

Aerospace and 5G: Realizing the Future

5G is an ecosystem that includes the newest mobile connectivity innovation promising to revolutionize our lives. Once 5G is fully deployed, it has the potential to change the way our world connects and transform the way we live and do business. To realize that promise and deliver enhanced services to billions of people around the world, 5G runs on dedicated bands of radiofrequency spectrum.

America's aerospace and defense industry has also long depended on their own dedicated portions of spectrum. Every time a plane takes off or a satellite is activated, they rely on that spectrum to perform.



The FCC has begun to look at allocating more spectrum to meet the increased demand for spectrum from new technologies. However, before the government allocates spectrum to new users or technologies like 5G, it requires caution and proper testing to ensure compatibility with technologies and systems already in place. It is critical that the government establish proper balances between allowing new users to operate on existing bands and protecting existing users within those bands.

What does 5G do and why does the aerospace industry care?

5G stands for the fifth-generation of connectivity. Each generation of mobile services has added new features: 1G ensured that mobile phone calls could be made; 2G made it possible to send text messages; 3G allowed for traditional smart phone capabilities; and 4G added streaming video capability. 5G will provide increased speeds (to move more data), lower latency (to be more responsive), and the ability to connect more devices at once.

5G will boost the connection of existing and emerging technologies, like driverless cars, satellites, stop lights, and endless household appliances like smart speakers and televisions. This "Internet of Things" allows for more devices to be connected than ever before, dramatically increasing the demand for bandwidth to move signals. As a result, it is vital that 5G be introduced in a safe manner.

While one phone is unlikely to cause much spectrum interference, there may be as many as one billion users of 5G mobile devices by 2023 – and that's not accounting for other existing technologies that will also rely on 5G. The high density of devices in operation at one time places a burden on spectrum bandwidth that could interfere with the ability of planes, satellites, and other aerospace and defense technology to operate safely and securely.

Spectrum is also a finite resource, meaning that there is only so much available. Developers of new technologies have already secured and are seeking more access to additional spectrum bands to support the rollout of 5G. Moreover, the aerospace and defense industry is rapidly developing and deploying new technologies and services; these innovations will have spectrum demands of their own.

Any changes to the current allocation of spectrum could have ripple effects on every system using the same or adjacent bands. Rushing ahead with 5G without proper testing could create harmful interference issues with existing aviation, space, and defense equipment currently operating.

For example, if new devices are to operate in frequency bands close to those used by existing aviation equipment, government and industry will need to ensure that aircraft operations and passenger safety are not jeopardized. In addition to potential safety concerns, if the aviation industry is forced out of its current critical band allocations, it could cost billions of dollars to modify aircraft systems with new equipment to operate in different bands. The same is true for satellites – but with an exponentially higher price tag, given the cost to replace satellites in orbit.

What are the challenges involved with 5G?

The Federal Communication Commission (FCC) is looking at opening spectrum bands previously allocated for other services to support 5G rollouts. The problem is that these spectrum bands cannot always be shared. Some products are not designed for sharing; others take up too much of the spectrum band.

For example, AIA is concerned with the FCC's exploration of allocating the entire 3700-4200 MHz band for 5G because of the high potential for interference with aircraft radio altimeters. This critical aviation system, that operates in the adjacent frequency band, is vital to providing altitude data for safe landings of not only every commercial aircraft, but many helicopters and private aircraft as well.



Recommendations:

AIA and our members are ready and committed to working with Congress and the Administration to support the safe deployment of 5G. AIA recommends:

- 1. Incumbent Protection:** As the FCC looks to open additional spectrum bands for sharing, they should also protect existing users from the potential of harmful interference. Any spectrum sharing regime should ensure that the newer entrant be responsible for proving compatibility or co-existence with the current users.
- 2. Spectrum Sharing:** Since spectrum is a finite resource, spectrum allocation in a 5G world requires industry, Congress, and the Administration to work together to find innovative ways to share spectrum and ensure allocations are properly considered.

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