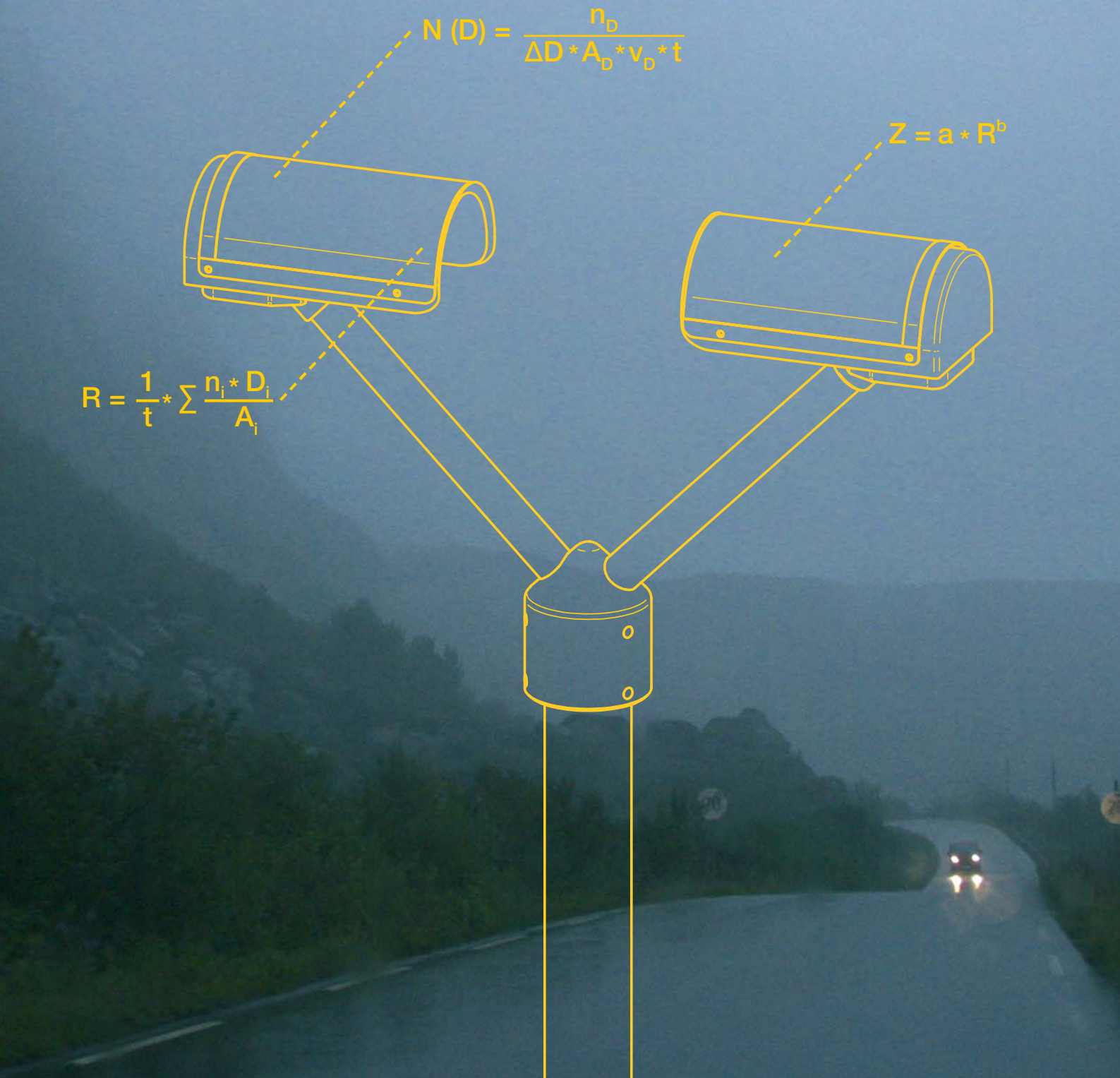
OTT Parsivel® =

The new formula for success in Meteorology

Laser-optical Disdrometer for simultaneous measurement of particle size and particle velocity of all liquid and solid precipitation



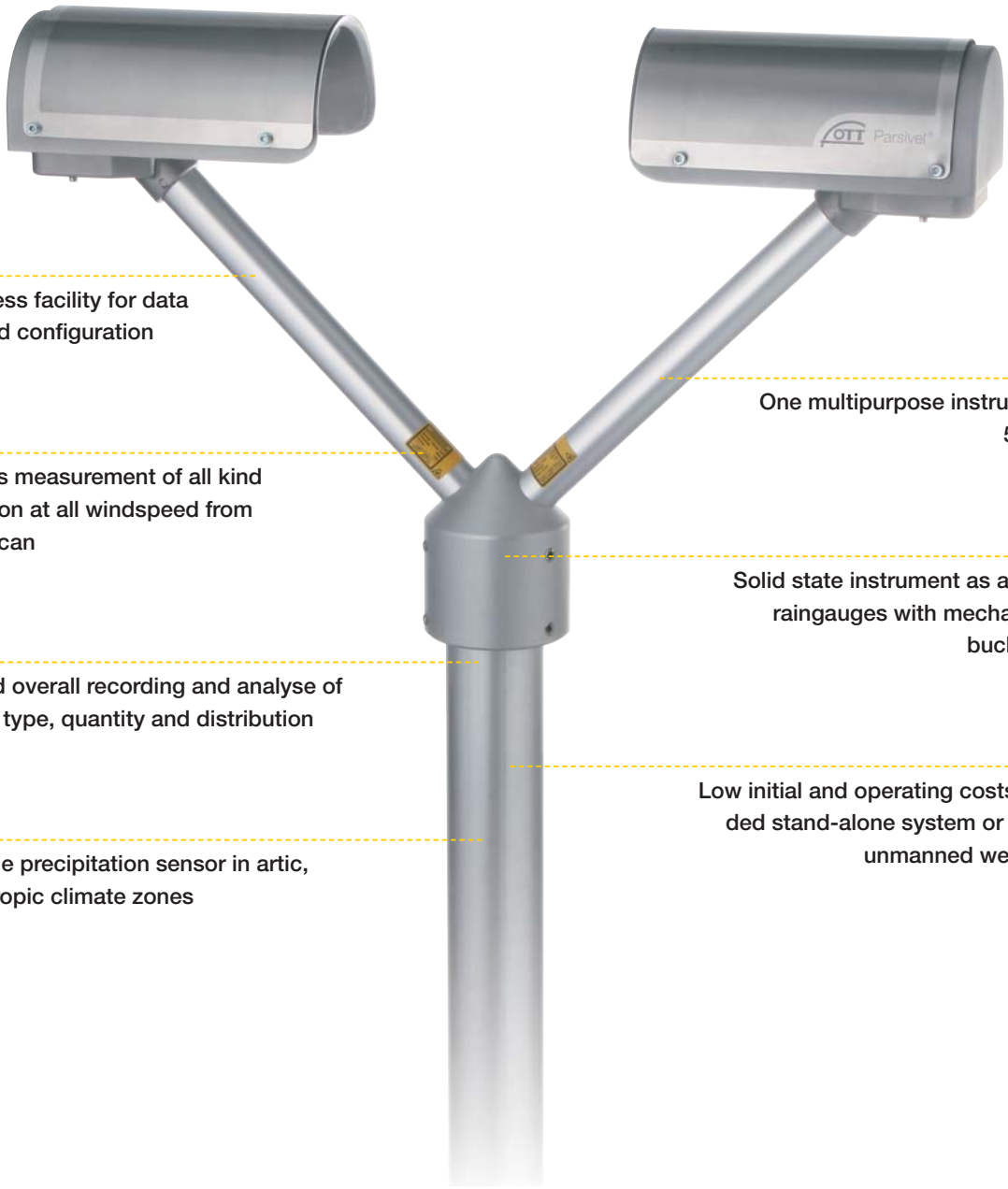
Measuring hydrometeors with Parsivel®

Parsivel is a modern, laser-based optical system for measuring all types of precipitation completely and reliably. Hydrometeors are differenciated and are classified as drizzle, rain, sleet, hail, snow and mixed precipitation.

Precipitation measurements are carried out with a special sensing head developed for this purpose. It detects precipitation optically one meter above ground-level (other heights are available on request). The data obtained are handled and stored by a fast digital signal processor:

Primary data are the size and velocity of each single hydrometeor, from which the size spectrum, the amount of rainfall, the equivalent radar reflectivity, the visibility, the precipitation kinetic energy and the precipitation type are derived. The results can be transmitted to a datalogger or a PC with a serial interface.

The advantages of Parsivel®



Remote access facility for data gathering and configuration

Simultaneous measurement of all kind of precipitation at all windspeed from calm to hurrican

Accurate and overall recording and analyse of precipitation type, quantity and distribution

Fully operable precipitation sensor in artic, desert and tropic climate zones

One multipurpose instrument fits for 5 single units

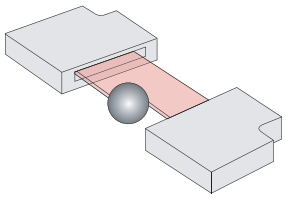
Solid state instrument as alternative for raingauges with mechanical tipping bucket principle

Low initial and operating costs as unattended stand-alone system or as part of an unmanned weather station

The principle

Parsivel uses a laser-based optical sensor to measure precipitation. The transmitter unit of the sensor generates a flat, horizontal beam of light, which the receiver unit converts into an electrical signal. This signal changes whenever a hydrometeor falls through the beam anywhere within the measurement area (48 cm^2).

The degree of dimming is a measure of the size of the hydrometeor, and together with duration of the signal, the fall velocity can be derived.



Parsivel® feature unique performance

– Patented extinction measurement procedure
– Operates unattended and fast, using maintenance-free laser technology
– Reliable in all environmental and weather conditions (lightning protection and self-regulated heating)
– Low power and heating operation by software commands
– Reliable recognition of all precipitation types, including mixed precipitation in the melting layer
– Comprehensive precipitation analysis using 2-dimensional distribution of size and velocity
– Special measuring head prevents secondary spectra caused by drops splashing on the sensor head
– Transmitter and receiver head in perfect design with no obstacles for precipitation catching

5 systems in one unit

Up to five systems can be accommodated in a single unit using appropriate and efficient software to suit customer requirements.

Precipitation

Measurements designed for determining the distribution and amount of precipitation can be carried out maintenance-free with Parsivel, regardless of the intensity, duration or type of precipitation. Additionally, its composition – i. e. the distribution of particles with respect to their type – is obtained directly from the measured sizes and velocities of each single particle and is recorded statistically.

Present Weather Sensor (PWS)

The present weather and the types of precipitation (rain, drizzle, snow, hail and sleet) are classified in accordance with a weather-code established by the WMO. Unmanned weather stations require automatic detection, reliably and unambiguously. Parsivel can ascertain the type, quantity and composition of the hydrometeor and the atmospheric visibility – in every kind of weather!

Monitoring of disposal sites

The functions of precipitation kinetic energy distribution and precipitation measurement are utilised by Parsivel to record the effect of rain on the condition of the disposal sites in conjunction with other sensors, e. g. ground-condition probes.

Monitoring road conditions

Highly localised precipitation can lead to aquaplaning or packed snow on roads. Therefore, rapid traffic warning and control systems are necessary in order to prevent accidents. Precipitation measurement, hydrometeor composition and atmospheric visibility are of considerable importance in such systems. Parsivel is an integrated instrument that measures all these quantities.

Flood early warning

To assure a timely warning of impending high water it is necessary to measure the amount and spatial distribution of precipitation rapidly and accurately. This goal can be achieved by combining weather radar measurements (spatial information with reduced accuracy) and groundbased disdrometer measurements:
Parsivel provides drop size distributions on the ground and a function to derive a local Z/R relation – ready to be used to adjust the radar data. In combination with water level sensors and drainage modelling, a high-performance regional high water early warning system can be erected.

Technical data

Optical sensor, laser diode	wave length 650 nm, 3 mW output power, Laser class 2
Beam dimension W x D	180 x 30 mm; 7.09 x 1.18 inch
Measuring area	54 cm^2 / 8.37 $inch^2$, detection of border events
Range of measurements	
Particle size	0.2 … 25 mm / 0.008 … 0.98 inch
Particle velocity	0.2 … 20 m/s / 7.87 … 787.4 inch/s
Identification and Performance	Precipitation intensity / accumulation
Particle distribution	32 size classes and 32 velocity classes 8 types of precipitation (drizzle, drizzle/rain, rain, mixed rain/snow, snow, snow grains, freezing rain and hail) radar reflectivity Z
Reports	WMO 4688/4677 (SYNOP) 4678 (METAR) and NWS code tables distinction for kind of precipitation drizzle, rain, hail, snow > 97 % compared with synoptic observer
Visibility in precipitation	measurement range (MOR) 100 … 5000 m / 300 … 16,000 feet
Rain rate	
Minimum intensity	0.001 mm/h / 0.00004 inch/h drizzle
Maximum intensity	1,200 mm/h / 47.2 inch/h
All weather operating conditions	self regulated deicing heating device (no icing and snow accumulation)
Power supply	10 … 36 V DC, reverse battery protection, software mode for heating device on / off
Power consumption	3 W (electronics with dew heater) / 40 W, max. 2 A (heating device)
Interfaces (configurable)	RS 485 1200 … 115,200 Baud, half duplex, 2-wire or SDI-12 Parsivel has an open collector output for simple status information (precipitation yes or no) or impulse output for precipitation in 0,1 mm / 0.004 inch
Overvoltage Protection	EN 61000-4-5 Level 5 (4 kV), integrated for power and interfaces lines
EMC / EMI	EN 61000-4-3, CE conform
Material	galvanized aluminium housing
Weight	max. 4 kg
Temperature range	–40 … +70 °C / -40 … +158 °F; 0 … 100 % rH
Protection	IP 65, salt fog proof
Dimension W x H x D	560 x 400 x 120 mm / 22.05 x 15.75 x 4.72 inch
Mounting	on a tube Ø 50 mm / 2 inch

OTT – Your partner for:

- Water level measurement in ground and surface water
- Discharge measurement
- Precipitation measurement
- Water quality measurement
- Data management and communication
- HydroService: consulting, training, installation and maintenance