

1st FORALPS CONFERENCE

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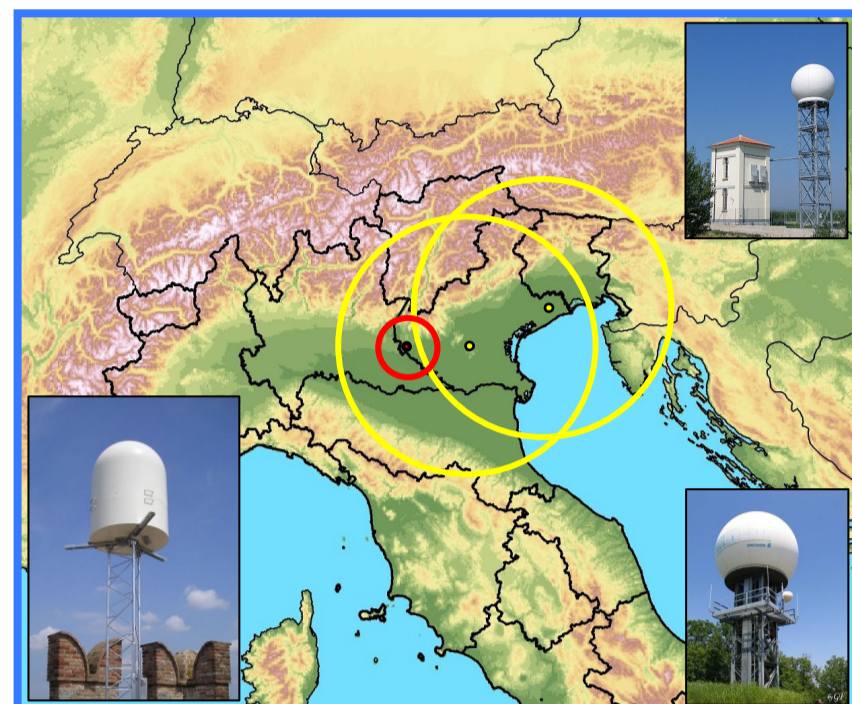
ARPAV-FORALPS MICRORADAR INSTALLATION ON A HISTORICALLY STRATEGIC VANTAGE POINT

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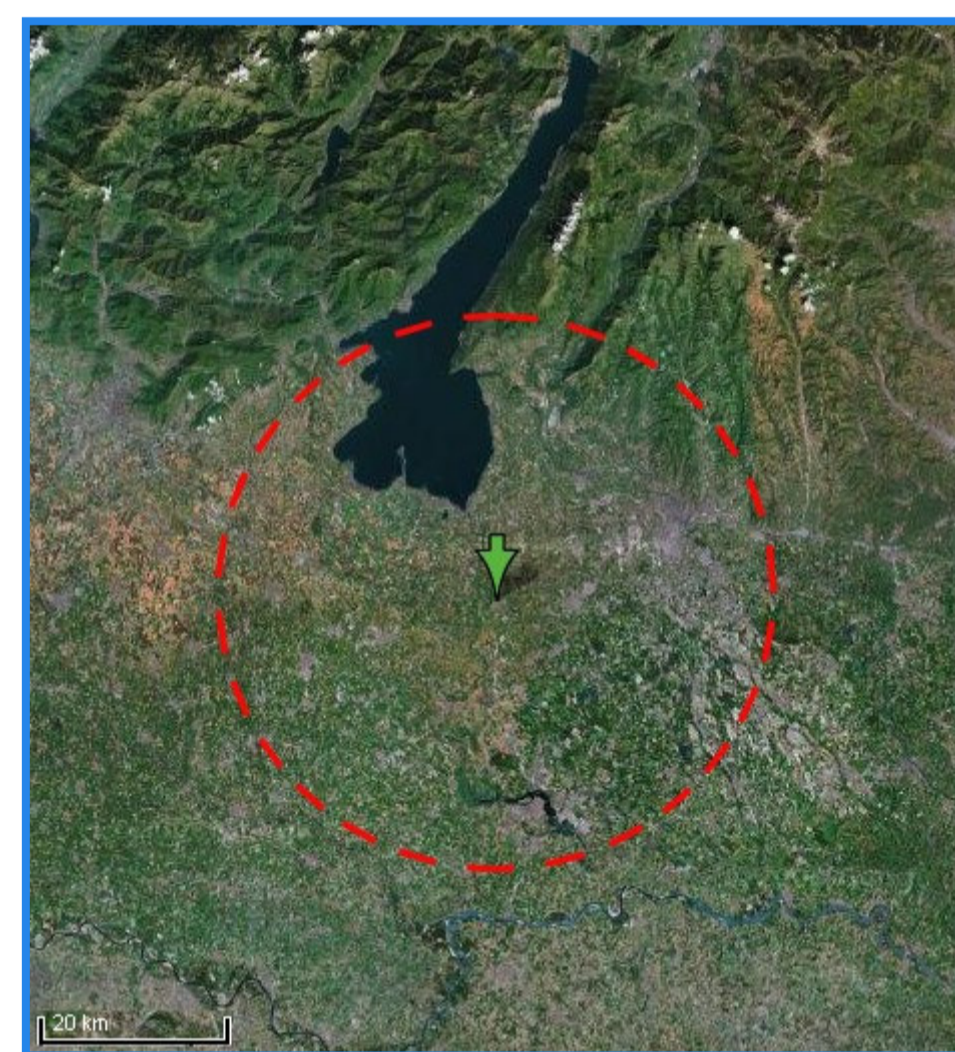
INTEGRATION OF THE ARPA VENETO MONITORING NETWORK WITH A X-BAND RADAR



A network of radars and meteorological stations provides an estimation of the amount of precipitation. FORALPS aims at the development of X-band microradar prototypes for high-resolution monitoring of precipitation in mountain valleys. ARPAV aims to use the existing C-band Doppler radars and the rain gauges network in conjunction with an X-band radar, in order to complement the monitoring capabilities over the Lake Garda region, which is not properly covered by the Teolo radar due to its distance and complex orography. The image on the left shows the coverage of ARPAV's two operational C-band Doppler radars, along with the range and the location of the new microradar.

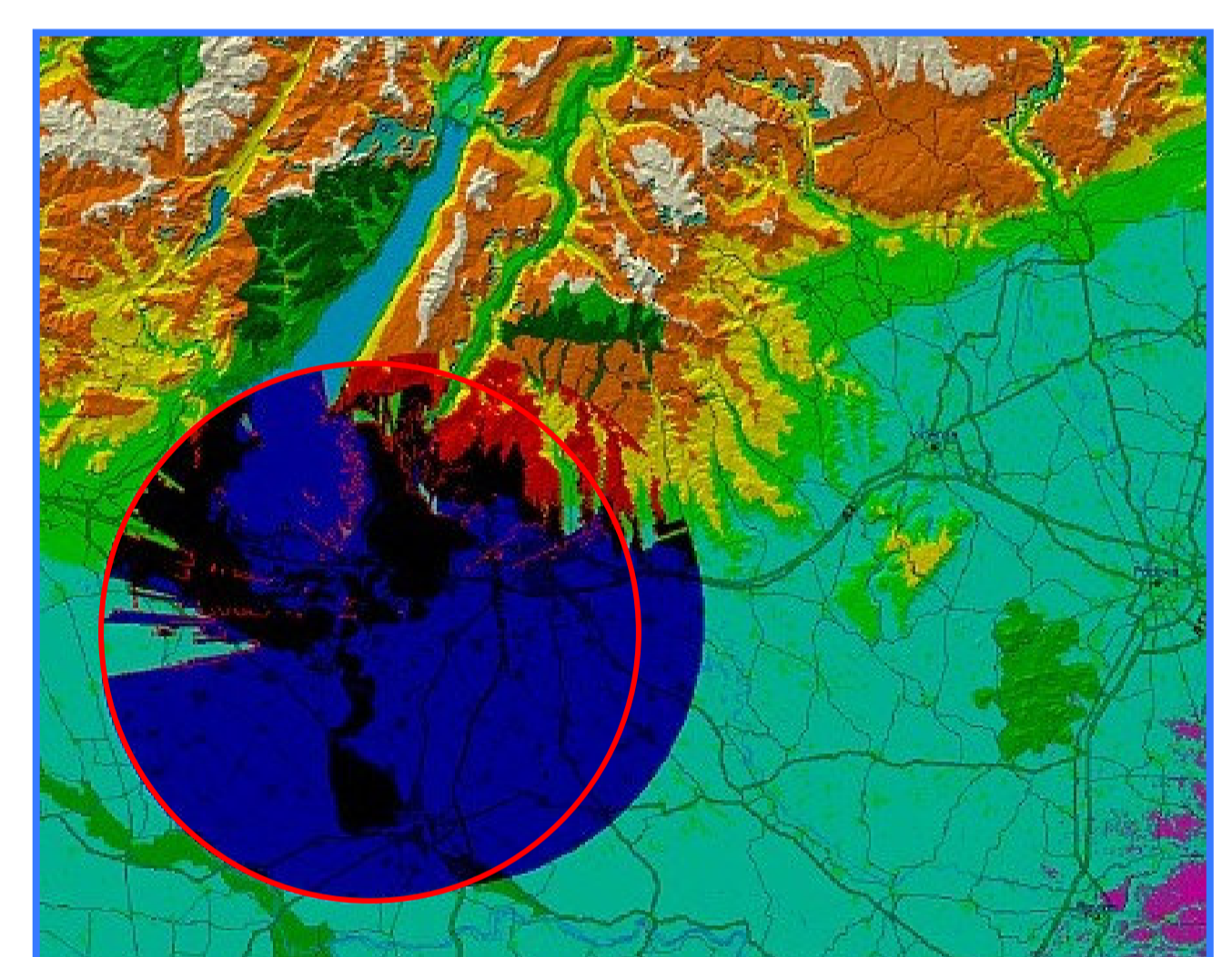
WHAT KIND OF X-BAND RADAR?

The goal of ARPAV is to cover with an X-band microradar a large enough region in the west side of Veneto. Due to the interface of the mountains, the Po Valley and Lake Garda the area is often hit by intense, hail-producing convective systems. The southern part of the Lake Garda valley is very wide, so that it makes sense to deploy a microradar which is able to perform azimuthal as well as volume scans. The red circle represents the typical range of our microradar (30 Km).



WHICH IS THE BEST SITE?

After considering the orography of the region near Verona with on-the-spot inspections and after consulting radar visibility maps (see Figure for tilt 0°), the conclusion was that the best site for the installation of the microradar (best location for good radar visibility) is the Main Tower of Castello Scaligero in Valeggio sul Mincio (Verona).

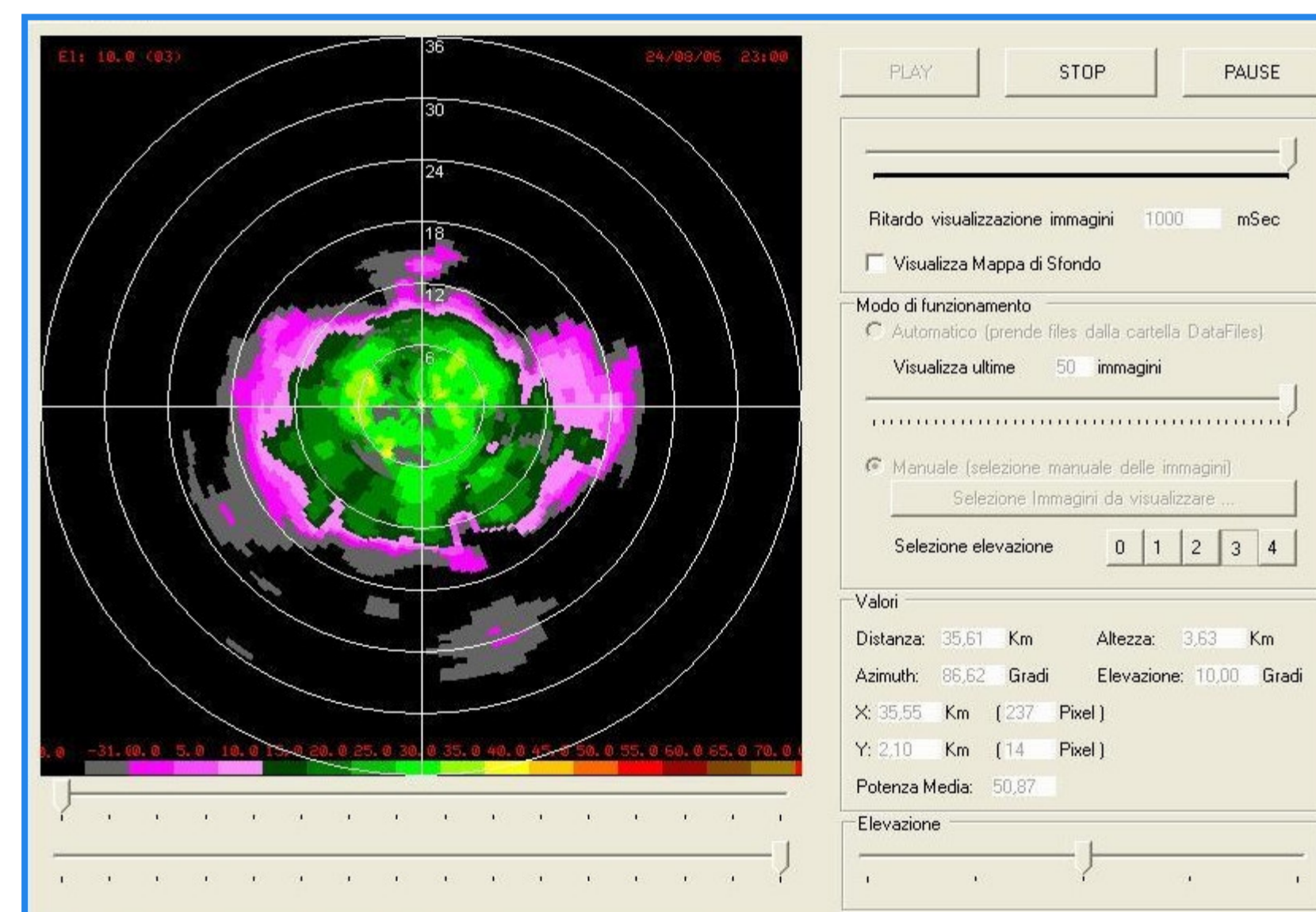


THE MICRORADAR ELDES WR-10X



The main technical features of the microradar are:

- ♦ Operating frequency: 9410 MHz \pm 30 MHz
- ♦ Repetition pulse frequency: 800 Hz \pm 10%
- ♦ Power Peak: 10 KW
- ♦ Pulse width: 0.6 μ S
- ♦ Typical Sensitivity: 10 dBz @ 25 Km
- ♦ Parabolic antenna aperture: 70 cm
- ♦ Beam width: < 3°
- ♦ Up to 5 different elevation angles



The GUI allows the visualization of the data and the total control of the microradar. Remote control system is also available with the possibility of turning the instrument on/off, monitoring remote parameters (T, power supply,...).

images: courtesy of 

THE X-BAND RADAR INSTALLATION IN VALEGGIO SUL MINCIO



Some simulations have been made in order to estimate the environmental impact of the microradar; the *Soprintendenza per i beni architettonici e il paesaggio* of Verona gave the authorization. The ARPAV Department of Verona quantified the electromagnetic emission of the instrument on the surroundings. Based on the good results obtained, the Municipality of Valeggio sul Mincio authorized the installation of the microradar.

The X-band radar has been installed on the Main Tower of Castello Scaligero in Valeggio sul Mincio first half of June 2006. Note that this tower constitutes a historically strategic vantage point from which all the enemies approaching the castle could well be spotted from a great distance, i.e. good visibility was as important back then as it is now! The radar will be put in operations when the safety problems regarding the electrical system (i.e. protection against strokes) will be solved.



IMPACT ON SAFETY AND ECONOMIC ACTIVITIES OF A DETAILED WEATHER FORECAST

The first results of a cost/benefits analysis shows that a detailed weather forecast is monetary convenient for the economical and agricultural activities of the region (see poster PRELIMINARY ANALYSIS COST BENEFIT OF WEATHER FORECAST ON GARDA LAKE AND VERONA PROVINCE - F. Predicatori, P. Frontero, F. Giacomazzi, A. Tacconi). The study on how to mitigate the impact of adverse weather phenomena evidenced the importance of a detailed and "just in time" weather information, i. e. the need of weather forecast using the X-band radar in conjunction with the already operative C-band radars, also for the human safety (Lake Garda is a very popular touristic region, often hit by severe weather events). ARPAV operates a *state of the art* technology for the composite and the elaboration of C-band radar data. The pilot application of the FORALPS microradar prototype, on the other hand, will permit to evaluate the improvements coming from this complementary monitoring with this kind of "low-cost/high-performance" instruments.

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