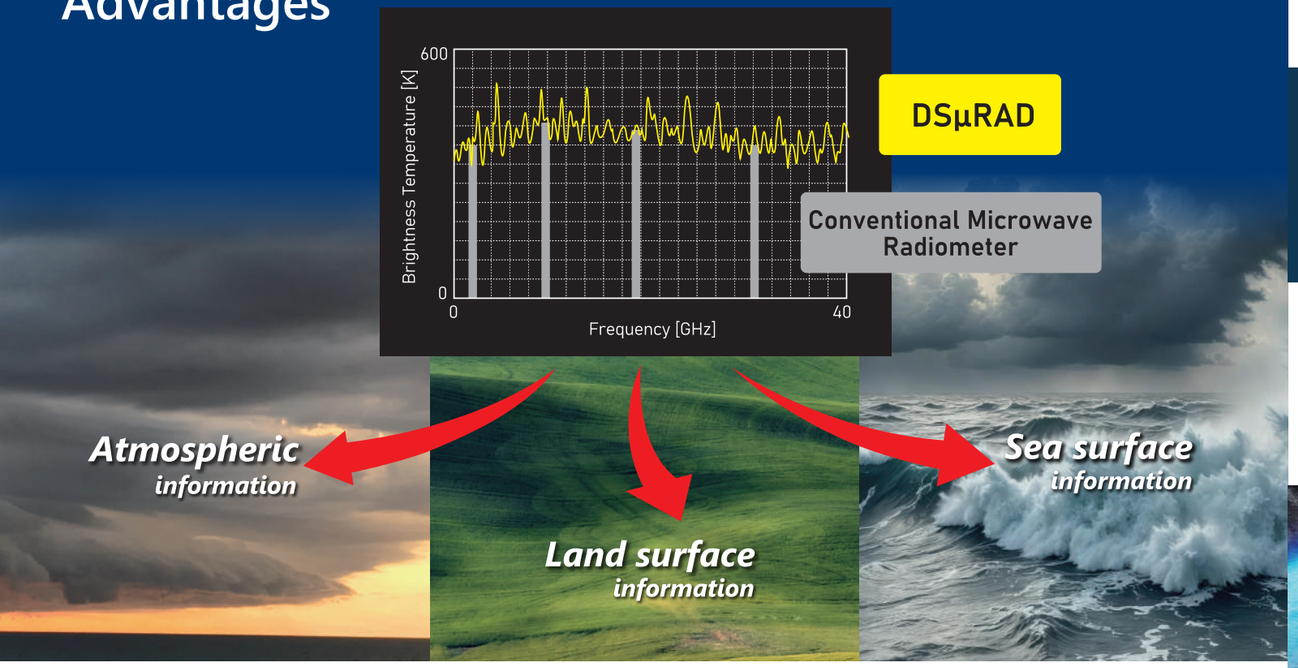
Advantages



Specifications

Category	Specification	Notes
Observation Frequency Bands	Band 1: 0.512~13.824 GHz Band 2: 13.824~27.648 GHz Band 3: 27.648~41.472 GHz	Selectable as one or multiple bands at the time of order, depending on the observation targets.
Observation Polarization	Vertical (V-pol) / Horizontal (H-pol)	Selectable as single or dual polarization at the time of order.
Spectral Channel Spacing	13.5 / 27 / 54 / 108 / 216 / 432 MHz	Selectable at measurement start.
Integration Time	1 / 10 / 100 / 1000 ms	Selectable at measurement start.
Brightness Temperature Range	3~1200 K	
Brightness Temperature Accuracy	Typ. 1 K (at 300 K)	
Power Input	AC100~240 V or DC+12~36 V	
Dimensions	700 × 270 × 270 mm (27.6 × 10.6 × 10.6 in)	Excluding protrusions (e.g., rubber feet,handles).
Weight	Max. 30 kg (66.1 lb)	Depends on the selected frequency band(s) and polarization configuration.

The overview and performance evaluation of this instrument have been published as a paper in IEEE.

Reference Paper on DSμRAD (Ver.1)
T. Maeda, N. Kawaguchi, K. Harada, K. Ozeki, Y. Chikahiro, H. Onuki,
Y. Hayashi, K. Ema, K. Naoki, M. Nakayama, and T. Takano,
"Direct RF Sampling Hyperspectral Microwave Radiometer (DSμRAD) for Ground Use," IEEE Geoscience and Remote Sensing Letters, doi:10.1109/LGRS.2020.2990707.

https://ieeexplore.ieee.org/document/9107449

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Notes

The products and services described in this document may be discontinued or specifications may be changed without prior notice.

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The world's first powerful tool to monitor the microwave spectrum from the environment

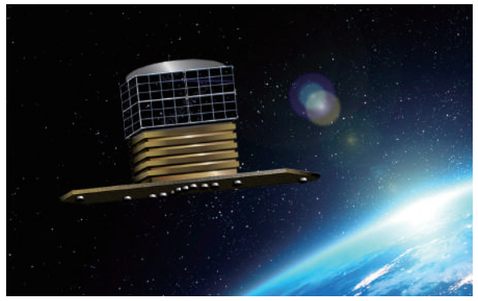
- Direct RF Sampling Microwave Radiometer (MWR)
DS μ RAD **Ver.2**

Features

- **Measuring up to 40GHz with a resolution of 13.5MHz**
- **Size : 28" x 11" x 11" or less Weight : Under 66 lb.**
- **Power : AC100~240V or DC +12~36V typ. 450W**
- **No liquid nitrogen is required for calibration during operation.**

Applied Project 1

SAMRAI



Scanning Array for hyper-Multispectral RAdiowave Imaging (SAMRAI)

The World's First Microwave Hyperspectral Radiometer

SAMRAI continuously monitors the ultra-wideband microwave spectrum (1–41 GHz) from a 500 km orbit, using a phased array antenna to achieve high-resolution observations without mechanical scanning. Its data support a wide range of applications, including meteorological disaster prevention, maritime monitoring, offshore wind energy optimization, and sustainable ocean resource management. SAMRAI enables safer, more efficient, and sustainable use of Earth's oceans and atmosphere.

Applied Project 2

Detection of Unidentified Vessels

Field Demonstration of Unidentified Vessel Detection

Microwave radiometers can detect suspicious or unidentified vessels at sea, even under poor visibility conditions such as fog, clouds, or nighttime. By detecting radio signals transmitted from these vessels, they can accurately track their presence and movement over wide areas. This technology enhances maritime security, port and coastal monitoring, and safe navigation in challenging environments. Furthermore, integration with satellite or unmanned observation systems enables real-time, wide-area monitoring.

In the future, this approach could be applied to maritime traffic safety management, protection of critical facilities, and environmental monitoring.

Application 1

Support for Icebreaker Navigation Using Remote Sensing

Support for Icebreaker Navigation Using Remote Sensing

The Arctic is highly sensitive to global warming and vulnerable to human activity, attracting worldwide attention. Accurate information on ice conditions, including shape and strength, is essential for efficient navigation. Broadband, high-resolution microwave radiometers can provide detailed sea-ice data, offering the potential for a high-performance navigation support capability for icebreakers.

Application 2

Monitoring Winter Road Surfaces Using Microwave Radiometry

Monitoring Winter Road Surfaces Using Microwave Radiometry

Research is underway to employ microwave radiometers for monitoring winter road conditions and distinguishing between snowcovered,icy, and other hazardous surfaces. ※1

Efforts to measure slipperiness on winter roads began in the 1940s in Scandinavia, originally to ensure the safety of airport runways. ※2

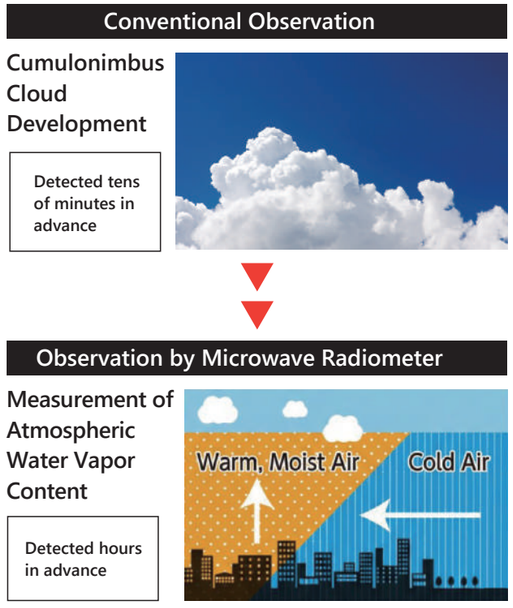
For modern winter airfields, broadband, high-resolution microwave radiometers offer the potential for quantitative, automated monitoring of runway conditions, eliminating the need for manual inspections.

※1 Y. Tanaka and K. Tateyama, "Analysis of Microwave Radiometry of Snow and Ice on an Outdoor Experimental Asphalt Surface," IEEE Sensors Letters, vol. 9, no. 2, 2025, doi:10.1109/LSENS.2024.10818409.

※2 Al-Qadi, Feasibility of Using Friction Indicators to Improve Winter Maintenance Operations and Mobility, NCHRP Web Document 53 (Project 6-14)

Application 3

Forecasting Linear Precipitation Bands Using Microwave Radiometry



Forecasting Linear Precipitation Bands Using Microwave Radiometry

Accurate forecasting of linear precipitation bands requires precise detection of water vapor inflow. Unlike conventional infrared observations, which detect cumulonimbus cloud formation, microwave radiometers measure atmospheric water vapor content directly. This capability is expected to enable earlier and more accurate predictions of linear precipitation band development, providing significant potential for improved weather forecasting.

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