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|  <b>Radiometer Physics</b><br>A Rohde & Schwarz Company | <b>RPG-FMCW-35 Cloud Radar</b><br><b>(Installation Manual)</b> | Code:  | RPG-FMCW-IM |
|                                                                                                                                          |                                                                | Date:  | 18.06.2020  |
|                                                                                                                                          |                                                                | Issue: | 01/01       |
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## 4 Instrument Specifications

| Parameter                           | Specification                                                                                                                                                                      |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency                           | 35 GHz ( $\lambda=8.6$ mm), bandwidth up to $\pm 100$ MHz                                                                                                                          |
| Transmitter Power                   | 15 W (solid state amplifier)                                                                                                                                                       |
| Antenna Type                        | Bi-static Cassegrain with 700 mm aperture                                                                                                                                          |
| Antenna Gain                        | 48.0 dB                                                                                                                                                                            |
| Beam Width                          | 0.8° FWHM                                                                                                                                                                          |
| Polarisation                        | V (optional V / H)                                                                                                                                                                 |
| Passive Channel Noise Figure        | 3.7 dB                                                                                                                                                                             |
| Dynamic Range (Sensitivity)         | -43 to +30 dBZ @ 5km distance / 30 m resolution / 10 s sampling time                                                                                                               |
| Ranging                             | 50 m to 12 km typical, 18 km maximum                                                                                                                                               |
| Vertical Resolution                 | 15-30 m (down to 4 m for a limited distance range)                                                                                                                                 |
| Calibration (automatic)             | Transmitter power monitoring and receiver Dicke switching for gain drift compensation (radar and passive channels)                                                                 |
| Calibration (maintenance)           | Liquid nitrogen receiver calibration                                                                                                                                               |
| End-to-end Calibration Verification | (1) Comparison with a disdrometer<br>(2) Comparison with a calibrated radar                                                                                                        |
| Calibration Accuracy                | $\pm 1$ dB                                                                                                                                                                         |
| ADC Sampling Rate                   | 11.45 MHz                                                                                                                                                                          |
| IF Range                            | 0.3 to 3.7 MHz                                                                                                                                                                     |
| Sampling rate (full profiles)       | Adjustable: typically $\geq 1$ second                                                                                                                                              |
| Doppler Resolution                  | $\pm 4$ cm/s or better                                                                                                                                                             |
| Doppler Range                       | $\pm 10$ m/s max                                                                                                                                                                   |
| Chirp Variations                    | 3 typical, 5 possible, re-programmable                                                                                                                                             |
| Passive Channels                    | 31.4 GHz for integral liquid water (LWP) detection (200 MHz BW)                                                                                                                    |
| Control connection                  | TCP/IP connectivity via fibre optical data cable                                                                                                                                   |
| Operation software                  | Real time visualization, real time data extraction, real time control (adaptive observation modes depending on context), data archiving, radar can be operated in stand-alone mode |
| Data products                       | Raw spectra, Spectral polarimetric parameters, Reflectivity, Mean Doppler velocity, Doppler width,                                                                                 |

|        |                |                                                          |                                                                                                                                            |
|--------|----------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
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|                                    |                                                                                                                 |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|                                    | Skewness, Kurtosis, Differential reflectivity, Differential phase shift, Correlation coefficient.               |
| Data Formats                       | proprietary binary<br>netCDF (conformity with CF convention)                                                    |
| Mitigation system for rain/fog/dew | Strong dew blower (4000 m <sup>3</sup> /h ), radomes with hydrophobic coating                                   |
| Additional sensors                 | Automatic weather station                                                                                       |
| Scanning (optional)                | Scanner unit for full sky scanning capability with maximum angular velocity of 5 °/sec in azimuth and elevation |
| Weight                             | Radar main body: 160 kg<br>Table: 35 kg<br>Blower: 109 kg                                                       |
| Maximum Power Consumption          | Radar: max. 1100 W, Blower: 850 W, Scanner: 800 W,<br>230 V AC, 50-60 Hz                                        |