AT-THE CENTER FREQUENCY

ANATECH ELECTRONICS INC

An e-Newsletter from Anatech Electronics

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What's News...

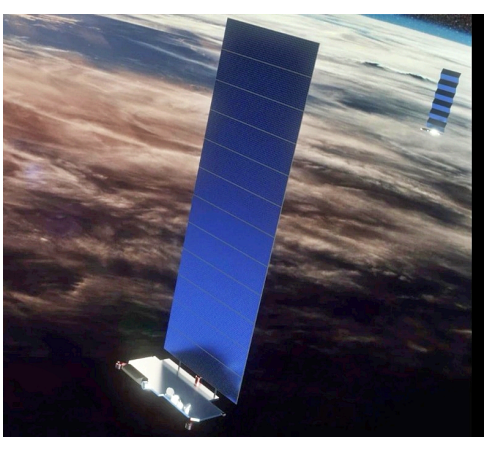
U.S. Anti-satellite System Near Completion

The U.S. will significantly enhance its space defense capabilities by deploying Meadowlands, a new anti-satellite system, in 2025. This ground-based system, estimated to cost $219 million, uses jamming to disrupt adversary satellite communications, posing a threat to China's reliance on this technology for its SIGINT and ocean surveillance satellites. Meadowlands builds on the existing Counter Communications System (CCS) capabilities, which allows the U.S. military to disrupt enemy satellite links in real-time. With 16 CCS platforms deployed globally, Meadowlands offers a more portable, automated, and efficient jamming solution. Its mobility, achieved through wheeled trailers, makes it harder to locate and counter. At the same time, its ability to selectively restore or disrupt satellite operations adds a layer of versatility and minimizes detection risks.

Source: Meadowlands | L3Harris

Starlink Aims to Deliver Gigabit-per-second Speeds

SpaceX seeks FCC approval to enhance Starlink's Gen2 system for gigabit-speed broadband service by lowering satellite altitudes, adjusting orbital planes, and implementing advanced hardware with improved beamforming and processing capabilities. While aiming to expand spectrum usage across Ka-, V-, and E-bands for mobile and fixed services, SpaceX faces regulatory challenges, including previous FCC denials and objections from competitors. Despite these obstacles, the company remains focused on improving network performance and extending high-speed internet access to underserved communities worldwide.



Source: Starlink Satellites | SpaceX

FCC Dives Into a “Single Network” Future

FCC Chair Jessica Rosenworcel envisions merging space-based and terrestrial networks for universal connectivity. Despite billions in federal funding, America's digital divide persists, with 15 million households lacking adequate internet, which has worsened since the recent end of the Affordable Connectivity Program. The FCC's proposed Supplemental Coverage from Space framework would integrate fiber, cellular, wireless, and satellite broadband into a unified network, eliminating dead zones and maintaining service during outages. This plan requires advancing space infrastructure, developing new policies for orbital debris, and repurposing spectrum from other federal agencies.

Source: FCC

Microwaves Power Breakthrough in Efficient Plastic Recycling

Researchers at West Virginia University are pioneering a method to break down polypropylene (P.P.) plastic into its original building blocks for reuse. Funded by the U.S. Department of Energy, this innovative approach uses microwave radiation to heat a catalyst, transferring heat to plastic waste. This technique allows for the breakdown of P.P. at lower temperatures than traditional methods, offering a more efficient and precise way to "upcycle" plastic and reduce environmental impact.

Source: WVU Photo | Paige Nesbit

A Word from Sam Benzacar

6G Is on the Horizon, But Don't Hold Your Breath

It’s been eight years since the 3rd Generation Partnership Project (3GPP), and it's a long way from meeting its intended goals. This means it's very likely that 6G won’t be realized by 2023 as most of the industry hoped. We should not be surprised, as 6G (and 5G) are enormously complex and multi-faceted in scope and require advances in everything from semiconductor technologies to network design.

The technology aims to achieve terabit-per-second data rates, microsecond latency, and coverage that extends from the ocean floor to space. These capabilities would enable applications far beyond what's possible with 5G, including holographic communications, high-precision digital twins, and immersive extended reality without external devices.

Many global initiatives are underway to make 6G a reality. For example, China's Ministry of Science and Technology launched a national 6G research project in Asia in 2021. South Korea's Electronics and Telecommunications Research Institute (ETRI) has been developing core 6G technologies since 2019. The European Union's Project Hexa-X, led by Nokia and Ericsson, represents one of the most comprehensive 6G research initiatives to date.

In the U.S., the FCC is working on identifying and allocating spectrum for future 6G use. It is also exploring regulatory frameworks to ensure the secure and efficient integration of 6G technologies into existing infrastructure. DoD is investing in developing 6G technologies with potential military applications. Numerous universities are engaged in 6G research, exploring fundamental concepts and developing innovative solutions for various aspects of 6G technology. Their research focuses on advanced materials, signal processing, artificial intelligence, and network security.

Researchers have also made progress in terahertz communications that offer enormous bandwidth potential but face challenges with signal propagation and atmospheric absorption. Recent advances in metamaterials and novel antenna designs are also helping to overcome these limitations. Unlike previous generations, 6G networks will likely incorporate A, enabling intelligent network optimization, predictive maintenance, and automated resource allocation.

So, as we move closer to the 2030s, the pace of 6G research and development will continue to accelerate. While many technical challenges remain, progress thus far suggests that what's proposed for this next generation is mostly achievable. Just don't expect it by 2030.

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