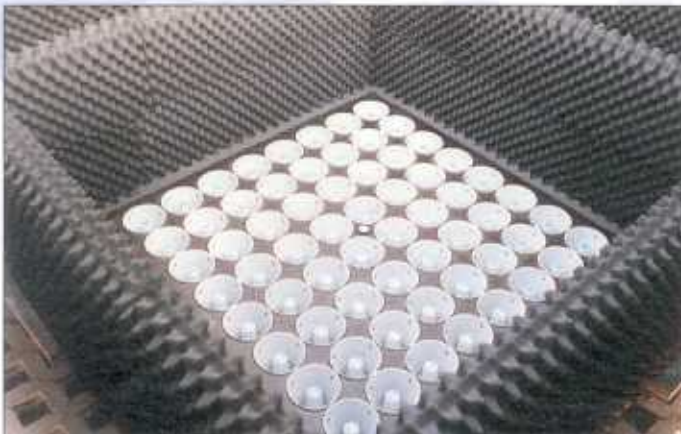


# Doppler SODAR

# DSDPA.90-64



- Superior Profiling of Wind, Turbulence and Dispersion Parameters
- Automatic Monitoring of Boundary Layer Structures
- High Flexibility by User Defined Operational Parameters
- Extraordinary Performance in Routine Applications
- System Embedded Quality Checks
- Powerful Offline Data Processing Features
- **Extendable with RASS** for Temperature Profiling



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# DSDPA.90-64

## General Remarks

The Doppler SODAR DSDPA.90-64 is a powerful acoustic sounder to get wind and turbulence profiles in up to 40 height intervals ( $> 5$  m) within a typical height range of 15-800 m (nominal max. height  $> 1500$  m). DSDPA.90-64 offers outstanding reliability for your measurements in view of system availability and system performance in long term unattended routine measurements. Powerful software tools allow system control, monitoring of system performance, automatic data storage, remote access by Modem (GSM), off-line data processing and evaluation, preparation of professional graphics or to data statistics.

## Mechanics and Set Up

All outdoor antenna components are made from high durable weatherproof and light weight materials. The electronics are easy to access for convenient regular inspection or system diagnosis. The modular concept reduces size and weight of the antenna components for quick transportation and set up.

## System Design

DSDPA.90-64 uses a 90 degree phase shift steering antenna array of 64 loudspeaker (max. load 30 W) with exponential horns for perfect impedance matching. The total power of the array is approx. 800 W (elect.). The steering allows measurements in up to 5 different orientations (1 vertical), the zenith angle can be adjusted by the flexible frequency (1400-3000 Hz). The antenna unit can be located 50 m apart from the main processor unit (VME-Bus, 68040) and the data storing PC.

The system is controlled by an pre-emptive real time operating system pSoS+. The signal processing uses a homodyne receiver, low pass filtering, sample and hold amplifier and a 16 bit AD conversion. This concepts allows a spectral analysis by using only 32 FFT-lines saving most of the processor power for comprehensive data tests. The acoustic output power and the gain of the received signal are controlled automatically or according to the user 's selection. As a unique feature the signal can be analysed simultaneously in averaging and/or instantaneous mode for all radial components. In average mode the system outputs all information from the spectral moments of 0th, 1st and 2nd order. Using the optional Ethernet port complete instant-aneous spectra and/or the original A/D converted time series of the received signal of each single pulse are available for special research purposes.

Conservative internal plausibility routines are performed on the instantaneous and the averaged spectra detecting and rejecting all data with insufficient signal quality. As a new feature an off-line data processing can be integrated to improve the data availability by evaluation of instantaneous data by means of cluster detection.

## Antenna

The 1 m x 1 m antenna is build up by a 8 x 8 array, the beam width of the main lobe is about  $\pm 5^\circ$  at 2000 Hz. This array can be even increased by adding identical antennas or subsets. Special care is given to the preselection of the loudspeaker elements reducing any artificial effects like ringing after sound emission. An optimum for noise reduction and side lobe suppression was designed: The array is surrounded by an inner shield of 4 acoustic panels of 1.50 m x 0.70 m lined on both sides with highly absorbing material. An outer shield is built up by 4 panels of 2.40 m x 1.50 m lined on the inner side. To access the antenna easily a door is integrated in one

panel. On request triangular shaped noise sinks can be mounted on top of the outer shields. By this design the side lobes are damped by more than 40 dB without any power reducing shading techniques. Thus the system performs excellent even in the vicinity of industrial sites.

## Parameter Lists

DSDPA.90-64 offers adjustments of all relevant system parameters. The complete parameter sets can be stored under up to 40 user generated parameter names which can be entered into a parameter list for automatic cyclic alternation of operation modes.

## RASS Extension, Sonic Integration, Spare Parts

Hard- and software components of DSDPA.90-64 are prepared to build up a MERASS 3000 system for simultaneous measurements of wind, turbulence and temperature. The RASS mode can be entered simultaneously or in a staggered way with the SODAR mode. For RASS mode the identical software tools are available as for SODAR. Even the METEK ultrasonic sensor USA-1 for ground based measurements of wind and turbulence (heat, momentum, etc) can be integrated. Using industrial standards METEK confirms a delivery of spare parts for at least 7 years.

## Output Variables

- Instantaneous and averaged mode simultaneously
- Spectra for all antenna beams and RASS
- Received power and height corrected reflectivity
- Radial and vector wind components, vertical component of sound speed, standard deviations
- Wind speed, wind direction
- Stability classes, heights of inversion layers, temperature gradients, mixing heights estimates
- Plausibility checks
- Signal/Noise ratio, single pulse data coverage
- Virtual temperature (with/without vertical wind correction)



All specifications are subject to change without any notice.

