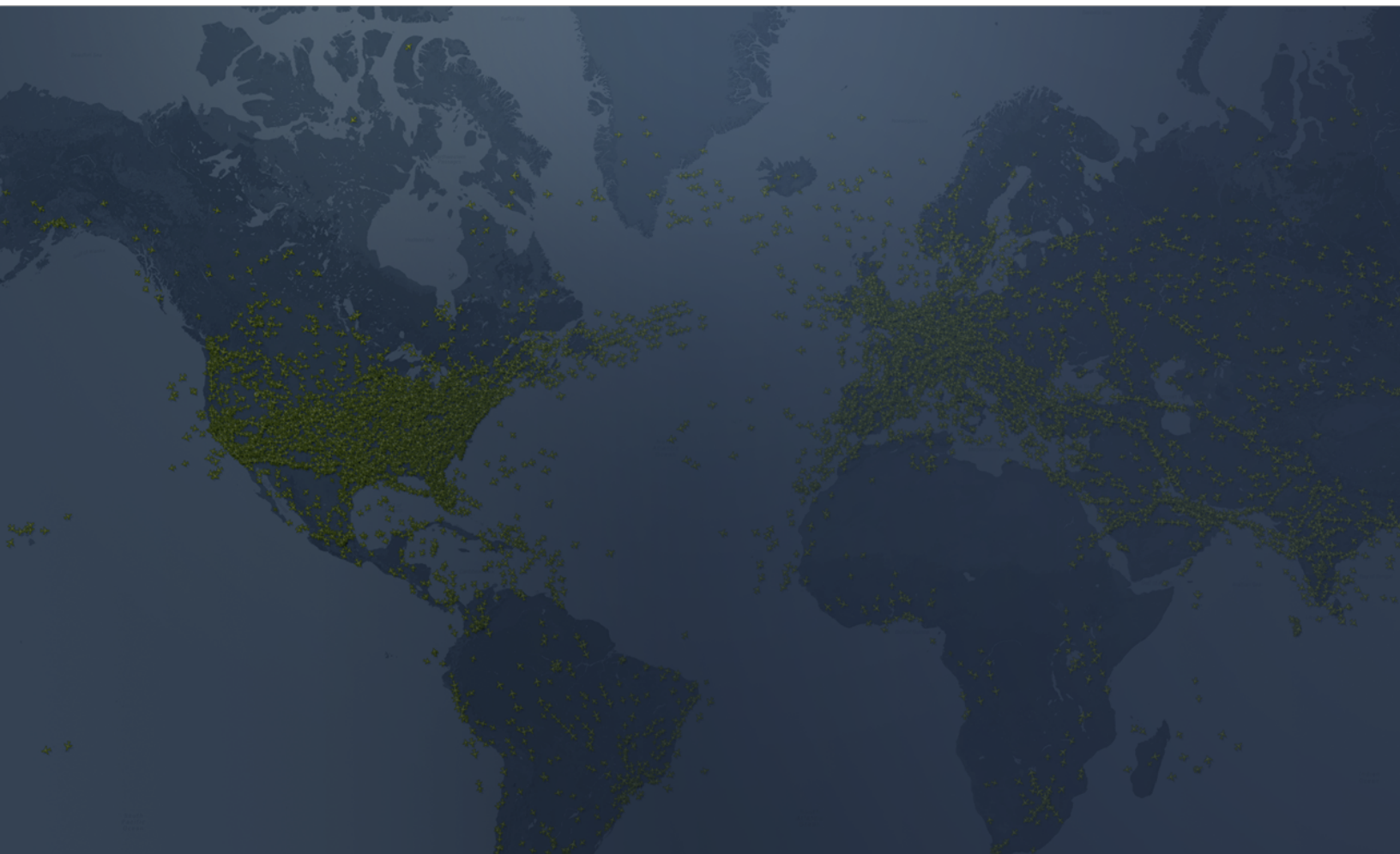


FLIGHTRADAR24

-KNOWLEDGE BASE-

“ADS-B ANTENNA”



We've put together the following tips to help you to get the best out of the equipment. If you have additional questions, please do not hesitate to reach out to support at Flightradar24.

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1. LOCATION SELECTION

There are two main things to consider with location: direct line of sight (LOS) and vertical alignment.

When mounting and positioning the antenna, it is critical that in the immediate vicinity, any masts, other antennas, and metal parts of neighboring objects are at a horizontal distance.

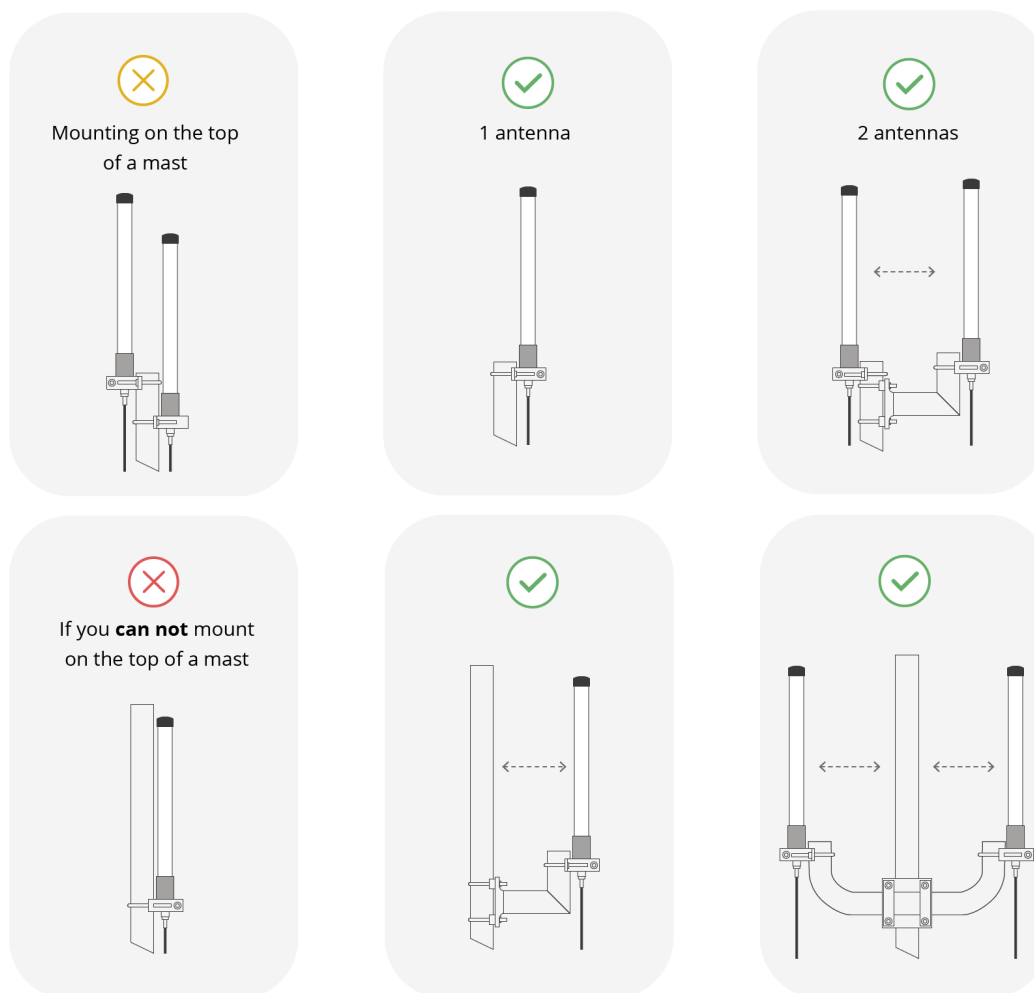


Cables can also be a source of interference in the immediate vicinity since the cable sheathing acts like a metal part.

The higher the antenna in relation to the environment, the larger the area from which it can receive signals. Obstacles such as buildings and topography can also play a role. These include mountains, buildings, settlements, forests and even the foliage of trees nearby. At greater distances, the completely natural course of the terrain up to the curvature of the earth can also cause disturbance.

Indoor positions, even if only behind a coated window pane or under a roof will always compromise the signal. An internally positioned antenna will not produce good results.

In order to correctly position the antenna, it must be aligned vertically. The more perpendicular to the horizontal the position is maintained, the better the radio connection. With an antenna mounted at an angle, half of this radiates into the ground and not to the horizon, or it does not receive any signals from the horizon.

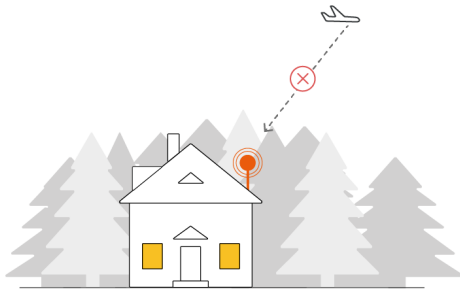




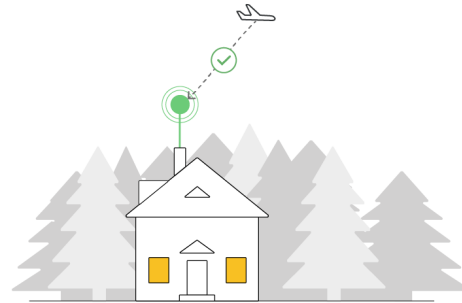
Bad position – hills blocking antenna



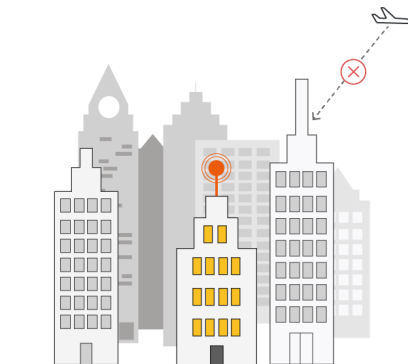
Good position – as high as possible



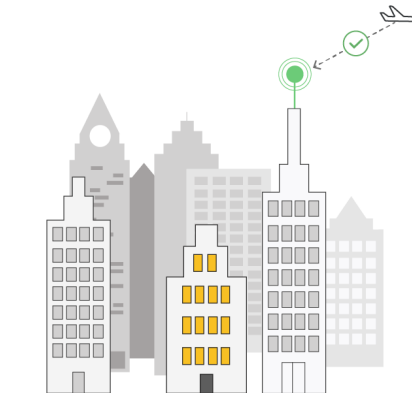
Bad position – trees blocking antenna



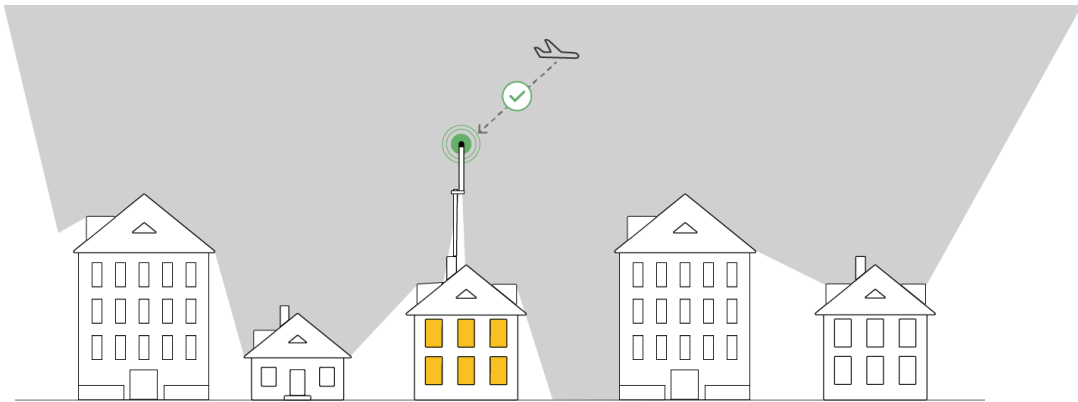
Good position – as high as possible



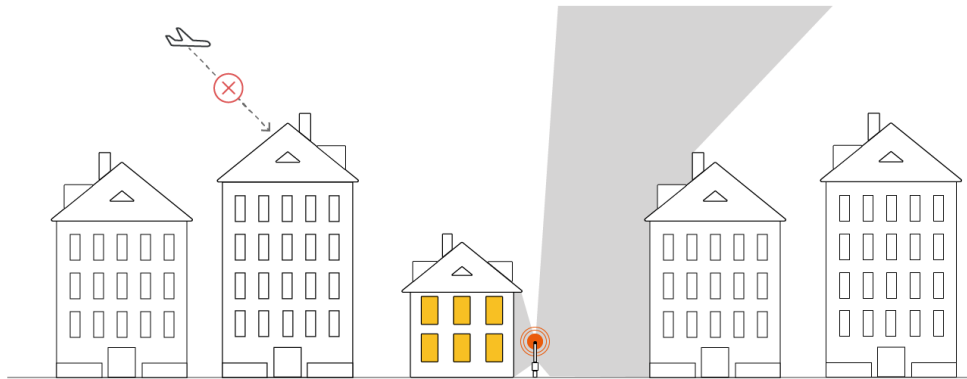
Bad position – buildings blocking antenna



Good position – as high as possible



Correct antenna placement –
good reception of ADS-B signals



Incorrect placement with blockage –
bad or no ADS-B signal reception

2. ANTENNA SELECTION

Within the radio frequency (RF) range, radio performance depends on the antenna - regardless of whether you use the antenna for transmitting or receiving. The antenna is the best amplifier and its selection should be prioritized over anything else.

This means, for example, an amplifier cannot compensate for an antenna that is too small. More is definitely more.

A doubling of the mechanical dimensions brings a maximum gain of almost +3 dB. A FLARM antenna of 8 cm, for example, cannot reach a real 8 dB. However, do be mindful when checking the marketing information of manufacturers.

As for the type of antenna, narrow-band antennas usually have higher gain than broad-band antennas. If you're considering adding an amplifier to the antenna of the right size, consider an active antenna with a built-in amplifier first.

Finally, depending on your location, consider whether you can or must rely on the durability of the antenna. Weather resistance is a must for outdoor use, and high-quality products can also withstand extreme heat, high humidity, or, for example, seawater. You should also be prepared for potential issues: What happens if the glued areas break? Does water then run into the antenna and maybe even further into the cable?

If you notice any weathering effects on the antenna, it is good practice to clean any algae buildup off to inspect the top cap for any damage or breaches and the silicone seal around the base. Any moisture build-up or cuts may allow water or condensation to build up inside. This has a high probability of reducing reception performance.

3. ACCESSORIES

With masts and mastheads, the most important factor is antenna placement. If a powerful antenna is in a good location, the only thing that can ruin the range is the wrong accessories. The most used hardware here is filters and amplifiers.

Filters are used when interference from other transmitters cannot be avoided when choosing the location - such as the LTE/GSM mobile antenna on the neighbor's roof. Without frequency interference, we advise against filters because they can also lead to an attenuation of the signal.

Receiver preamplifiers are a means of compensating for a lack of sensitivity in the receiving device or the attenuation caused by a long cable that is absolutely necessary. A reception preamplifier will not be able to work in the vicinity of strong transmitters because the strong signals from the transmitters overload it. It may be better or even necessary to use a filter so that the receiver is not overloaded by the transmitters.

Regardless of the use of a receiver amplifier, it is worth using as few adapters as possible and cables as short as necessary. Use high-quality adapters and the shortest possible, low-attenuation cables. And last but not least, please don't forget to ground during installation: direct lightning strikes are unpredictable and protection against electrostatic discharge needs to be considered.

The higher the antenna, the better the reception. If the receiver can be located close to the antenna, there will be less signal degradation from the coax cable which loses data over a long cable run.

4. SUMMARY

An antenna that is freestanding and placed as high as possible usually covers most of the surrounding area in direct line of sight. In a city, the immediate surroundings are the limiting factor. Houses and trees, especially those with a lot of foliage in the summer months, limit the range and strength of the signal. Other obstacles, such as near mobile phone masts, should also be avoided or compensated for.

Next on the list of priorities is antenna gain. You can recognize a good omnidirectional antenna by the fact that it achieves maximum gain for its physical size. If you then mount the antenna correctly and choose cables with low attenuation, almost nothing can go wrong.

Finally, depending on the cause of your setup's performance degradation, you can significantly improve the performance of the antenna with an amplifier or a filter.



Important for applicants for a FR24 receiver:

Some landlords or local authorities may prohibit the installation of an external antenna. Please check before completing the application form.

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Placing the antenna outside, as high as possible, is essential. An internally positioned antenna will not produce good results.

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