range: 200km);
- **iAIS** – Inland Automatic Identification System integrated with DGPS reference stations in order to distribute AIS message 17:
  - **Szczecin** (range 50km);
  - **Widuchowa** (range 45km).

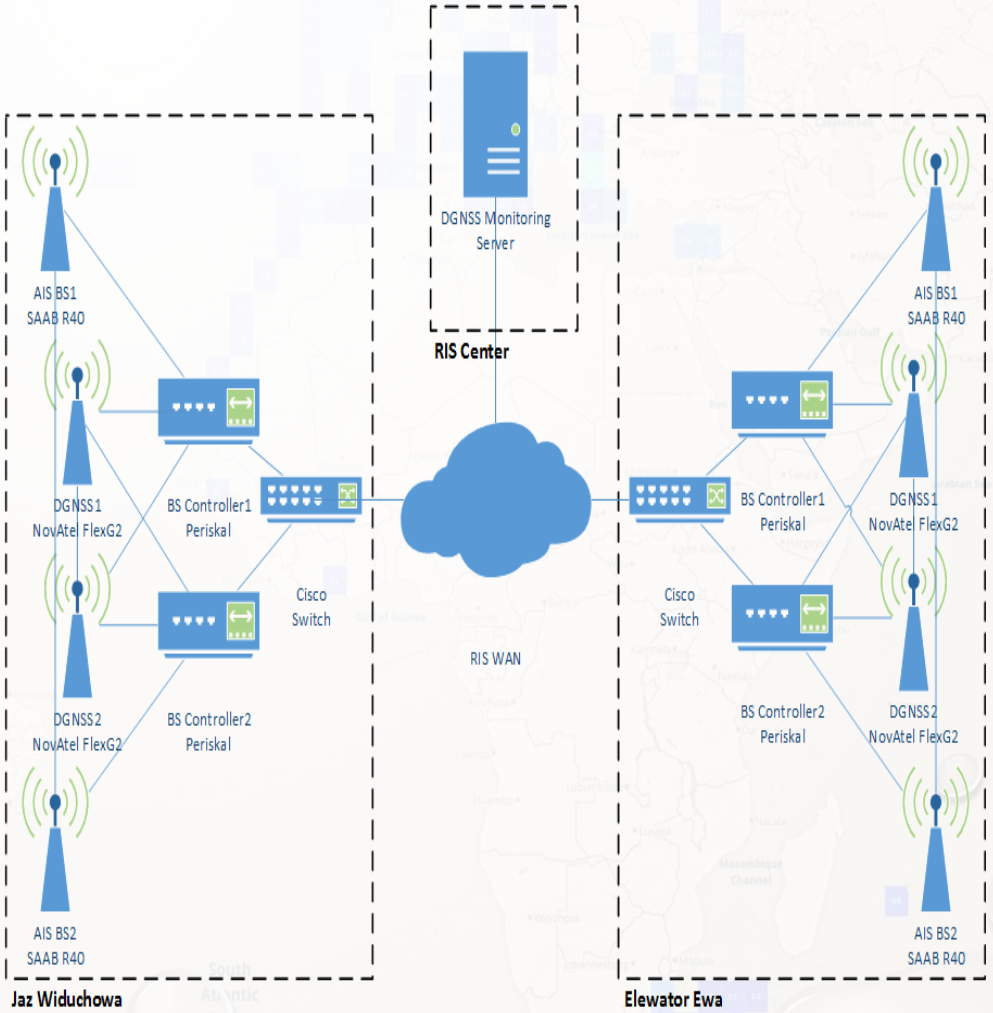
# PILOT IMPLEMENTATION ON THE LOWER ODER RIS PROJECT



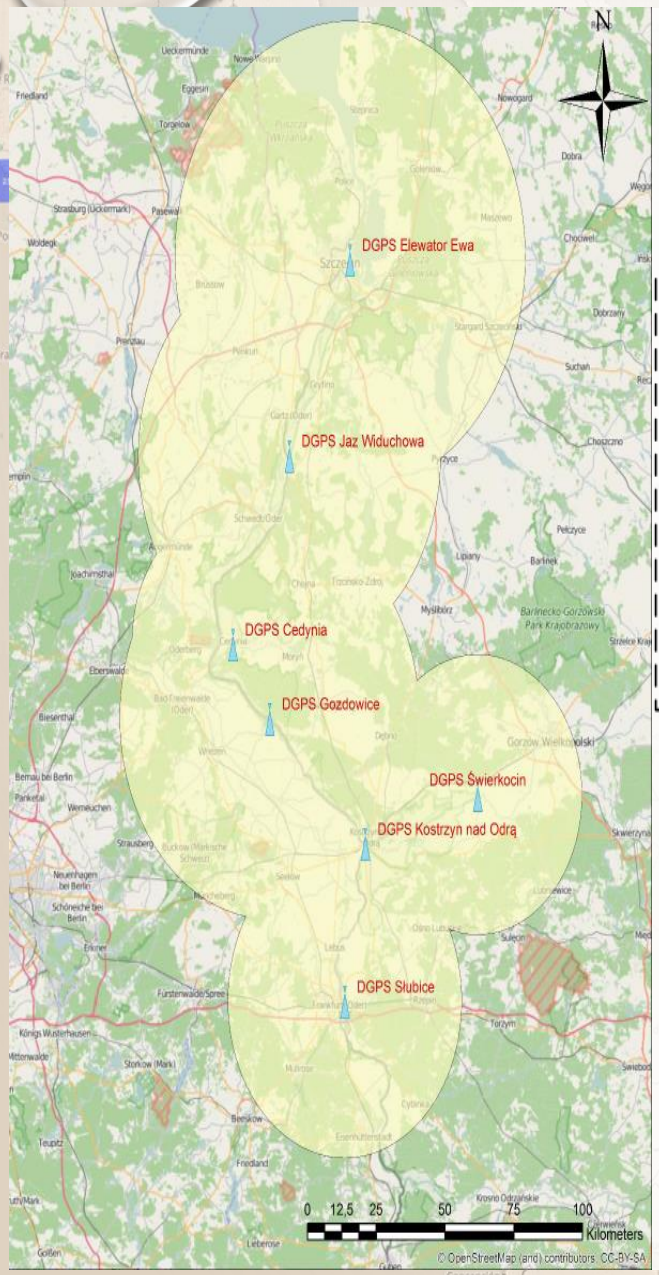



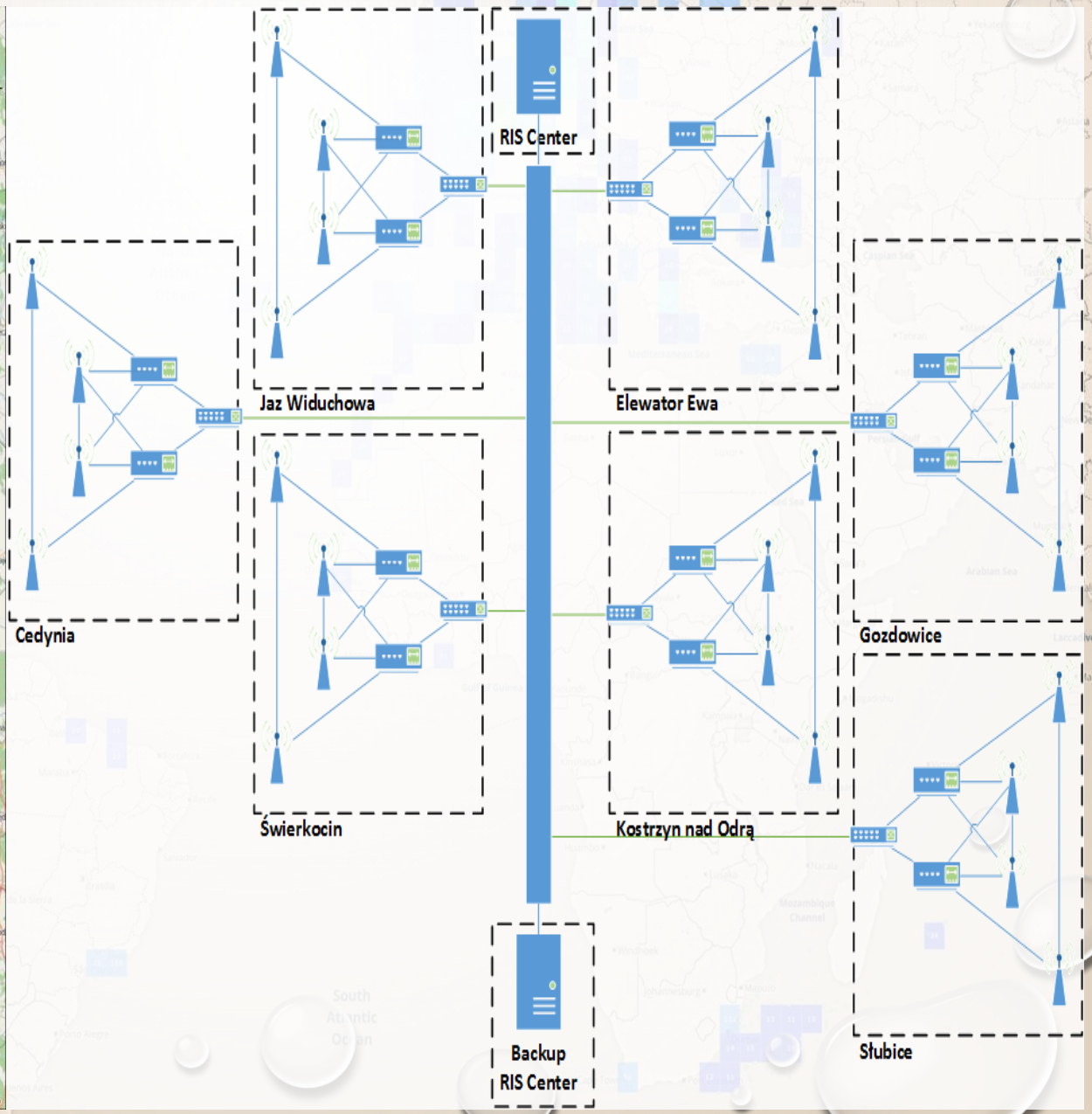
# RIS-ODRA DGNSS SUB-SYSTEM



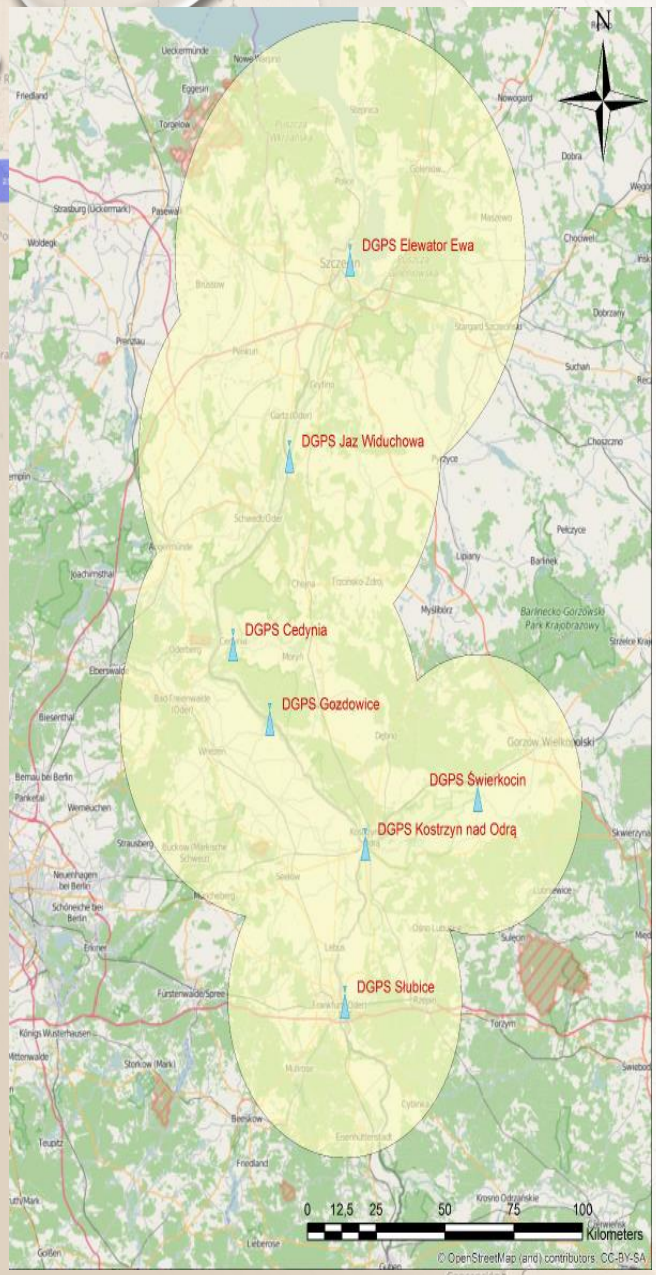



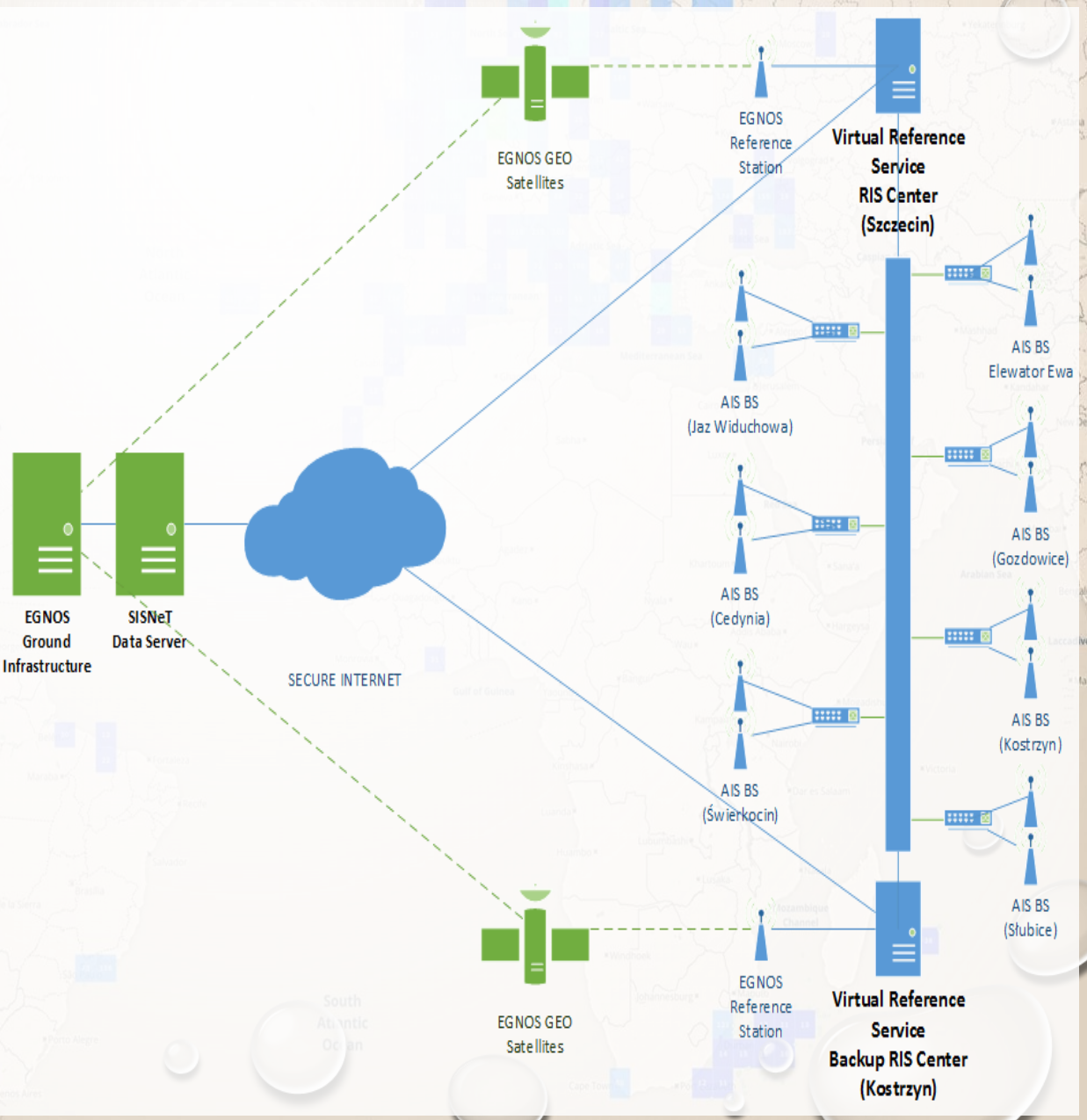
# FINAL RIS-ODRA IMPLEMENTATION



# EGNOS SBAS/SISNET ALTERNATIVE



# D-GNSS VS E-GNSS

**(a comparison based on the RIS-Odra Final Implementation)**

| | System | Accuracy | Number of devices (per site) | Max. Power consumption (per site) | Weatherp roof | Internet independent |
|---|---|---|---|---|---|---|
| DGNSS | Classic D-GNSS | 1-5m | 7 | 900W | ✗ | + |
| EGNOS | E-GNSS (SBAS + SISNeT) | 1-5m | 3 | 260W | + | + |

# OPPORTUNITIES:

- **Simplified hardware architecture -** Number of devices **reduced over 50%** would have a significant impact on cost of rental fees, insurance and vendors extended support;
- **Power consumption -** In case of RIS-Odra system the annual power savings calculated for 7 sites would reach **5,5MWh;**
- **Centralized monitoring and management -** all algorithms and processes are managed by central servers - no need to replace/update devices on sites.

# CHALLENGES:

- **Awaiting IALA/IMO approval -** for public administration that is important to offer type approved services even if it is not formally required;
- **Total Cost of Ownership (TCO) -** at this stage, due to limited amount of EGNSS implementations in RIS domain, it is difficult to compare TCO with classic DGNSS approach.

# NEXT STEPS

- Final implementation of RIS on the Odra river is expected to be commenced in 2017 and completed at the end of 2019.
- One of the crucial part will be further development AIS services including DGNSS correction distribution over AIS Message 17.
- Cost-benefit analyses will be prepared in order to decide about eventual implementation of EGNOS as a primary or back-up DGNSS solution supporting sailors and skippers visiting the RIS-Odra area.


# Thank You for attention!
# Any questions?

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