



NORWEGIAN MAPPING  
AUTHORITY

# NORWEGIAN SUPPORT TO MOLDOVA: ESTABLISHMENT OF MOLDPOS

POSITIONING DATA – FOR THE BENEFIT OF SOCIETY

EUREF 2011 SYMPOSIUM  
CHISINAU MOLDOVA 25 – 29 MAY 2011

# NORWEGIAN SUPPORT TO MOLDOVA: MOLDPOS

Agency for Land Relations and Cadastre of Moldova

Norwegian Mapping Authority

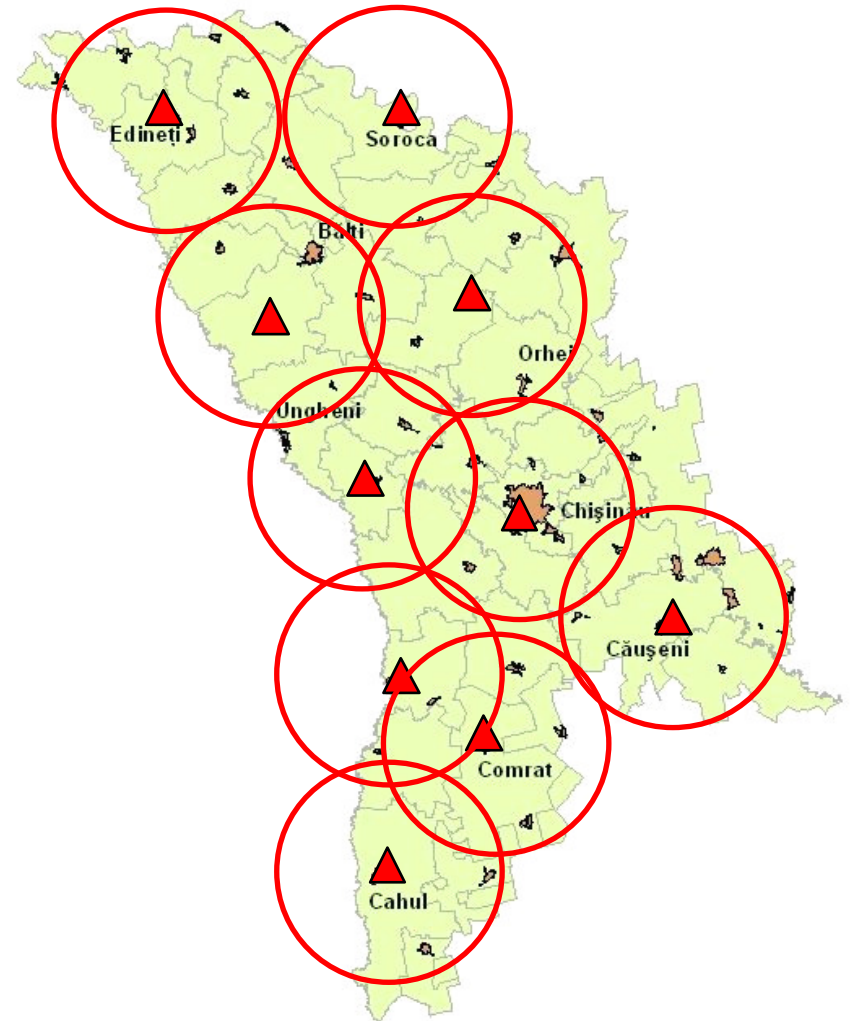
Leica Geosystems & Servalux

Ca. 2 min NOK/ 250 000 Euros

10 Reference Stations

To be launched in September 2011

Challenge – development of Business Model





# MOLDPOS Project : Leica Geosystems Solution

- MoldPOS Services
- Network design
- Leica GNSS Equipments & SW
- Monitoring MoldPOS



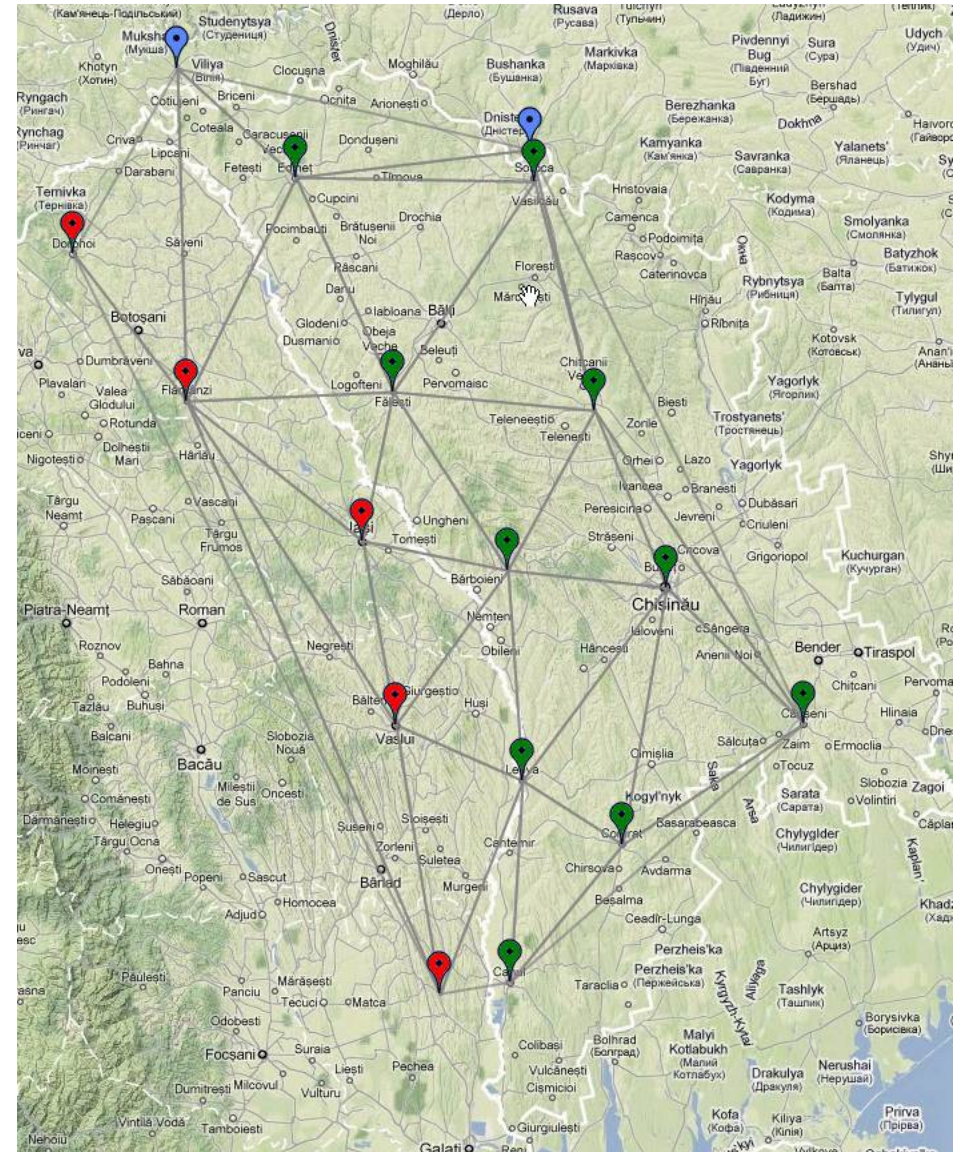
# MOLDPOS Project: Services of MoldPOS

Ref.	MOLDPOS service	Procedure/ method	Data transfer manner	Accuracy	Data format
3.1	DPS differential positioning	Code network (incl. phase smoothing) solution in real- time	Wireless Internet (GPRS, UMTS,) NTRIP protocol,	Up to $\pm 0.5$ m	RTCM 2.3
3.2	VPPS* highly precise positioning	Network solution of phase measurements in real-time	Wireless Internet (GPRS, UMTS,) NTRIP protocol,	Up to $\pm 4$ cm (2D)  Up to $\pm 7$ cm (3D)	RTCM 2.3 RTCM 3
3.3	GPPS** geodetic highly precise positioning	Post – processing	Internet (FTP, e-mail)	Up to $\pm 1$ cm (2D, 3D)	RINEX 2.11 RINEX 3

# MOLDPOS Project : Network Design

## Motivation to select MoldPos design :

- ✓ Optimized coverage of Moldovan Territory
- ✓ Consistency for the Network RTK applications
- ✓ Independancy from neighbouring countries
- ✓ Capacity to share data in future with ROMPOS
- ✓ Data Centre located in Chisinau
- ✓ Remote Stations connected via IP-VPN (MoldTelecom)

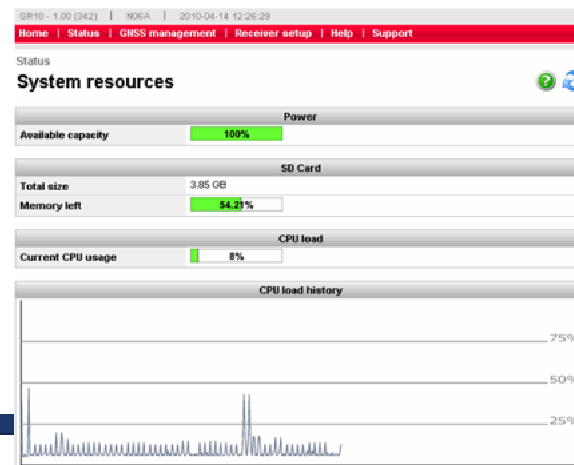




# MOLDPOS Project : Leica GR10 receiver

New Leica Reference Station receiver :

- ✓ GPS L1, L2P, L2C, L5
- ✓ Glonass L1, L2
- ✓ Ready for Galileo E1, E5a, E5B, AltBOC



# MOLDPOS Project : **Leica AR10 Antenna**

## Advanced Antenna Technology :

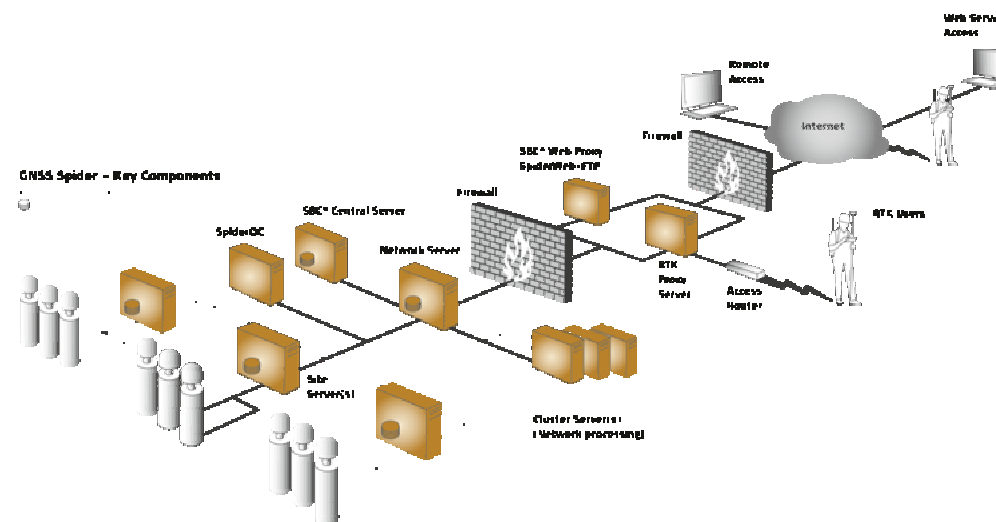
- ✓ All new wideband element for excellent performance over all frequencies
- ✓ Large ground plane, integrated radome
- ✓ Sub-millimeter phase centre accuracy



# MOLDPOS Project : Leica GNSS Spider

## Overview of GNSS Spider Configuration

- ✓ **Spider Site server**
  - ✓ Manages Control GNSS receivers
  - ✓ Generates File & Products (RINEX, QC)
- ✓ **SpiderNET & Network RTK**
  - ✓ Process network
  - ✓ Provides RTK corrections (VRS, MAC,...)
- ✓ **Spider Web**
  - ✓ Distribution of RINEX, virtual RINEX
  - ✓ QC of Network (Raw data, Nova Maps)
  - ✓ Automatic Computation Service
- ✓ **Spider Business Centre**
  - ✓ Web interface for registration
  - ✓ Manage end-users accounts
  - ✓ Provides info for billings mechanisms





# MOLDPOS Project : Initial Computation

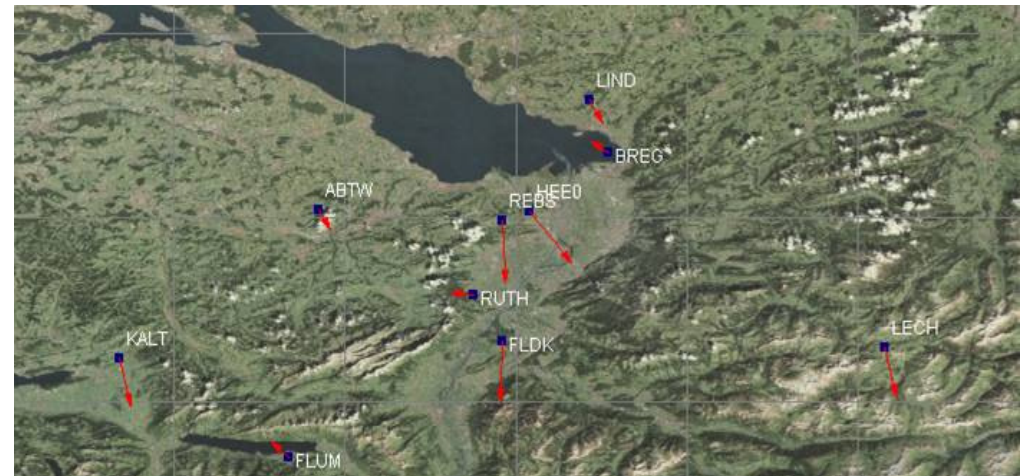
## Primary Computation of Network

- ✓ Performed by IGS Global Data Centre in France
- ✓ Coordinates expressed in IGS08 and MOLDREF99.

# MOLDPOS Project : Monitoring MoldPOS

## Cross-Check Monitoring Service

- ✓ Detection and warning of mm antenna movements in near real time
- ✓ Positions calculated at daily interval
- ✓ Secure web based reporting of the site movements
  - ✓ Display of time series for coordinates, 2D & 3D displacement
  - ✓ 2D & Height vector maps, velocity time series
- ✓ Email messages provide warning when a significant movement occurs
- ✓ Cross-Check is a Commercial Service operated by Leica Geosystems



Processing managed by Bernese BPE v5