



Intelligent Articulating Antenna

IAA · AI-Driven, Self-Aligning Millimeter Wave Antenna System

The Vubiq Intelligent Articulating Antenna (IAA) is a patented, AI-driven antenna system that solves the two hardest problems in narrow-beam millimeter wave point-to-point communications: achieving precise antenna alignment at installation, and maintaining that alignment over long distances despite pole sway and thermal effects. By intelligently articulating only the high-gain antenna element, the IAA delivers fast, low-skill installation and continuously sustained link performance.

$\pm 20^\circ$

Yaw & pitch alignment range

Fractional°

Beam-alignment precision

Milliseconds

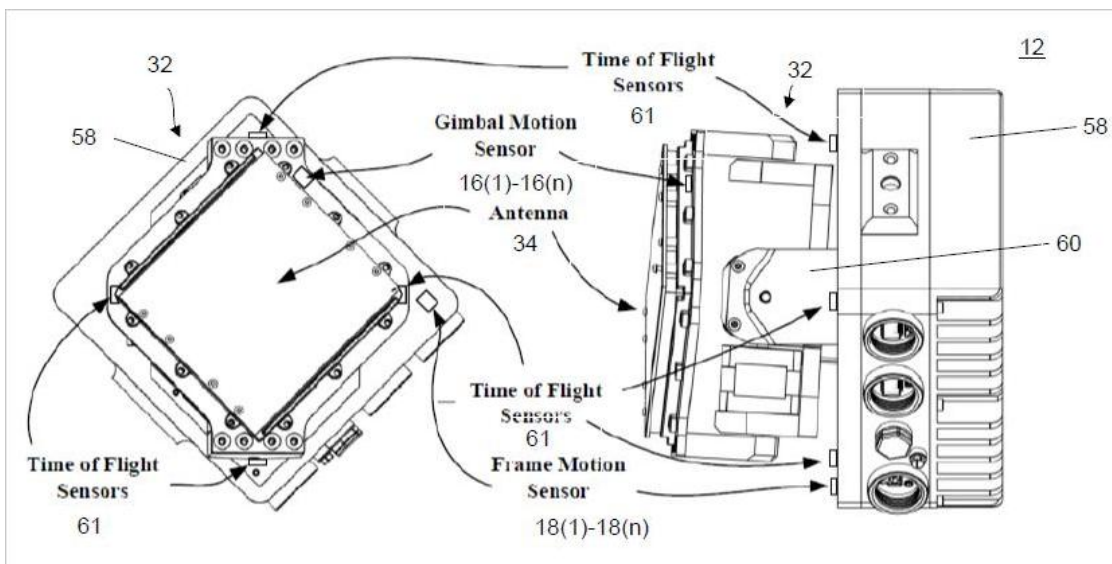
Alignment response time

The Challenge

Narrow-beam millimeter wave links demand exacting antenna alignment. Today, achieving that alignment requires substantial time and precise mounting — and if alignment is not initially obtained, and not dynamically maintained during operation, the loss in data-carrying capacity can be substantial. Pole sway, thermal expansion of the mounting structure, and other physical fluctuations continuously threaten the link.

The Vubiq Solution

Rather than moving the entire radio system to align the link — as conventional systems require — the IAA controls the movement of only the high-gain antenna element. Using machine-learning algorithms, geolocation, and sensor-fusion technology, the alignment and compensation control system responds in real time to physical changes in the radio's support structure. With $\pm 20^\circ$ of antenna yaw and pitch range, installation time and the skill required are significantly reduced, and beam alignment is maintained to fractional-degree precision in milliseconds.



Vubiq's IAA combines AI-driven alignment algorithms, geolocation, and multi-sensor fusion

Continuous, Self-Maintaining Alignment

Antenna adjustments are driven by a fusion of inertial sensors, time-of-flight sensors, gimbal- and frame-motion sensors, and position indicators, continuously compensating for pole sway, thermal changes in the mounting system, and other physical fluctuations that cause misalignment. Because only the lightweight antenna element is moved — not the whole radio — movements are far more precise, the system is markedly less expensive, and the response time for maintaining alignment is dramatically faster.

Key Benefits

- **Fast, low-skill installation** — automatic alignment replaces painstaking manual mounting.
- **Sustained link availability** — dynamic, real-time compensation for pole sway and thermal drift.
- **Fractional-degree precision** maintained in milliseconds.
- **Lower cost and complexity** — articulates only the antenna element, not the entire radio.
- **AI-driven control** — machine learning, geolocation, and sensor fusion working together.
- **±20° yaw and pitch articulation** for wide installation tolerance and ongoing correction.

Preliminary Specifications

Alignment range	±20° antenna yaw and pitch
Alignment precision	Fractional-degree, maintained in milliseconds
Control	AI/machine-learning alignment and compensation, sensor fusion
Positioning	Geolocation (GNSS) aided
Sensing suite	Inertial sensors, time-of-flight sensors, gimbal-motion sensor, frame-motion sensor, position indicators
Compensates for	Pole sway, thermal drift of the mounting structure, structural fluctuation
Articulated element	High-gain antenna element only (radio remains fixed)
Antenna options	E-Band parabolic (30 cm / 60 cm) and integrated antenna
Radio compatibility	Vubiq HaulPass Fiber E-Band radio (71–76 / 81–86 GHz)
Mounting	Standard pole mount

Preliminary specifications — subject to change. Contact Vubiq Networks for the latest IAA integration details.



Making Millimeter Wave Ubiquitous

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