Close Future of Slovak Weather Radar Network

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1 Introduction

Slovak Hydrometeorological Institute (SHMU) is now operating weather radar network consisting of two radars: Maly Javornik (west part of Slovakia) and Kojsovska hola (east part of Slovakia). Current coverage of Slovak territory is not sufficient for effective flood warning service due to big landscape variability: from Danube and Eastern Slovak Lowland to Carpathian Mountains (including High Tatras). In the late 90's SHMU's specialists started with Slovak radar network extension preparation. Selection of places for 2 new radars covering valleys in Orava and Liptov region and central part of Slovakia has been initiated. Tool for the radar horizon simulation was developed (Kotláriková, D. and Kaňák, J. and Strmiska, I., 2000). Radar horizon including minimal visible height above ground level was simulated for each point of available digital elevation model of Slovakia. Set of good candidates for the new radar sites were examined on the place. The application of extended criteria like road access and electric power availability helped to choose Kubinska hola (north part of Slovakia) and Spani laz (central south Slovakia) as place for new radar sites.

Figure 1: Radars position in future Slovak weather radar network. Blue - existing radars, green – new radar sites under constructions.

2 From plan to reality

After new positions were selected, works on building permission has been started. Big Environmental Impact Analyses were performed for both new sites, including meeting with local inhabitants. In 2004, SHMU obtained building permission for the radar at Kubinska hola, unfortunately SHMU didn't receive finance assignment to start real work on new radars and also preparation processes for Spani laz were canceled. However, the limited financial resources were spent for replacement of old MRL-5 radar at Kojsovska hola by new RDR 250-GC with ENIGMA signal processor.

In 2012, the call for the project from European funds has been issued for Flood Warning and Forecasting System (POVAPSYS) and SHMU revived idea of the new weather radar network consisting of 4 radars. In 2013, SHMU received building permission for Spani laz and successfully applied for grants from EU funds and is running new project POVAPSYS. In parallel, international tenders for construction work and for technology were published. In July 2014, construction of both new towers has been started and contract including new radar network was signed. New radar network has to be operational in October 2015.

3 New weather radar network design

New Slovak weather radar network will consist of 4 identical dualpolarization radars METEOR 735CDP10 from SELEX company:

- Maly Javornik (existing site, only radar replacing)
- Kojsovska hola (existing site, only radar replacing)

- Kubinska hola (new radar site, new 23 m tower)
- Spani laz (new radar site, new 43 m tower)

All radars shall perform full volume scan every 5 minutes. Volume data shall be transferred to SHMU headquarters for central processing and archiving. Data from all radars should be available in OPERA Data Center, Odyssey.

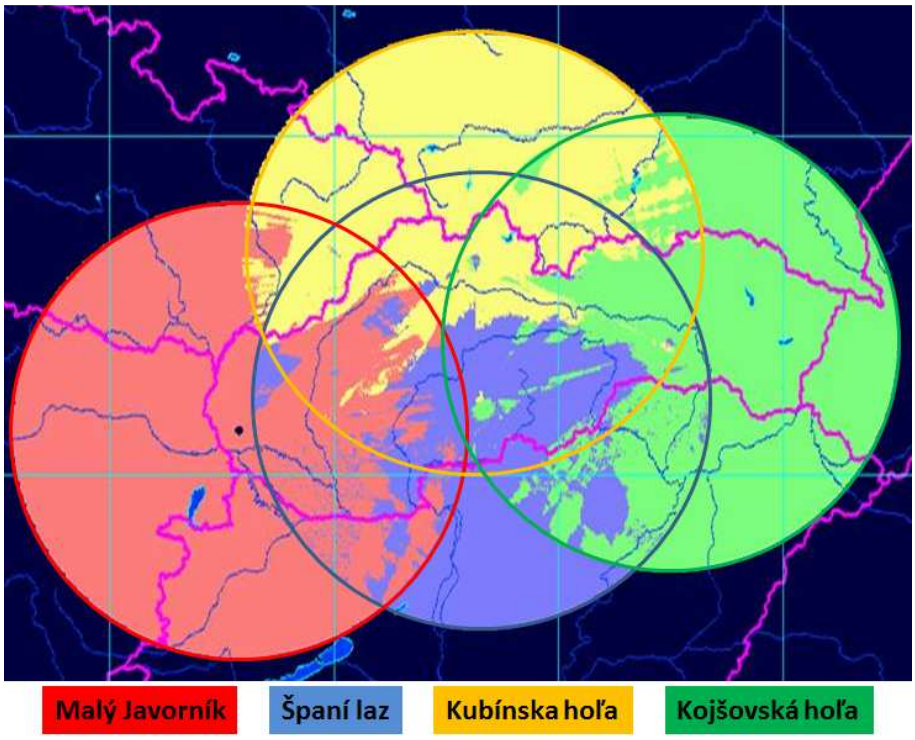

Figure 2: Simulated compositing map of Slovak radar network. Selection criteria: minimum visible height over terrain by radar (Kotláriková, D. and Kaňák, J. and Strmiska, I., 2000).

During POVAPSYS project, SHMU will renew its IT infrastructure; purchase almost 140 automatic raingauge stations, almost 80 automatic weather stations and new reception system for data from geostationary and circumpolar satellites. From another project (Improving technical infrastructure for research and development purposes at regional offices SHMÚ), new LINET lightning detection system, new aerosol micropulse lidar and ozone brewer spectrophotometer are being installed. Newly acquired technology will also bring new research potential not only for remote sensing department of SHMU.

Acknowledgement

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References

Kotláriková, D. and Kaňák, J. and Strmiska, I. Radar Horizon Modelling as a Requirement of SHMI Radar Network Enhancementh // Physics and Chemistry of the Earth, Part B: Hydrology, Oceans and Atmosphere - September 2000 - Vol. 25, Issues 10-12. First European Conference on Radar Meteorology, Bologna/Italy - pp. 1153-1156.