



## Miniaturized Waveguide Front-ends (MWF)

Waveguide-based front-ends remain the gold standard for high-performance RF systems, but their deployment is dominated by bulky assemblies, tight mechanical tolerances, and interface-driven risk—particularly in space environments where mass, reliability, and integration simplicity are critical

### **Pantenna's MWF Advantage – Game-Changing Design:**

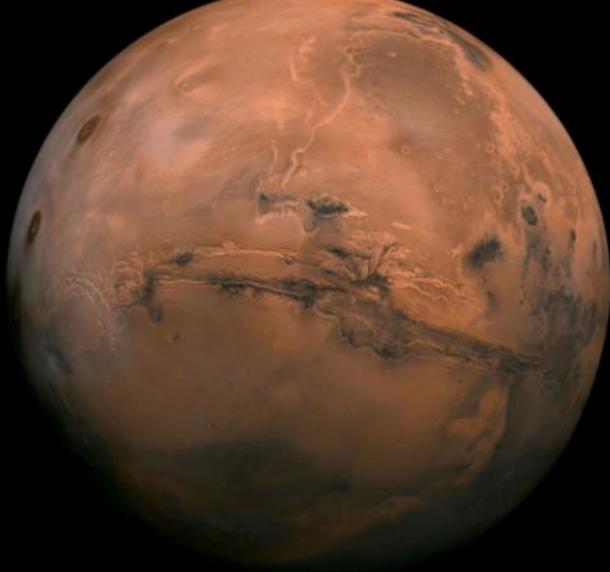
- Entire RF front-end consolidated into a single monolithic waveguide structure.
- A proprietary monolithic waveguide geometry that integrates mode conversion, polarization control, impedance transition, and radiation into one continuous structure
- Precision metal additive manufacturing in gold-plated stainless steel or titanium, enabling flight-compatible mechanical robustness and environmental stability
- Direct, repeatable integration with electronic boards using simplified end-launch or vertical-launch connector-style interfaces..

### **Flexible, Scalable, Repeatable:**

- Supports linear, dual-linear, and dual-circular polarization within the same integration architecture.
- Compatible with multiple radiating element types while preserving a common back-end integration interface.
- Ultra-compact, all-metal integration that is inherently repeatable and tolerance-robust.
- Scalable from mmWave to sub-mmWave frequencies without increasing mechanical or assembly complexity.

### **Impact:**

- Waveguide-class performance delivered without waveguide-class integration cost, mass, or mechanical complexity.
- Enables high-frequency RF systems that were previously impractical due to size, mass, or integration constraints.
- Redefines what's possible in space and commercial applications.



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MWF is a front-end integration platform, not a discrete antenna component.

Meet The First Members of the MWF Family:

#### MWF-DC-EL-SE

- Dual Circular Polarization
- Spline Horn Antenna
- End-Launch Interface
- E-Band



#### MWF-DC-EL-CV

- Dual Circular Polarization
- Corrugated Horn Antenna
- End-Launch Interface
- V-Band

#### MWF-L-EL-SW

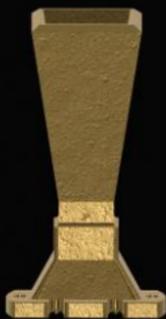
- Linear Polarization
- Scalar Horn Antenna
- End-Launch Interface
- W-Band





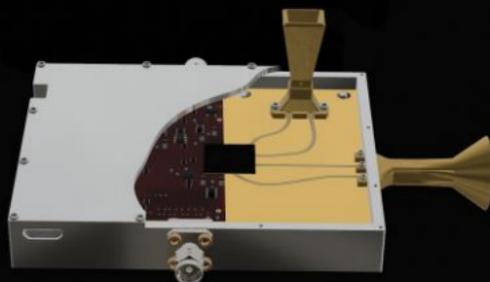
### MWF-DL-VL-SCE

- Dual Linear Polarization
- Smooth Conical Horn Antenna
- Vertical-Launch Interface
- E-Band



### MWF-DL-VL-PV

- Dual Linear Polarization
- Pyramidal Horn Antenna
- Vertical-Launch Interface
- V-Band



Direct electronic board integration using a simplified, connector-style RF interface:

- No Flanges
- No alignment pins
- No torqueing screws
- No solder
- No pogo-pins



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### **Typical modular system:**

Corrugated horn, mode converter, polarizer, waveguide adapters, RF connectors, and coaxial cables assembled in series. Performance, mass, reliability, and cost are dominated by interface count and accumulated mechanical tolerances.

**Typical mass:** ~200

### **Pantenna's (MWF-DC-EL-CV)**

Equivalent waveguide-grade functionality consolidated into a single monolithic front-end with direct electronic integration. Interfaces are eliminated rather than managed, electrical length is minimized, and mechanical robustness is inherent to the monolithic structure.

**Mass:** ~12 g



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