GNSS – InSAR collocation in Slovakia

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# Geodetic networks in Slovakia

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<th>Geodetic reference system representation</th>
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<td>National spatial network</td>
<td>ETRS89</td>
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<td>National levelling network</td>
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<td>National gravimetric network</td>
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<td>„National InSAR reflector network“</td>
<td>ETRS89 (means referencing that InSAR images to ETRS89)</td>
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Why „National InSAR reflector network“?

• **InSAR** (Interferometric Synthetic Aperture radar) is:
  – new geodetic technique
  – as a technique has ability to detect and provide submillimeter information about HZ and V changes of natural or artificial reflectors (in LOS geometry)
  – InSAR is „relative“ technique - to provide changes in absolute values needs geodetic referencing
  – accurate coordinates of artificial InSAR reflector will enable to do correct absolute referencing of InSAR images to ETRS89

• national InSAR reflector network
  – will consist of set of artificial reflectors with known precise coordinates of its phase centers
  – results from referenced InSAR image processing will be used e.g. for vertical monitoring of Slovakia
Why „National InSAR reflector network“?
State wide monitoring = levelling only where it will be needed
Why „National InSAR reflector network“?
Regional monitoring = e.g. for geologists
Slovakian decision = To collocate InSAR with GNSS on SKPOS stations

• Why?
  – there are enough and well distributed SKPOS stations across whole country
  – we can compare precise (mm) HZ or V changes got from both techniques (GNSS and InSAR)

• Final decision:
  – to built up InSAR network in collocation with SKPOS
  – inspiration was from Netherlands (EUREF symposium Amstredam 2018)
  – Study first: GKU ordered study (in Slovak university of technology experts) for checking of SKPOS stations suitability for InSAR reflectors installation
Checking of SKPOS stations suitability for InSAR reflector installation

- checking of SCR (signal to clutter ratio) on SKPOS station - example of bad station
Checking of SKPOS stations suitability for InSAR reflector installation

- checking of SCR (signal to clutter ratio) on SKPOS station - example of good station
Proposal of SKPOS - GNSS InSAR collocation sites
SKPOS GNSS/InSAR collocation sites (status in November 2022 = 11 sites)
Passive reflector – slovakian type
Instalation during process of the new pillar stabilisation
Passive reflector – slovakian type
Instalation of reflector on the existing pillar
Active transponder (electricity needed)
Eccentric placement = not very comparable with GNSS
Determination of coordinates of reflector phase center is very important
Near future plans (in cooperation with SUT colleagues = InSAR experts)

- finish „National InSAR reflector network“ and start provide phase center coordinates for referencing
- compare results from GNSS and InSAR
- creation of state wide InSAR maps
- set monitoring
Thank you for your attention

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