Technical E-Paper

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Eradicating risk in a custom antenna design.

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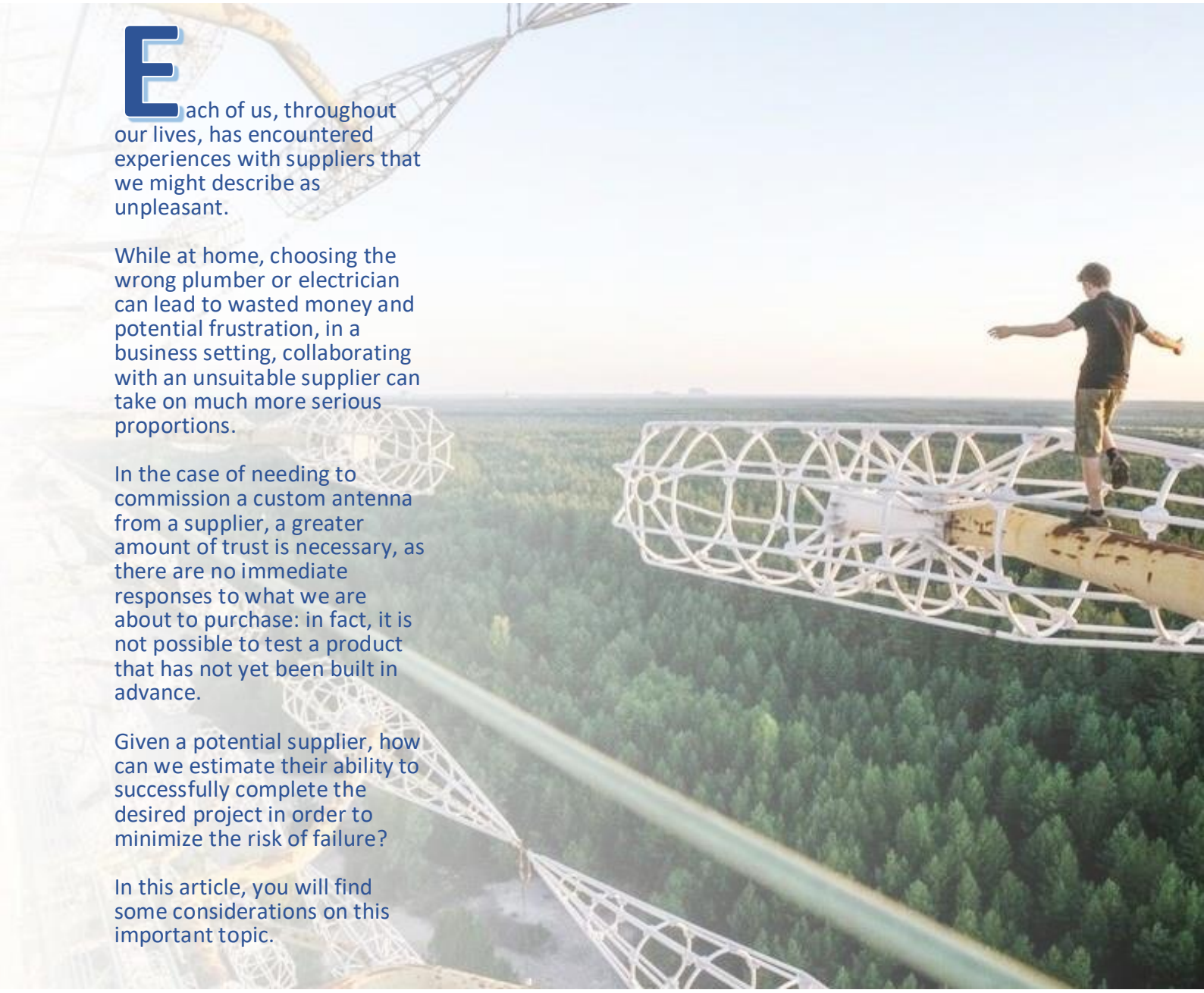
Each of us, throughout our lives, has encountered experiences with suppliers that we might describe as unpleasant.

While at home, choosing the wrong plumber or electrician can lead to wasted money and potential frustration, in a business setting, collaborating with an unsuitable supplier can take on much more serious proportions.

In the case of needing to commission a custom antenna from a supplier, a greater amount of trust is necessary, as there are no immediate responses to what we are about to purchase: in fact, it is not possible to test a product that has not yet been built in advance.

Given a potential supplier, how can we estimate their ability to successfully complete the desired project in order to minimize the risk of failure?

In this article, you will find some considerations on this important topic.



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1. The perception of risk.

The design of custom professional antennas is often perceived by the customer as a high-risk activity, especially when compared to the reassuring notion of relying on a standard product already available on the market.

It is a common feeling, especially among those who have never had the opportunity to delve into the subject thoroughly. We could compare this reaction to that of a spectator watching a tightrope walker walking on a high wire: to the unaware observer, this is a reckless daredevil risking their life.

But if our spectator had the opportunity to consider the hours the tightrope walker spent training their body, improving their technique, choosing the most suitable equipment, and defining the necessary precautions, their opinion would change drastically, and they would be convinced they are witnessing an expert with the technical means and experience necessary to ensure the success of the endeavour.

Returning now to the subject of our discussion, it is important to emphasize a substantial difference compared to the example just given: if in the case of the tightrope walker the spectator's mistaken feeling somehow contributes to making the show more exciting, the situation changes when we need to make important decisions for our business and truly understand the level of risk we are facing.

In this case, relying solely on perceptions or feelings can be a mistake, and it is always advisable to analyze the situation in detail to form as clear an idea as possible, using tools that allow for an independent and objective assessment, both regarding the issue in general and when addressing it more specifically to meet one's particular needs.

In the following paragraphs, we will suggest a series of tips on what to pay attention to when deciding to undertake a professional custom antenna design activity, with the aim of making the risk comparable to purchasing a product from any catalogue.

2. Definition of a professional antenna and a custom antenna.

Firstly, let's provide a better description of the type of activity we are discussing: the design of custom professional antennas.

To begin with, it's important to give a precise definition of a professional antenna to avoid any misunderstandings: a professional antenna is a product that effectively meets all the technical specifications stated by the manufacturer and/or requested by the customer for its specific application. It is therefore a certain product, completely known from a technical standpoint, both for those who build it and for those who use it.

A custom antenna is a professional antenna developed and produced upon the request of a client, characterized by one or more technical specifications and/or commercial requirements that are not found in commercially available products.

We are thus facing a very specific activity that requires experience, expertise, and adequate equipment. Therefore, when evaluating the most suitable supplier, it's necessary to verify the presence of these particular characteristics.

Having a wide catalogue of antennas and being able to produce them does not automatically imply the ability to design them properly.

3. The search for the supplier.

In the search for our ideal supplier, the first important factor to consider is the accumulated know-how in this particular niche market over the years.

It is certainly not unreasonable to state that, nowadays, to establish oneself in a given sector, it is necessary to acquire a certain level of expertise, achievable by focusing exclusively and for a certain period of time on the specific activity of our interest.

The world of antennas is broad and multifaceted, and the simplistic definition of an "antenna expert" holds no meaning unless one has delved into particular and specific aspects of this vast subject in a serious and accurate manner.

Therefore, the first step towards reducing the level of risk is to search for a supplier expressly and exclusively dedicated to the "design and construction of professional custom antennas"

capable of documenting their experience and capabilities gained through the realization of previous projects.

Gathering this information can be done through word of mouth, visiting the company's website, or requesting direct contact with the potential supplier.

As we will see in the next paragraph, the supplier's willingness to conduct, without obligation, one or more preliminary meetings is an important aspect to consider, as it allows for gathering fundamental indications to make a safe and risk-free choice.

4. The first contact.

Direct contact with the supplier is definitely an excellent opportunity to identify the characteristics that differentiate an experienced and qualified company, thus significantly reducing the risk in managing this type of activity compared to a non-specialized company.

The potential supplier must indeed have the ability to address the specific subject "live" through a face-to-face meeting or via video conference. This method allows verifying, through direct contact, a series of fundamental aspects such as:

- the level of expertise in the particular design activity to be undertaken;
- the ability to understand the specific needs of the customer;
- the attitude and willingness to provide basic information about the requested antenna already at this stage, immediately giving an idea of what is possible and useful to do and what is not.

The answers should not be generic but specific and targeted to the problem being analyzed, thus demonstrating the right predisposition to provide a customized solution tailored to the client's needs. Unless explicitly requested, the fact that the supplier simply proposes adapting a standard product already present in its catalogue may be a warning sign of its actual ability to respond adequately.

Once the necessary competencies to define the ideal custom antenna have been identified in the potential supplier, the next phase can proceed, which is to verify the means and equipment at its disposal.

5. Equipment and resources available to the supplier.

A common mistake, which can also have serious consequences, is to think that designing a custom professional antenna solely requires using electromagnetic simulation software. However sophisticated and costly it may be, to avoid unexpected and costly modifications in an advanced stage of the project, it is necessary to have other means and equipment available.

Those involved in the design of professional antennas must have the necessary experience and sensitivity to strike the right balance between using software and conducting appropriate laboratory tests and verifications. Therefore, it is essential to have a laboratory equipped with the necessary

instrumentation to carry out adequate and continuous verification of the various steps encountered throughout the project, continually monitoring the results obtained. This is done both to implement any optimizations to the ongoing process and to promptly correct any errors that may arise.

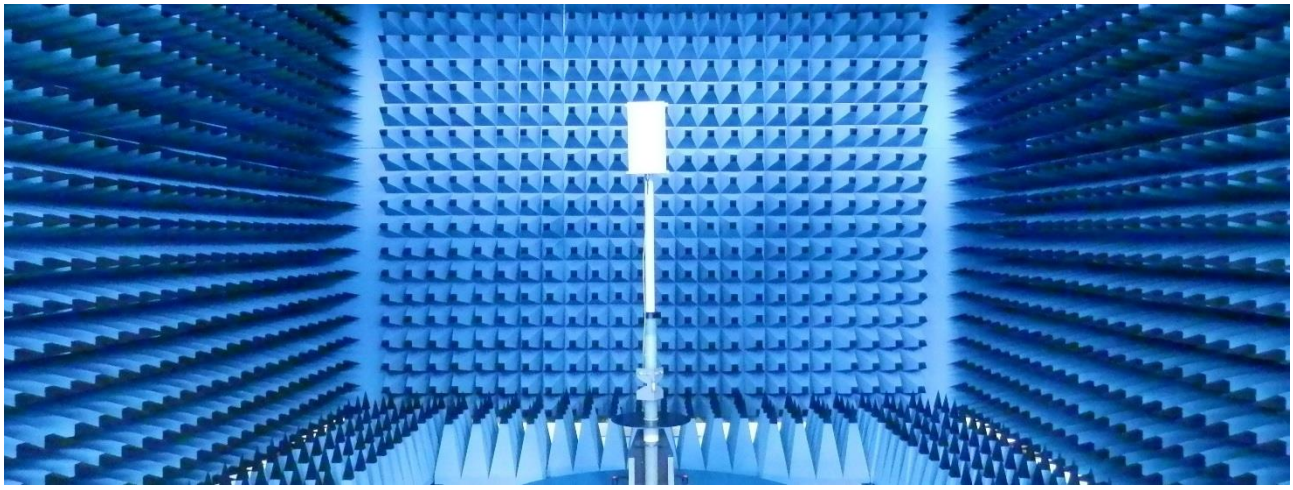
Consider, for example, the significant advantages gained by being able to perform reliable measurements in a short time, creating various partial prototypes already in the internal mechanical workshop and measuring them in the company's anechoic chamber, appropriately equipped for specific tests.

Particular attention should be paid to everything concerning the antenna measurement and characterization system, necessary to validate the design activity and communicate the results obtained to the customer.

In this regard, we invite you to read the technical insights already published previously:

- **TEP No.5 - Using the anechoic chamber in the design of antennas. PART ONE**
- **TEP No.7 - Using the anechoic chamber in the design of antennas. PART TWO**
- **TEP No.14 - Using the anechoic chamber in the design of antennas. PART THREE**

Asking the potential supplier to visit the laboratory and explain how the measurement system is used is another fundamental aspect in choosing the most reliable supplier.



6. How the quotation should be drafted.

The way the quotation is drafted is important, as it represents an indirect but unmistakable indicator of the supplier's competence on that particular project. The supplier must demonstrate that he has understood the customer's needs exactly and has a precise idea of how the new custom antenna will be and how it will be realized.

Continuing to pursue the goal of minimizing risk, it is therefore not advisable to reduce the analysis and comparison of the various available quotations solely to price and delivery times.

Each quotation should be checked for important information, such as:

- Description of the project, highlighting the main technical criticalities and how they intend to solve them;
- Project execution method, describing the order and objectives of each phase to be addressed;
- Product description, providing as precise as possible the electrical, mechanical, and aesthetic specifications of the product to be realized.

At the end of reading the quotation, the customer should clearly understand how the project will be carried out and what characteristics the custom antenna will have. The precision index in the exposition of all these points will be directly proportional to the reliability, professionalism, and seriousness of the supplier.

The quote should also include a precise description of what will be provided at the end of the project. In this regard, we consider the important clarification discussed in the next paragraph to be appropriate.

7. The project outputs.

Every custom antenna project should conclude with the delivery of one or more prototypes to the customer, characterized and fully functional.

After receiving these prototypes, the customer should be able to independently verify, either instrumentally or in the field, what they have commissioned. Unless there are specific alternative requirements, it's advisable to always request the delivery of at least one prototype at the end of each project.

Nonetheless, it's essential to ascertain in advance which parameters need to be measured during the antenna characterization phase, as they must align with the project specifications or customer's requests.

At this stage, we might consider having all the necessary information to identify the most suitable supplier for the new custom antenna project. However, we want to emphasize another aspect that further reduces the risk: the supplier's written guarantees.

8. Written guarantees from the supplier.

To achieve the goal we set at the beginning of this discussion, which is to compare the risk the customer undertakes by choosing the design of a new custom antenna with that of purchasing a standard antenna already available on the market, it is necessary for the supplier to provide written guarantees at the start of the design process.

These guarantees cannot be defined in advance and vary from supplier to supplier, based on their experience and capabilities.

Regarding us, when a customer entrusts us with the creation of a new custom antenna, we provide the following written guarantees:

A. The custom antenna must be feasible, according to the methods and timelines agreed upon with the customer.

B. The custom antenna must comply with the technical specifications and commercial requirements defined with the customer at the beginning of the project.

C. The project activities for a custom antenna must be transparent to the customer, who can freely request details and clarifications throughout the project.

D. The custom antenna must be the exclusive property of the customer who commissioned it and paid for its design, and cannot be sold to other parties.

E. The custom antenna must have unique and exclusive technical characteristics and must not be a mere copy of a product already available on the market, or purchasable by the customer without significant complications.

9. Conclusions.

The development of custom professional antennas represents a highly specialized niche sector, for which the search and evaluation of a suitable supplier may not be easy or straightforward.

The qualified candidate must possess experience, expertise, appropriate technical means and instrumentation, and, no less importantly, availability and ability to listen to the actual needs of the customer, knowing how to propose the most suitable solution for their requirements.

A proper evaluation of the supplier allows for the minimization of risk, bringing it to the same level as one would assume when purchasing an existing product available on the market.

*All the information and experiences reported in this article are the result of the design, development, and implementation of professional custom antennas carried out by **ElettroMagnetic Services Srl** using the **AntennaCustomizer method**.*

*For questions, clarifications, or further information on this or other topics regarding professional antennas, please contact **bollini@elettromagneticservices.com**.*

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