

## RAPTOR™ Radar Wind Profiler Models

Radiometrics, Corp. designs and manufactures a full line of radar wind profilers (RWPs). The different models are designed for various applications to allow the customer to choose the best system for their specific requirements. Most RAPTOR systems can be customized for user requirements. Please consult the Radiometrics factory or your representative for further information.

**Table 1: RAPTOR Radar Wind Profiler Models by Atmospheric Height**

RAPTOR Model	Atmosphere Level	Typical Height <sup>1</sup>	Frequency Band	Description
<b>DBS-BL</b>	Boundary Layer	3-4 km	900 – 1400 MHz	Upgrade for LAP®-3000 <sup>2</sup>
<b>FMC-BL</b>		1-3 km	900 – 1400 MHz	Designed for shipboard installation
<b>XBS-BL</b>		3-4 km	900 – 1400 MHz	Lower cost; designed for trailer or static mount
<b>VAD-BL</b>		3-6 km	900 – 1400 MHz	High-performance stationary system
<b>XBS-T</b>	Troposphere	5-8 km	400 – 500 MHz	Lower cost; designed for trailer or static mount
<b>FBS-T</b>		5-8 km	400 – 500 MHz	Scalable antenna and transmitter
<b>FBS-ST</b>	Troposphere/Stratosphere	16 km	400 – 500 MHz	Scalable antenna and transmitter
<b>FBS-ST-EX</b>		18 km	200 MHz	Scalable antenna and transmitter
<b>FBS-MST</b>		20 km	50 MHz	Scalable antenna and transmitter

*Acronyms: DBS – Doppler Beam Swinging, FMC – Full Motion Control, XBS – Hexagonal Beam Steering, VAD – Velocity Azimuth Display, FBS – Full Beam Steering, BL – Boundary Layer, T – Troposphere, S – Stratosphere, M – Mesosphere, EX – Extended.*

*A Radio Acoustic Sounding System (RASS) is available for all models or can be integrated with a Radiometrics radiometer system. Radiometrics also builds S- and X- band vertical hydro-meteorological radars and can customize all models.*

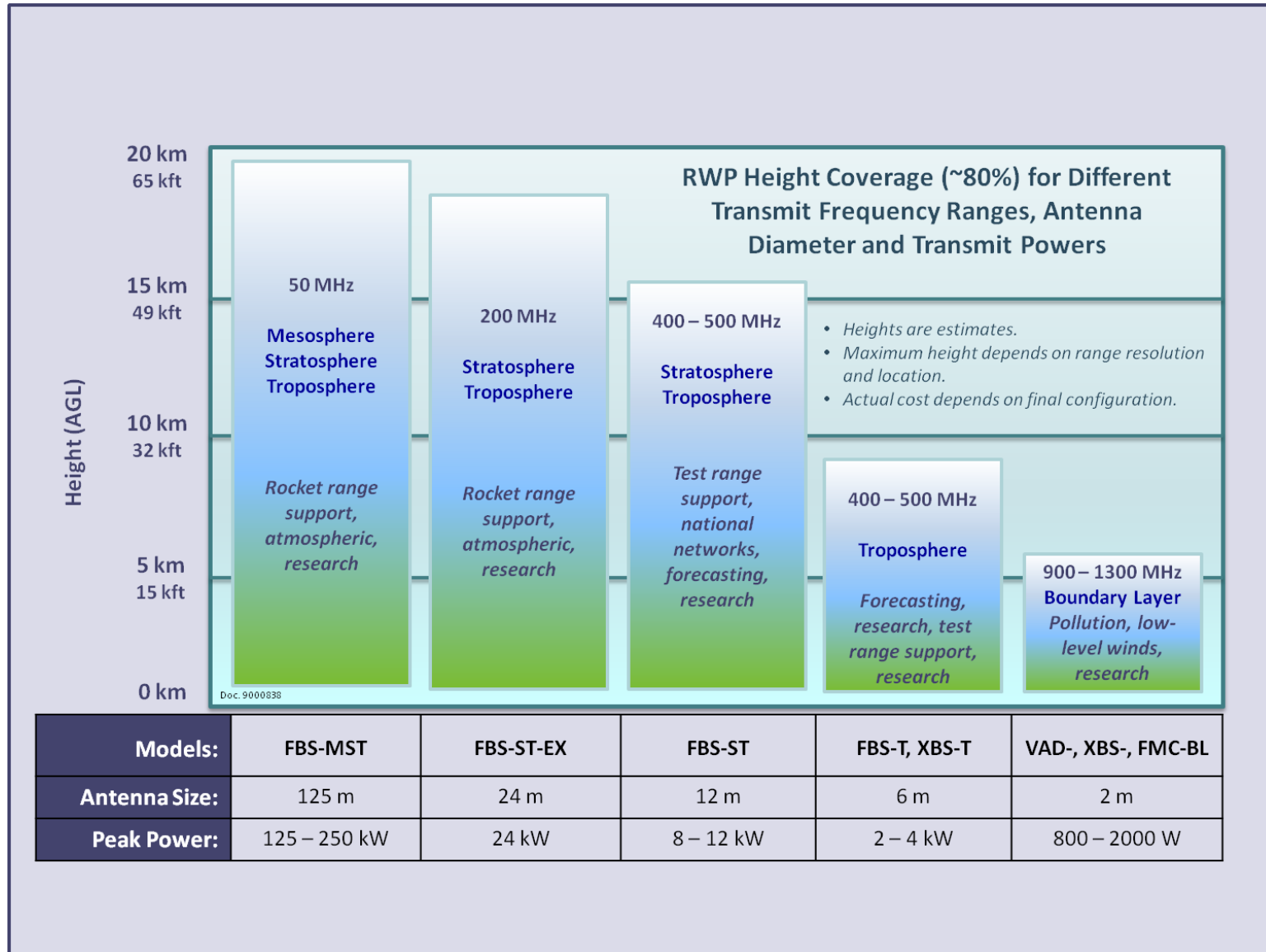
<sup>1</sup> Maximum height is listed for clear-air and is highly dependent on geographical latitude and local climatology. Please check with the factory for maximum height estimate for your specific location. For boundary layer systems, rain improves maximum height.

<sup>2</sup> LAP is a registered trademark of Scintec Corp. These systems were formerly manufactured by Vaisala, Radian, and NOAA.

Table 2: RAPTOR Radar Wind Profiler Families

RAPTOR Model	Frequency <sup>3</sup> (MHz)	Model Descriptions	Application
<b>DBS-BL</b>	900 – 1400	Upgrade for LAP®-3000. Upgrade re-uses the antenna (radiating panels and clutter screen), up/down converter, and final amplifier from original system. Replacement parts include completely new data system, power supplies, transceiver, health monitor, and solid-state antenna phase shifters.	Upgrade of older RWP systems.
<b>FMC-BL</b>	900 – 1400	Boundary layer radar wind profiler designed for shipborne operations. Uses inertial measurement unit (IMU) to allow real-time correction of beam pointing and radial velocities to compensate for ship motion.	Shipborne use.
<b>XBS-BL</b>	900 – 1400	Innovative hexagonal micropatch antenna, using solid-state phase shifters to allow 6 oblique beams and 1 vertical beam. System is designed to allow trailer mount and for low acquisition cost for a boundary layer system but with good performance. Can be equipped with RASS system to measure virtual temperature profiles.	Portable system and for lower-cost entry point for boundary layer radar wind profilers.
<b>VAD-BL</b>	900 – 1400	High performance boundary layer and mid-tropospheric (in tropics) radar wind profiler. System uses large high-performance parabolic dish antenna for low-loss, good sidelobes, and very high gain. Can be equipped with high-power amplifier to provide very high power-aperture product and redundancy.	High performance BL and lower troposphere wind profilers for fixed location.
<b>XBS-T</b>	400 – 500	Innovative hexagonal Yagi antenna, using solid-state phase shifters to allow 6 oblique beams and 1 vertical beam. System is designed to allow trailer mount and for low acquisition cost for a mid-tropospheric system. Can be equipped with RASS system to measure virtual temperature profiles.	Portable system and for lower-cost entry point for mid-tropospheric radar wind profilers.
<b>FBS-T, FBS-ST, FBS-ST-EX</b>	200 – 500	Permanent installation for tropospheric and lower stratospheric operation. Antenna is composed of thinned array of Yagi elements, each with its own phase shifter for full beam steering. Antenna arrays and transmitters are fully scalable to allow several wind profiler models to match desired performance and budget.	Full tropospheric and higher systems for operational forecasting, test range support and national networks.
<b>FBS-MST</b>	50	Low frequency system to allow capture of data to 18 km and higher. System uses scalable antenna and transmitter to allow tailoring of hardware per customer performance requirements.	Maximum sensitivity for high altitude winds for research and rocket range support.

<sup>3</sup> Frequencies are listed as range or band. Radiometrics can customize radar models for specific required frequency.



**RAPTOR Models — Approximate Height Coverage**



**RAPTOR FBS-ST 256e-12kW Stratosphere-Troposphere Radar Wind Profiler designed and built for the US National Weather Service.**



**RAPTOR VAD-BL High-Performance Boundary Layer RWP with RASS.**



**RAPTOR VPR-X Vertical Hydrometeorological Radar.**

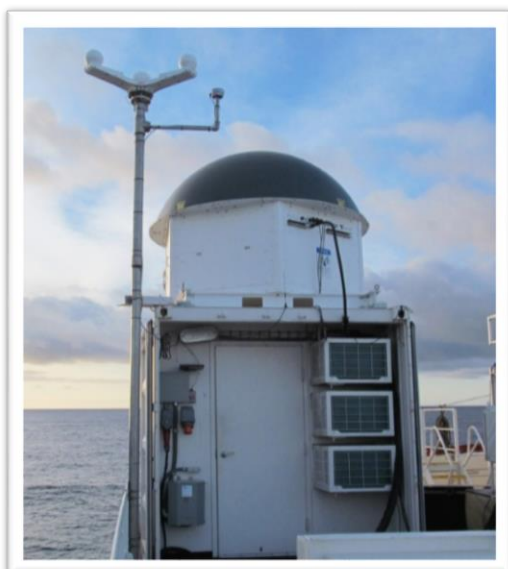


**RAPTOR LAP®-3000 Boundary Layer RWP Upgrade with Electronics Rack.**





RAPTOR FBS-T 449 MHz 73e-2kW Tropospheric RWP antenna folded for transport (left) and set up for transmission (right).



RAPTOR FMC-BL Shipborne RWP aboard container ship.



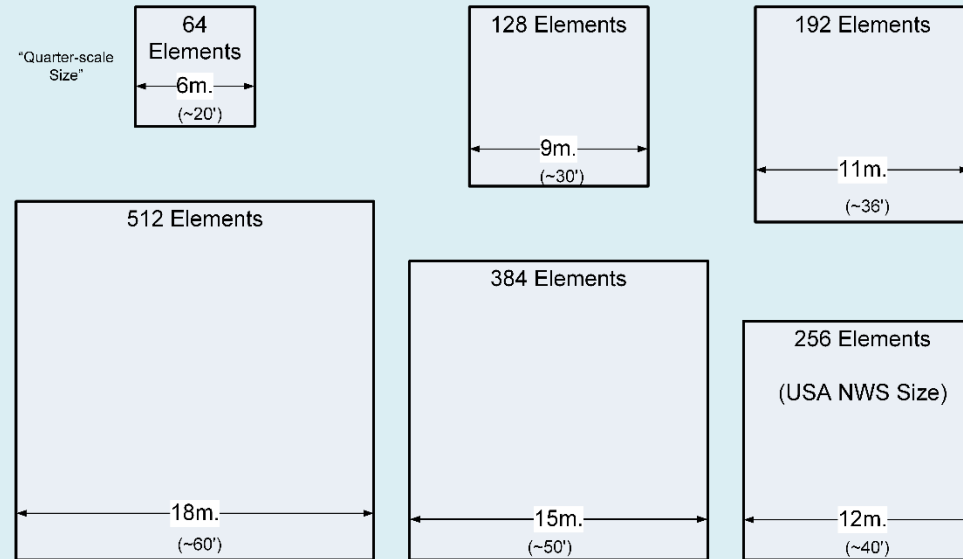
RAPTOR XBS-BL Portable Boundary Layer RWP with optional Radiometer.

The **RAPTOR FBS** RWP model line is uniquely designed for straightforward scalability to meet customer performance requirements. Both the antenna size and transmit power can be varied depending on maximum desired height. The below example model numbers indicate the number of elements and transmit power.

- FBS-T 64e-2kW (optional 4 kW)
- FBS-T 128e-2kW (optional 4 kW)
- FBS-T 192e-2kW (optional 4 or 6 kW)
- FBS-ST 256e-8kW (optional 12 or 16 kW)
- FBS-ST 384e-12kW (optional 16 or 24 kW)
- FBS-ST 512e-16 kW (optional 32 kW)

## Approximate Antenna Frame Sizes for 400-MHz Band RAPTOR FBS Models

(Final size depends on transmit frequency and available standard materials.)



RAPTOR FBS-T Scalable Tropospheric, shown in 64-element configuration.

*As remote sensing devices, the height performance of a wind profiling radar is dependent on the atmosphere itself. The latitude of the installation site, along with the overall climatology, means that two identical radars installed in different locations will perform differently. For example, a 1 GHz BL system installed near the equator might obtain wind data to 8 km, but the same system at higher latitudes might only obtain data to 3 km. Similarly, systems installed at high altitudes with cold and dry conditions will not perform as well as the same system installed in a more tropical region closer to sea level. The scalability of the **RAPTOR FBS** model line allows selection of models to meet the desired performance by the customer regardless of the installation site. Please consult with Radiometrics engineers to find the right model for your application.*



**RAPTOR FBS-MST Scalable Mesospheric-Stratosphere-Troposphere 50 MHz Radar Wind Profiler. Installed for NASA Kennedy Space Center in 2014. Shown configuration uses 640 Yagi elements, 150 m diameter antenna, and 320 kW peak transmit power. Typical range is 20 km.**

*Radiometrics is a world leader in ground-based remote sensing offering several models of microwave profiling radiometers, acoustic wind profilers and radar wind profilers. The instruments can be sold individually or integrated into **SkyCast**: a full wind and thermodynamic profiling system, providing continuous radiosonde-like performance in the boundary layer and lower troposphere. Radiometrics was founded in 1987 and has delivered over 500 systems worldwide.*

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