In the UK, the E-Space team tackles a new area of communications technology

Alex Miller 4 minutes

Team E-Space Technology

E-Space's UK facility is located in Loughborough, England

Engineers in the Loughboroughfacility are focused on payload computer and avionics for the upcomingsatellite constellation

About 140 miles from London in a picturesque area of England known as the Midlands is the E-Space facility in Loughborough. The E-Space office is in the Loughborough Innovation Centre, part of the Loughborough University campus. Comprised mostly of engineers, the team is focused primarily on digital signal processing (DSP) and payload systems architecture for the E-Space satellite constellation.

Originally part of CommAgility — which E-Space acquired in 2022 — this team's particular expertise is embedded hardware, so the Loughborough facility has plenty of lab space for building and testing components alongside software development.

"We've always concentrated on embedded hardware as opposed to general-purpose hardware," says Paul Moakes, E-Space payload systems engineer. "It's always low power, high density and very specialized to deliver high processing power for wireless telecommunications."

After the acquisition, Paul says the team was able to expand their curiosity and work on new projects. Working closely with the communications software team in Duisburg, Germany, and the architecture team in Toulouse, France, the Loughborough group brings an impressive amount of DSP expertise necessary for spacecraft communications. The team also has experience in radio frequency (RF) design from previous projects including non-terrestrial systems — an important technology for the satellite system.

"We're working on baseband processing for wireless solutions, originally we started in the LTE/4G space," Paul says. "Now we're into 5G, and our concentration remains the physical layer — the mapping of transmission data onto the wireless signal."

Some members of the Loughborough team along with Paul Moakes (center, blue shirt)

As he explains, the limited amount of wireless spectrum makes it critical to maximize the data throughput within the available bandwidth.

"Frequency bands are expensive, so the more bits per Hertz you can get through the same band the better off you are. With satellite, there's the additional challenge of the terminal being on a spacecraft moving overhead at high speed, along with many different link pathways, which can degrade the link."

That band efficiency goal requires the creation of specialized hardware for encoding the RF signal, including software-defined radio design alongside writing device driver software; Linux operating system porting; control and management; temperature monitoring of the hardware; and other housekeeping before the critical task of integrating it all into the satellite can take place.

Although it hasn't been quite a year since the acquisition of the team, Paul says the team in Loughborough has been both challenged and excited by the mission.

"Part of our growth and metamorphosis is reflected in the fact that our software team is also working on the flight computer for the spacecraft, not just on the baseband side," he says. "So, we're bringing those skills to other areas of the satellite."

Working in conjunction with E-Space teams across the globe has been a rewarding experience for the team, he adds.

"As part of the flight avionics team, we're offering a lot of feedback from our knowledge of embedded solutions. It's a two-way street, where our knowledge is added to the other teams who have deep experience with the space environment and know all about the extra mile you have to go to make it all work. It's a great example of how we collaborate here at E-Space to integrate all of these systems."

The Loughborough team, he says, has a robust mix of experience between engineers like himself and Simon Pack — who co-founded CommAgility with Paul in 2006 — and younger engineers recruited both from the Loughborough area and further afield.

"Graduate recruitment from the university has traditionally represented a strong component of our staff, and in general we have very low turnover here," he says. "The fact that we also have turnkey manufacturing capabilities makes it an appealing place to work for engineers who like to be hands-on and experience the full development lifecycle."

And while the tech-heavy Loughborough area brings with it a high degree of modernity, the surrounding area is rich in history. The iconic Carillon Tower — a WWI memorial — is a familiar sight and known for its 47 bells cast by the John Taylor Bell Foundry in Loughborough. There are mountain biking and hiking opportunities in nearby Charnwood Forest as well as paddle sports on the river Soar.

"There's a fantastic mix of engineering capability here being on the university campus," Paul says, "and with outdoor activities close at hand, it's a great place to live and work."

The Loughborough facility includes lab space and equipment for testing.

Alex Miller

Alex Miller leads editorial at E-Space. Based in Denver, he's a longtime journalist who's been involved with the satellite industry for over a decade.

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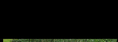

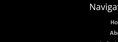

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