Researchers Identify Air Navigation to Pair with GPS

Zurich University of Applied Sciences report says eDME, eLoran, and LDACS-NAV

Aviation relies on GPS for safe and efficient operations.

ALEXANDRIA, VA, UNITED STATES, December 22, 2024 / EINPresswire.com/ -- Each day thousands of aircraft lose GPS signals because of jamming. Thousands more are spoofed with fake GPS signals that place them miles from their real locations. This increases already heavy workloads for pilots and air traffic controllers and can result in delayed arrivals and canceled flights.

Worse, jamming and spoofing decrease safety margins and increase the likelihood of a major accident. In a survey of almost 2,000 flight crew members 70% said their concern about spoofing's impact on flight safety was "very high" or "extreme."

> "Because of the high costs and likely lengthy timelines for adapting these technologies for aviation CPNT, the focus should be on modernizing terrestrial aviation current RADIONAV."
>
> *Dr. Okuary Osechas*

Interference with weak GPS signals has been an aviation worry for years. In 2019 a passenger aircraft almost crashed into the Rocky Mountains because of accidental interference with GPS. Yet in the last year spoofing alone increased over 500%, largely due to Russian interference in the Baltic and the war between Israel and Hamas.

As a result, aviation experts like the technical directors for Eurocontrol have resolved that reliance on weak and easily imitated signals from GPS and similar satnav systems is not enough to ensure the long term safety and efficiency of air travel. After decades of structuring plans around GPS and similar space-based systems, they are wondering "what should be next?"

A new report from the Zurich University of Applied Sciences by researchers Okuary Osechas and Gary McGraw seeks to answer that question.

The report is framed as way to achieve the global aviation community's goal of a hyper-efficient, lower environmental impact, and lower cost method air travel called Performance Based Navigation or PBN. With PBN aircraft are able to fly point to point on the most efficient routes and use the safest and most efficient procedures.

To reinforce and complement signals from Global Navigation Satellite Systems and ensure aircraft are capable of PBN, the report recommends:

• Accelerated development of Enhanced DME (eDME), as this technology can help to address intra-system interference issues with current DME, as well as offer performance improvements;

• Continued development of Enhanced LORAN (eLORAN) for aviation, as this system can provide coverage over larger areas with less infrastructure, as well as timing for aviation and other users; and

• Continued development of a navigation capability in the L-band Digital Aviation Communications System (LDACS-NAV). This system is capable of providing higher performance ranging than either eDME or eLORAN.

The analysis also says there are synergies between these three systems. For example, eDME and LDACS-NAV measurements can be integrated together in airborne solutions, reducing the required number of ground installations needed in a region for each system. Also, eLORAN can serve as a timing aid to eDME and LDACS ground stations, while LDACS can disseminate differential eLORAN corrections with very low latency.

All three technologies also have the high trustworthiness needed for aviation and have been, or are in the process of being, approved for use in aviation.

The report "Complementing GNSS for resilient performance based navigation" can be accessed from the Zurich University of Applied Sciences website:
https://digitalcollection.zhaw.ch/items/5c87abab-d180-46ef-a33a-4d4a1cc77e2b

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