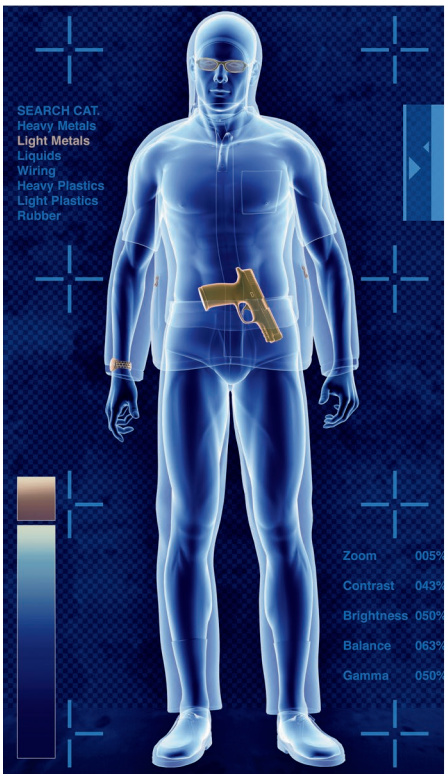
A Thintri
MARKET STUDY
2020

Millimeter Waves:
Emerging Markets, 2020

Thintri, Inc. announces the release of **Millimeter Waves: Emerging Markets**, a new market study that explores the current state of millimeter wave technology and market opportunities for systems operating in the millimeter wave range. This in-depth investigation, the third update to Thintri's original 2010 study, discusses millimeter wave technologies already creating significant markets, emerging market opportunities, and overall market development. The report surveys today's technologies and applications, separates hype from reality and assesses applications where millimeter wave technology will open up significant new markets, with market forecasts going out to 2025.



Contents

MMW Systems Overview
- Technology Background
- Technical Issues (GaAs vs. SiGe/CMOS, packaging, components, etc.)
- Public Policy, Regulation, Licensing
- Standards (WiGig, Wireless HD, etc.)
- Established Markets

Prime Applications
- Imaging
- Telecommunications
- Consumer & Automotive
- Defense & Security

Imaging
- Active vs. Passive Systems
- Markets in Checkpoint Security (Airports, concerts, sports events, etc.)
- Markets in Loss Prevention/ Inventory Control
- Markets in Through-Wall Imaging
- Markets in Consumer Retail/ Clothing Sales
- Issues of Privacy and Public Perception
- Competing Technologies

Telecommunications
- Established Lower-Frequency Applications
- Applications for Millimeter Waves (Enterprise, Backhaul, P2P, etc.)
- Licensed vs. Lightly Licensed vs. Unlicensed
- Performance and Availability
- 23 to 39 GHz Bands
- 60 GHz Band Markets

Consumer Markets
- 60 GHz: Consumer, Home Media Markets
- Data Compression
- Hardware Considerations
- Market Growth
- Automotive Radar
  —24 GHz vs. 77 GHz
  —Market Growth: Trucks, Automobiles

Defense & Security Radar Markets
- Smart Munitions
- Perimeter & Surveillance Radar, Intrusion Detection
  —Defense vs. Private Sector
  —Range Considerations, Long Range vs. Short Range
- Marine Radar
- Defense & Intelligence Communications

Other Millimeter Wave Markets
- Commercial Ka-Band Satellite (VSAT) Communications
- Medicine and Health
- Chemical Monitoring
- Construction and Infrastructure
- Manufacturing

Thintri Inc.

Thintri Inc. provides business and market intelligence for a wide range of technologies through custom consulting, technology assessments, and published market studies in a broad range of disciplines:

- Materials Engineering
- Aerospace
- Manufacturing
- Electronics
- Photonics
- Telecommunications

Contact:
J. Scott Moore, Ph.D., *President*
Thintri, Inc.
914/242-4615
smoore@thintri.com

Thintri Inc
Business Intelligence • Technology Assessment

Background on Millimeter Wave Systems and Their Markets

Millimeter wave (MMW) radiation, that portion of the electromagnetic spectrum generally defined as roughly 20 GHz to 300 GHz, has gained commercial traction in the past two decades. Accelerating evolution in technology and changes in the regulatory environment have expanded opportunities in existing millimeter wave applications and opened new, potentially significant markets.

MMW imaging is established in airport security and markets are rapidly growing in loss prevention, where systems can quickly scan employees leaving a manufacturing facility to prevent theft. New technology will soon dramatically reduce the cost of such imaging systems, allowing their adoption in a much broader range of venues such as courthouses, concerts, stadiums, schools, dance clubs and many others.

MMW systems are also transforming telecommunications, offering data rates that can approach those of optical fiber. E-band links are quickly capturing markets in backhaul, where they can be deployed quickly and at a small fraction of the cost of laying optical fiber.

Millimeter waves may be the only viable solution to the bandwidth challenges facing today's telecom industry as it transitions to next-generation 5G networks. Some 4G networks are already approaching the theoretical limit on how much data can be squeezed into a given band. The Internet of Things is bringing tens of billions of devices, including tracking tags, body sensors, vehicles, clothing and a broad range of appliances, sensors and other technologies, all connected to mobile networks. Wireless data transfer volumes will be thousands of times greater than they are today, with demand for data transfer rates at 10 to 100 times faster than has been practical recently.

One of the most exciting frontiers in telecommunications is fixed wireless Internet access, where MMW systems are about to facilitate a game-changing market shift. As small, highly flexible startups move to offer MMW-based wireless Internet access across broad geographic regions, the walls that once served to separate the various access suppliers are breaking down. The result is a Wild West scenario where a large number of players, large and small, compete to offer consumers and businesses up to gigabit data rates at low cost.

Likewise, satellite Internet access, serving rural users and ships at sea, is creating billion-dollar markets for millimeter wave equipment.

Automotive radar is another burgeoning market. Eventually, as collision avoidance systems in cars and trucks becomes standard and even mandated in some places, the advantages of millimeter waves in achieving low cost radar systems with high resolution will lead to billion-dollar revenue streams.

The unique properties of millimeter waves lend them to a host of other markets as well, including manufacturing process and quality control, medical diagnosis, munitions guidance, security perimeter radar, and monitoring of chemical processing and pipelines.

The Thintri market study, Millimeter Waves: Emerging Markets, makes use of extensive, in-depth interviews with industry executives, market development managers and government and academic researchers. The report provides a survey of the current state of the art in millimeter wave technology, an assessment of potential applications in terms of their commercial viability, discussion of market development and forecasts for individual markets from 2020 to 2025.

Understand the Markets

The outlook for millimeter wave technology is extraordinarily promising. Steady reductions in hardware cost and progress in system development are dovetailing with growing demand in a number of markets and, in some cases, greatly relaxed regulation, all leading to growth in widely diverse markets. Depending on the market, that growth is already well underway, is starting now, or will start soon. Most importantly, some of the most significant markets, including security and telecommunications, are not only potentially quite large but relatively immune to economic conditions. Developers in other applications are making use of new technologies to bring millimeter wave systems within striking distance of mass markets.

Some emerging markets require little more than education of users in the capability of millimeter wave systems while in others, that case has already been made and equipment sales are growing rapidly. In most areas, technologies have matured to the extent that scientific understanding is not an issue; instead, the principal requirement is bringing prices in line with market demand.

Price: $4,800

To order, contact Thintri, Inc. or visit our Web site: www.thintri.com

Thintri Inc
Business Intelligence • Technology Assessment

914/242-4615
smoore@thintri.com
www.thintri.com

Report Contents