ANATECH ELECTRONICS INC

AT THE CENTER FREQUENCY

An e-Newsletter from Anatech Electronics

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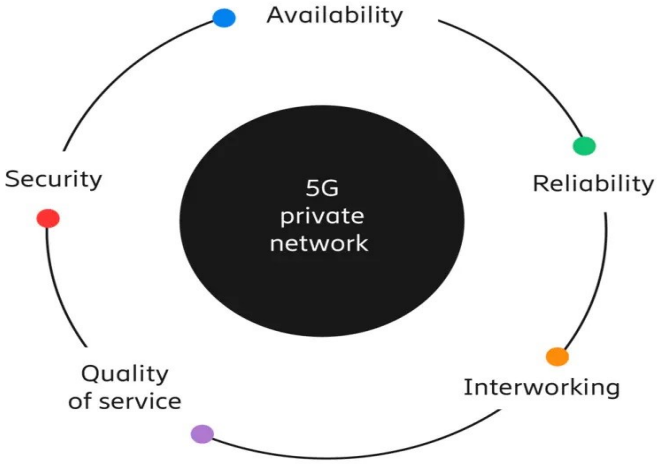
What's News...

Private Network on the Upswing

A report from the Global Mobile Suppliers Association (GSA) notes that at least 794 organizations in 68 countries are deploying private mobile networks based on LTE or 5G. And although LTE is still the most favored technology, the report states that 5G is being used by around 37% of customers tracked in its study. The association also identified more than 70 telecom network operators providing private mobile network services. The manufacturing sector is the largest adopter with 140 companies involved in pilots or deployments, which is an increase from 111 at the end of 2021. The education sector is the second most-common group, with 80 customer deployments, followed by mining companies (69) and power utility companies (68).



Phased-array Radar Market Growing Fast

The electronically scanned array market was about $7.4 billion in 2021 and is projected to reach $10.4 billion by 2026 with growth rate of 7.1% from 2021 to 2026, according to a report from ResarchandMarkets.

A Word from Sam Benzacar

The Very Real Vulnerabilities of GPS

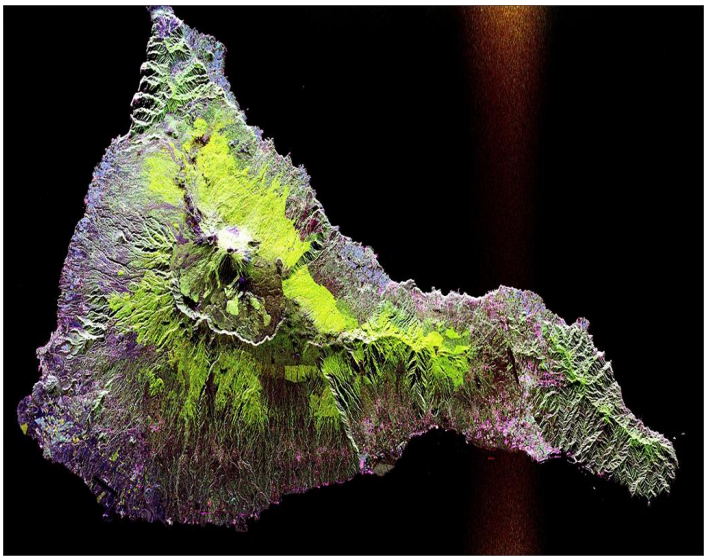
By Sam Benzacar

Since the GPS satellite constellation was first deployed it's become an integral part of our lives. It's also the core, Positioning, Navigation, and Timing (PNT) solution used by the Department of Defense, which is more than a little unsettling because it is inherently vulnerable to techniques designed to either degrade or destroy its performance. Even more unsettling is that these techniques are already being used by Russia and China and will only become more effective over time.

For example, a Ukrainian military official told the U.S. in 2020 that Russia had successfully jammed its GPS capabilities and congressional defense task force warned that same year that GPS could be a single point of failure for the US military and that we have not kept pace with our adversaries. That said, defense PNT technologies have advanced over the years to make them more robust in the face of interference and jamming.

However, electromagnetic effects are not the only way GPS can be disrupted as PNT data can be falsified and "spoofed" and it's not fantasy to imagine that the spacecraft themselves can be attacked by other spacecraft. In short, no matter how much GPS is improved, it remains a single point of failure. Adversary countries are also developing cyber capabilities, directed energy weapons, ground-based antisatellite missiles, and other capabilities that potentially damage, or destroy U.S. satellites. Given its ubiquity, the failure, malfunction, jamming, or spoofing of GPS signals or equipment could disrupt aircraft, ships, munitions, land vehicles, and ground troops in military operations and conflicts.

Growth is attributed to advances in electronically scanned arrays and 4D arrays that determine the range, azimuth, height, and velocity vector of an object. As they are expensive, they are most widely used when high-resolution signals are required, and the U.S. and Germany have invested heavily to advance the technology.



To remedy this, DOD is pursuing alternative PNT technologies that are not dependent on GPS signals being continuously available. These alternatives consist of sensors designed to provide relative PNT information and external sources to provide absolute positioning and navigation. Relative PNT includes inertial sensors and clocks to allow a platform to track its position and keep track of time without an external signal.

However, this approach requires another PNT technology to correct errors that accumulate over time. Absolute PNT technologies allow a platform to use external sources of information, including celestial and magnetic navigation very low frequencies or low Earth orbit satellites to transmit information.

DoD plans to keep GPS at the core of its PNT capabilities, using these alternatives when possible. The question, of course, is how long it will take for these alternative technologies to be deployed, and whether they will be effective in the face of the onslaughts from adversaries. Unfortunately, there's really no way to make this determination in peacetime, so let's hope DoD's current (and substantial) efforts to protect its PNT capabilities prove up to the task.

Starlink is No Longer Alone

Two Chinese space startups recently launched low Earth orbit satellites in the country's efforts to create satellite constellations to challenge Starlink. Competitors like U.K.-based OneWeb and Amazon's Kuiper project have been joined by two startups from China. Early this month, a Chinese rocket launched nine satellites into low Earth orbit LEO) made by Geespace, a subsidiary of Chinese auto giant Geely, which owns Volvo and has a joint venture with Mercedes. In March, another Chinese company, GalaxySpace, launched six satellites in an experimental network. Geespace plans to build a constellation of just 240 satellites compared to Starlink's 3,000 and be mainly used to help Geely receive and transmit data for autonomous driving. However, the company doesn't rule out employing the constellation for other uses in the future.

Dish and Space X Duke It Out

Dish Network, which has showed off how it can offer 5G to 20% of the U.S. population, is combatting new allegations from SpaceX over the 12 GHz band, a situation that has beenongoing for more than a year. Most recently, SpaceX accused Dish of meddling in its attempt to help people in Ukraine. Dish criticizes SpaceX CEO Elon Musk for responding to the Ukrainian Vice Prime Minister's request for ideas to keep Starklink's services online in Ukraine. Musk then responded by noting that "While one can hope that Dish made this condemnation in error, these tactics nonetheless highlight the lengths to which Dish will go so long as the commission inexplicably leaves the 12 GHz proceeding open." Dish says SpaceX has been encouraging Starlink users to operate their terminals when moving on planes, boats and recreational vehicles, which it says is against the law in the U.S.

(973) 772-4242

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