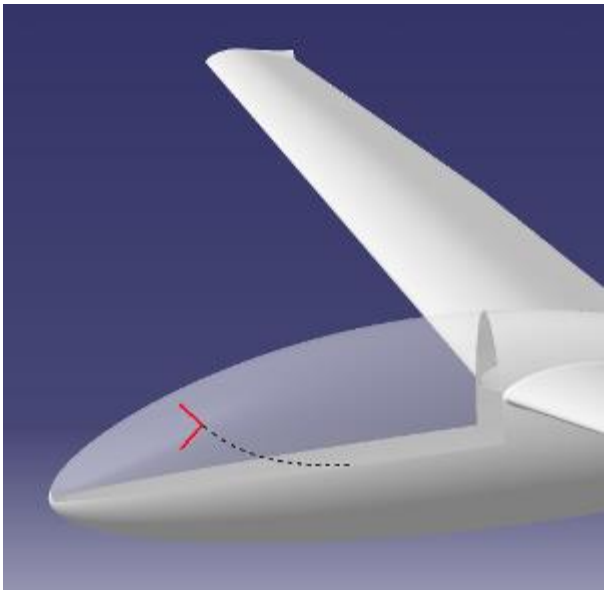
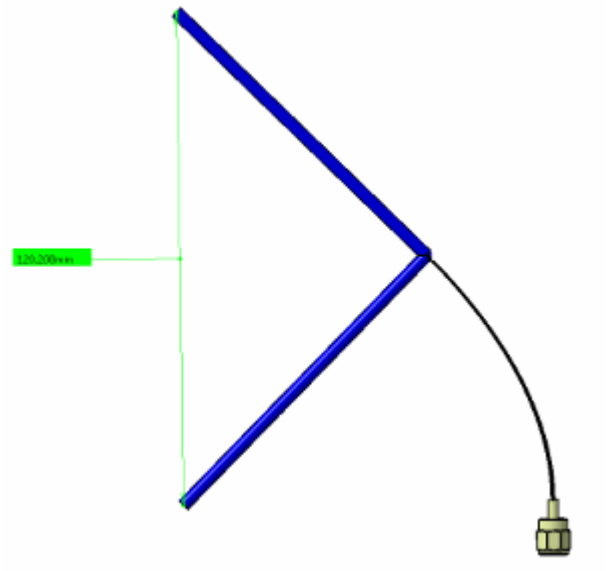
Installation of the FLARM or aviation radio antenna

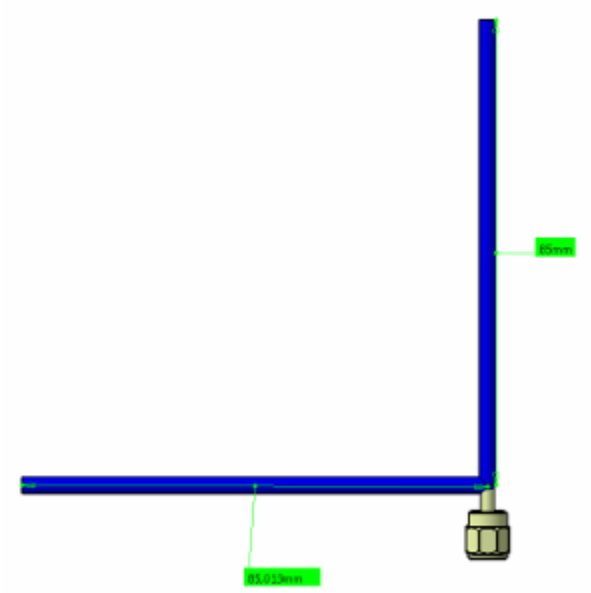
Please read and follow the instructions below carefully - this is the only way to achieve the maximum range of the antennas. An old radio proverb says: "An antenna is the best radio frequency amplifier - a poorly installed antenna is indistinguishable in performance from a piece of bread."

- The greatest possible distance from conductive materials must be maintained. Examples of conductive materials are metal, carbon fiber, conductive paints, the human body (water), instruments, control rods, steel tubes (hulls) or other antennas.
- Theoretically, the minimum distance to conductive materials is at least one wavelength - corresponding to 2.4 m for aviation radio, 0.35 m for FLARM Lambda. If this distance cannot be maintained, the performance of the antenna decreases and the standing wave ratio becomes worse. In real operation, a minimum distance of 0.5 m for the *SuperRAnt* aviation radio antenna and at least 20-25 cm for the two FLARM antennas *SuperFAnt* and *FAnt have proven to be a good compromise.*
- Conductive material (even outside the minimum distance) creates a blind spot when sending/receiving. The expected effects can be determined by a simple geometric consideration: straight lines starting from the antenna, which delimit the edge of the part, show the blind spot. Such dead zones must be minimized during installation.
- If there are conductive materials near the antenna, it is better to "point" the antenna legs perpendicularly to it rather than parallel to it.
- Mount antennas (transponders, aviation radio, FLARM...) at a distance from each other - other antennas are conductive material for the sending or receiving antenna and induction can occur and the output stage of the other devices can be destroyed. Due to their performance as transmitters, the aircraft radio and a transponder are particularly critical.
- Do not roll up the cable to the antennas - coils with significant power losses will form if they are large in diameter and do not wrap cables around metal parts.
- Speaking of the supply line: as the frequency increases, the attenuation of the antenna cable continues to increase. Accordingly, the supply lines must be kept short, especially with FLARM antennas. Even if, for example, an optimal position for the antenna itself is achieved by installing a FLARM antenna in the vertical stabilizer, the losses in the supply cable result in a significant deterioration in overall performance.
- The connecting cable should always have a maximum distance from the antenna and should therefore be laid vertically near the antenna.
- Keep the number of plugs/sockets in the antenna cable as low as possible, as power losses also occur there - especially important when using existing cabling for aviation radio.
- Lay the legs of the antennas as straight as possible, otherwise the geometry will no longer fit and the performance will decrease. Mounting along curved surfaces - such as the fuselage - should be avoided, especially with aircraft radio antennas. In order to be able to lay the legs straight, pine strips or glass (!) fiber rods have proven to be effective.





- Alternatively, the following installation with horizontal and vertical antenna legs is also possible.



- The following applies to the *FAnt* or *RAnt* : The two legs of the antenna should lie along a line and be vertical.

An inspection of the antenna installation should also be carried out after installation and noted in the aircraft's L file. A distinction is made between FLARM and aviation radio. For the FLARM it is best to use the **range tool** directly from the FLARM homepage. It gives a good overview of actual performance. A possible blind zone to the rear is less critical than to the front, as the risk of collision is greater due to the relative speed to the front.

For aviation radio antennas, the installation test is best carried out using a standing wave measurement. The necessary devices can be purchased online for around 50 euros - please note: they must be usable up to 140 MHz. If you have never done such a measurement before, you should ask someone who is familiar with it... the risk of damaging the radio or obtaining incorrect values cannot be ignored. If you've never worked on your car's brakes, you won't just do it like that...

Regarding the standing wave measurement itself: Standing wave ratios of > 2 should be avoided. This means poor transmission/reception performance and the risk of destroying the radio's output stage. If such a standing wave ratio is obtained, the following possible causes include:

- Mounting position of the antenna is unfavorable - see above
- Too many plugs/sockets in the antenna cable
- Radio defective

And very important: Never operate a radio without an antenna - this also applies to the FLARM!
If you still have any questions, just send an email.