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Mobile Weather Radar for Commercial Applications

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For some applications accurate weather forecasts for a small area are very important. These can be live outdoor events like concerts or Formula 1, construction sites, hydrography applications or even military purposes. The desired range to monitor is limited to about 50 – 70 km.

Normal S- or C-Band radar systems are located quite far away from each other with little overlap. If one is in the middle between two radar systems the data could not be very useful because of the height of the radar beam. And in some regions radar do not cover the desired area because of mountains or there is no radar available at all. One is also dependent on the radar operator and their data. The radar scanning modes or other settings can't be changed and the data can get costly. Sometimes the available data is not accurate enough due to large range cells (a couple of km in square). This can be partly compensated by buying more accurate data for an increasing price where possible. Small range cells (100m in square) are important for example for sewer systems of cities or precise location of rain cells (street level rain).

Therefore it would be more than practical to have a small and mobile weather radar system that can be put into operation by only two persons in less than in an hour. Because of the power amplifiers or magnetrons, wave guide assembly and antennas modern S- and C-Band radar are not meant to be mobile. A good solution is a X-Band radar system. The antenna gain is high compared to the size and some of the components can be bought of the shelf.

The Rainscanner from Selex SI Gematronik is a product that fits these requirements. It offers a cost efficient and effective solution for short to medium range weather radar application. Simplicity and ease of use are the primary design features, permitting fast installation, easy radar control and data handling. The entire system is lightweight

and portable. It can be installed by two men on a 16m telescopic mast easily. A setup can be seen on the poster. The Rainscanner indicates precipitation areas, and classifies precipitation into levels. The transmitter is capable of delivering 25 kW power output, ideal for operation at ranges between 50 and 100 km, depending on environmental and meteorological conditions, e.g. intensity of precipitation. The antenna and pedestal combination is designed for exposed outdoor operation. Fast antenna scans provide quick updates of atmospheric situations. The modular design offers 3 reflector types, yielding in beam width of 1˚ to 4˚ degrees. Available are a 8 ft fan beam antenna or two parabolic dishes with 60 cm or 120 cm diameter. Depending on the reflector size and the environmental conditions, a suitable radome is also available.

The Rainscanner consists of a scanner unit, interface box and workstation. The scanner unit contains the transmitter, receiver and antenna unit. Antenna data (IF frequency and video signal) are feed directly from the scanner unit to the A/D converter in the interface box. The interface box comprises of a robust industrial signal processor and the interface unit. The interface unit is the interface between the radar system and the workstation through which the system in controlled. Using a modified marine radar and off the shelf components keeps initial and running expenses low. Due to the construction of the marine radar the waveguide runs are kept very short thus eliminating losses.

Data display as well as product and data archiving are provided with the real-time visualization software RainView. This software module is based on Gematroniks field proven software package Ravis. The real-time radar system and data visualization software Ravis forms an essential component of the full-size METEOR weather radar series.

Data transfer between the signal processor in the interface unit and the remote RainView PC can be provided via LAN or WLAN, etc. To plot the radar data on maps, different underlay functions are also available.