

LAP[®]8000



The LAP[®]8000 radar wind profiler reliably provides continuous and real-time vertical profiles of horizontal wind speed, wind direction, vertical wind speed and turbulence in the troposphere. Depending on the atmospheric conditions, the measurement height reaches 8 km or higher above ground level.

The operation is based on the scattering of electromagnetic pulses at inhomogeneities in the air with subsequent

Doppler analysis of the backscattered signal. The wind vector is derived using the beam swinging method.

The LAP[®]8000 radar wind profiler provides upper-air data with high resolution in time and height. It can substitute extensive radiosonde launching schemes. The LAP[®]8000 is designed for durability and low maintenance requirements. It works automatically and is virtually maintenance free. It is economic to operate and suited for

operation at unmanned, remote sites. The proven coaxial collinear antennas feature unmatched efficiency and withstand harsh environments. The new Digital IF Processor SIRP offers characteristics never found in wind profiler signal processing before. This results in higher data quality, better height coverage and more flexibility to tailor the system output to the user's specific needs.

Features

- maximum range up to 8 km and more
- durable and highly efficient antenna
- binary pulse coding
- Advanced Coherent Noise Suppression ACNS
- free positioning of range gates
- unlimited multiple-mode capability
- built-in system monitoring
- RASS extension available for temperature sounding

Applications

- weather analysis and forecasting
- severe weather observations and predictions
- aviation and rocket operations
- aerostat and unmanned aerial vehicles support
- atmospheric research
- air quality monitoring and emergency response
- global climate change studies

Uncompromised Wind Profiler Antenna Concept

The coaxial collinear antennas of the LAP®8000 have no moving parts, ensure long-term reliability and avoid safety hazards. Using a true vertical beam, vertical wind and turbulence are accurately measured and precipitation identified. The beams point into perpendicular directions and can be set parallel to the earth coordinate system North-South and East-West consistent with meteorological definitions of u and v. A fast switching between beams enhances accuracy in complex terrain.



LAP®8000 coaxial collinear antennas

A New Digital Signal Processor for Wind Profilers

The new SIRP Digital IF Processor was specifically developed for radar wind profilers. It combines Advanced Coherent Noise Suppression ACNS, vertical signal oversampling,

16 chip binary pulse coding, true Gaussian matched filters, and freely programmable height gates. Vertical range resolution can be set to values finer than 50 m. The revolutionary

ACNS cancels radio frequency interferences and improves data quality at sites suffering from radio pollution.

Comfort and Flexibility: the New Operation Software

Measurement Mode - LowMode

Radar Transmit and Receive | RASS Acoustic Sweep

Used for Raw Time Series

Inter Pulse Period: 32137.5 ns PRF: 31.1 kHz

Pulse Length: 800 ns No Coding

Pulse Height Resolution: 119.9 m Duty Cycle: 2.5 %

Pulse and Filter Shape: [Waveform icon]

Default Shape [Dropdown] Custom...

Advanced Coherent Noise Suppression

Coherent Integrations: 6 = 6 Coding Groups

Pulses per Dwell: 1769472 = 294912 Coh.Integr. = 36 FFTs = 1 Spectra

Auto-Set

Dwell Period: 56.9 sec Sampling, 58.9 sec incl. Delays

Usable [Techn.] Heights: 172 to 4281 [-38/-37 to 4771/4609 m]

Height Spacing: 50.000 m

Height Range: 250.000 m to 4000.000 m

Height Range (Actual): 250 m to 4000 m

Height Gates (Actual): Vertical: 76 Gates - Delay Clocks: 155, 27, 26, 2
Tilted: 76 Gates - Delay Clocks: 160, 27, 28, 27

SIRP Processing: 7 Channels, 160 Taps

SIRP Transfer: 22414 (22413.312) Packets, 24.1 Mbit/s

SIRP Time Series Size: 171.0 MByte

Vertical Direction: W/x: Feed Vertical Beam via X Cables (XN)

Preprocessing LowMode

Channel Name: LowMode Set Channel Name Suffix...

Channel Kind: Clear-Air

Used for Raw Spectra

Spectra Points: 8192 Incoherent Integrations: 36

Spectra Filtering: Default Filtering Clear-Air Custom...

Spectra Storage: Default Partial Storage Clear-Air Custom...

Spectra Coherence Time: 1.6 sec

Spectra Output Period: 56.9 sec (1 Spectra/Dwell)

Used for Raw Moments

Preprocessing Interval: 60 min

Peak Detection: Default Peak Detection Clear-Air Custom...

Peak Selection: Default Multi-Peak Method Custom...

Quality Control: Default Quality Checks Custom...

	Frequency	Doppler Velocity
Resolution:	0.633 Hz	0.217 m/s
Unambiguous Range:	-2593.0 to 2592.4 Hz	-888.21 to 888.42 m/s
Stored Range:	-146.2 to 146.2 Hz	-50.10 to 50.10 m/s
Searchable Range:	-129.1 to 129.1 Hz	-44.25 to 44.25 m/s
Search Range:	-58.4 to 58.4 Hz	-20.00 to 20.00 m/s

Create New Create Copy Remove

OK Cancel

Advanced configuration SRUN

The SIRP interfaces to the computer using USB 3.0 supporting highest data rates. With unlimited multiple mode capability, different settings with respect to pulse length, pulse coding and pulse shaping can be operated simultaneously. This allows a single wind profiler to support different applications at the same time. An auto configuration option optimizes the settings without need of user interaction. A variety of graphical data representations, data output formats and data transfer options matches all needs.

RASS Extension Available for Precise Temperature Measurements

A RASS extension is optionally available to make the radar wind profiler a combined RASS wind and

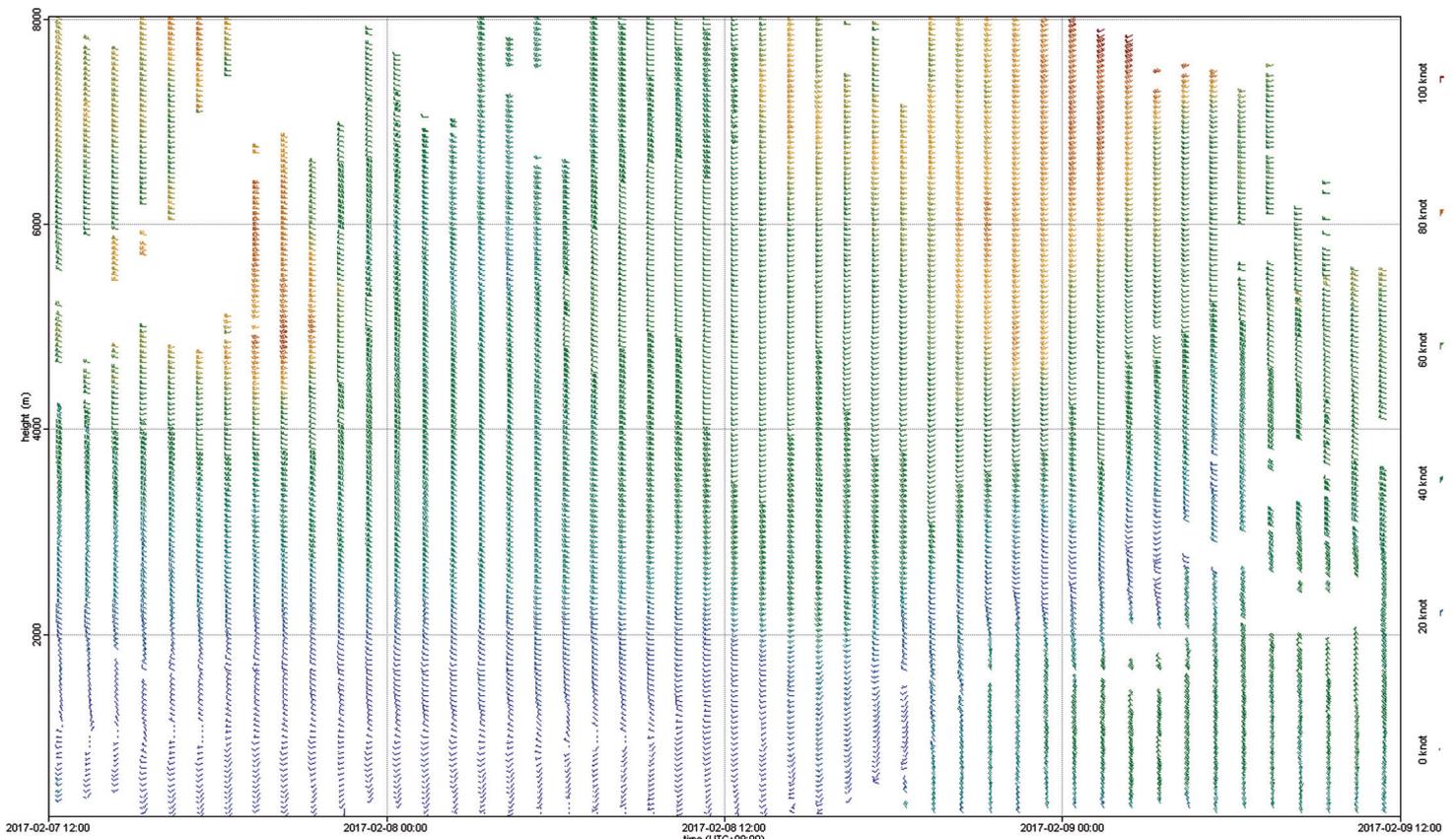
temperature profiler. The accuracy of the RASS temperature measurement is far better than that of any other

remote temperature measurement technique.

Software Specifications

Description	Specificaton
Data output	Horizontal wind speed and direction, wind components u, v and w, standard deviations of wind, backscatter, spectra, moments, time series of I/Q samples, quality levels
Real-time monitoring	Monitoring variables for all hardware units
Automatic self-test	Automatic hardware test for all hardware units under controlled conditions
Control and configuration	Graphical user interface, no manual editing of configuration files required
Displays in real-time	Wind barb and vector plots, time vs. height color plots, profile plots, time series plots, spectra plots and tabular displays
Displays offline	Same as displays in real-time
Data export in real-time	Network output via FTP, TCP, UDP or shared folder
Reprocess capability	Reprocess of time series, spectra, moments or main data, fully configurable through graphical user interface
Automation capability	Additional network and command-line interfaces for automated measurement control, change of configuration and data reprocess
Operating system compatibility	Windows 10, Windows 8, Windows 7, Windows Server 2016, Windows Server 2012 R2, Windows Server 2012, Windows Server 2008 R2 with native 64-Bit support

Specifications are subject to change without notice.



LAP®8000 data sample: wind barbs

Available Versions (other operation frequencies on request)

Order code A050100: LAP[®]8000, operating frequency 482 MHz

Order code A050101: LAP[®]8000, operating frequency 449 MHz

Order code A050102: LAP[®]8000, operating frequency 437.5 MHz

Basic Specifications

Description	Specification
Operating frequency	482 MHz, 449 MHz, 437.5 MHz, other frequencies on request
Antenna type	Coaxial-collinear phased array formed by 12 antennas in two axes
Antenna gain	29 dBi
RF beam width (-3 dB, full width)	7°
Antenna aperture	28 m ² approximately
Beams	4 oblique beams N, E, S, W and 1 vertical beam
Switching time between any beams	< 1s
RF power output	2000 W peak
Occupied bandwidth (99% power bandwidth)	≤ 3 MHz, at 1165 ns pulse width
Pulse width (selectable)	400 – 3340 ns
Minimum height	200 m approx.*
Maximum height	Up to 8 km in clear air and beyond in precipitation*
Height resolution (selectable)	60 to 500 m, depending on pulse width
Wind speed accuracy	<1 m/s
Wind direction accuracy	<10°
Measurement range of horizontal wind speed components	-200 to 200 m/s, larger ranges configurable
Measurement range of vertical wind	-50 to 50 m/s, larger ranges configurable
Averaging time (selectable)	5 – 60 minutes
Power requirements	100 – 240 VAC <2000 W
Operating conditions outdoor components	Temperature: -40°C to +50°C Relative humidity: 0% to 100%
Operating conditions indoor components	Temperature: +10°C to +35°C Relative humidity: 0% to 80% non-condensing

*) depending on settings, meteorological conditions and environment

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Extensions and Accessories (to be ordered separately)

Order code A050125: RASS extension

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