

The production phase

of

Custom Professional Antennas

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As discussed on several occasions, a custom professional antenna is developed to meet specific technical and/or commercial requirements.

Once the design and subsequent engineering phase have been completed, production must be planned. This can either be organised by the Customer or entrusted to a specialist supplier.

This article offers some considerations on the decisions required to manage this final stage in the development of custom professional antennas as efficiently as possible, minimising the risk of something going wrong.



1. Introduction.

Once the design phase has been completed and the prototype validated, the Customer faces a particularly important decision: determining who will be responsible for series production of the new antenna.

For custom professional antennas, there are essentially three options:

- Handle production in-house;
- Entrust production to the supplier that successfully completed the design phase;
- Commission a new partner to carry out the work.

This choice requires careful consideration of a range of factors that vary significantly from case to case.

Each custom antenna has its own distinctive characteristics and level of complexity, requiring different degrees of precision, expertise and experience in component procurement, assembly and testing.

Just as entrusting the design to suppliers lacking the necessary expertise is unlikely to yield satisfactory results, in-house production by the Customer that commissioned the design can also lead to problems or inefficiencies, resulting in wasted time and money.

Before making this important choice, it is therefore essential to assess the specific situation carefully, recognising that a reliable, professional supplier must be able to offer considerably more than the simple sum of material costs and assembly labour.

Before reaching a decision, the specific situation must therefore be carefully assessed from both a technical and an organisational perspective, identifying the key factors to consider when evaluating the competence of a potential production supplier.

Let us now look at how, in our experience, this assessment should be approached and which considerations can help guide an informed decision.



2. Initial considerations.

At the end of the design phase, the Customer will receive from the design supplier all documentation relating to the construction of the prototype. This will primarily include mechanical manufacturing drawings, the bill of materials, a list of accessories and any procedures, supported by photographs, that help clarify the assembly stages.

This documentation will enable the Customer to gain a clear understanding of both the antenna to be manufactured and the various manufacturing stages and their complexity, in order to determine whether all the necessary capabilities are available within the company or can be developed.

In particular, the Customer should check whether:

- The experience and expertise of the personnel responsible for production meet the requirements of the specific manufacturing activities, both in defining assembly procedures and in carrying out the assembly work;
- The supplier network can provide all the necessary materials within the timescales and under the conditions required by the application;
- Personnel are available to carry out appropriate incoming inspection and acceptance of materials before they enter the production line;
- All equipment and technologies required to assemble the various components are available, together with personnel trained in their use;
- The company already has the equipment needed to verify and test the antennas to be manufactured, as well as personnel capable of defining suitable procedures and maintaining them in use.



By checking these capabilities within the company at an early stage, the Customer will be able to estimate production costs with reasonable accuracy and compare them with any quotation from an external partner.

If any of these factors is missing, an accurate cost assessment will not be immediately possible. Action will also be needed to address the gap, assessing the available options and the investment required in terms of both money and time.

Clearly, not all the factors listed carry the same weight. While finding a new supplier for a particular component may prove relatively straightforward, a lack of the necessary expertise among existing personnel can become a much more difficult and time-consuming obstacle to overcome.

For example, without specific mechanical expertise, having access to a workshop manual is not enough to overhaul a car engine.

One of the most important factors when assessing whether an investment is worthwhile, particularly if it involves training some of the personnel, is the expected production volume.

The greater the number of units produced, the lower the impact of these costs per unit.

Another decisive factor is the delivery schedule for the various production batches and whether it allows sufficient time to train personnel to the required standard.

As mentioned earlier, all these assessments will support a careful and accurate comparison with any quotations from external partners. In the next section, we will examine the aspects that deserve particular attention when making a cost-effective choice.

3. External partners.

The assessment of external partners must start from a fundamental premise: the price quoted must cover more than simply the cost of materials and the labour required for assembly. It must also account for the expertise, capabilities, responsibilities and equipment essential to successful production.

Let us now look at what a reliable partner must be able to guarantee to ensure that the outcome meets expectations.

3.1. Expertise and experience.

Before offering to undertake production, a reliable and responsible partner must carefully assess one particular technical aspect: the technical expertise and experience of the personnel who will assemble the antenna.

Especially when assembly is complex, having dealt with similar situations in the past provides the skills and practical judgement needed for the specific work involved.

Both technical expertise and experience are particularly important. Only together can they make production truly efficient and ensure satisfactory results.

The technical skills of the personnel carrying out the assembly help ensure that each stage is completed correctly, avoiding oversights and errors. The ability to define an appropriate assembly procedure further reduces the risk of mistakes, optimises production time and costs, and enables continuous monitoring of the quality of the work being carried out.

It is therefore advisable to have experienced personnel who can define the various production stages and the most suitable methods from the outset, avoiding a process of trial and error and corrections during production.

In this respect, the supplier responsible for the preceding design phase may have an advantage. Having already built one or more prototypes, they should have a clear understanding of both the best procedure to follow and how to address the various critical issues that arise during assembly. Verifying this point is certainly important.





3.2. Assembly and testing equipment.

Suitable assembly and testing equipment must be available to ensure that production can be completed correctly.

If this equipment is not available, it must first be procured, and personnel must then be trained to use it effectively, avoiding errors and wasted time.

Clearly, this must not adversely affect the Customer through unjustified increases in costs or delivery times, or a reduction in the quality of the products delivered.

Particular emphasis should be placed on the importance of testing equipment and the definition of appropriate verification and inspection procedures, both throughout assembly and for final validation.

Especially when dealing with antennas designed for specialised applications, obtaining the equipment required for the necessary tests and knowing how to use it correctly are not always straightforward.

3.3. Supplier network.

Another decisive factor is the supplier network available to the prospective partner.

To deliver a professional product to the Customer, an equally high standard of quality must be maintained when sourcing the various components required to assemble the antenna.

This means ensuring both the use of suitable materials and the adoption of the most appropriate manufacturing technologies.

As with other aspects, the supplier responsible for designing the antenna may have a clear advantage here, having already identified, during the design phase, the best suppliers for the various manufacturing technologies involved.

The existing relationships within this supplier network are another factor to consider. Long-standing collaboration provides a thorough understanding of each party's needs and requirements, minimising the risk of receiving non-conforming materials or components.

3.4. Responsibilities and warranties.

Taking responsibility for production therefore means accepting obligations towards the Customer and being able to provide assurances aimed at achieving two fundamental objectives:

- Ensuring that the antennas produced meet the specified requirements, with technical characteristics identical to those of the prototype tested and validated by the Customer;
- Ensuring the necessary repeatability across all units delivered, maintaining consistent antenna characteristics across different production batches.

Another important capability is managing the possible discontinuation, over the years, of one or more components used in the antenna, preventing this from affecting the product's life cycle.

This possibility must be taken into account, and managing it is undoubtedly easier when working with a partner with experience and knowledge of this specific sector.

4. Conclusions.

Deciding who to entrust with the production of a custom professional antenna is a particularly important and sensitive decision.

Every antenna produced must meet the quality standards established during prototype development and serves as a calling card for a new Customer. Choosing an inadequately prepared partner without the necessary manufacturing expertise can prove to be a serious mistake.

Undertaking this type of work and providing the required assurances call for appropriate experience and specialised equipment.

Addressing any gaps within your own company can require a substantial investment in both time and money. It is therefore essential to assess all the factors involved carefully, avoiding mistakes that could have highly undesirable consequences.

In this article, we have sought to highlight the most important aspects, sharing our experience in the hope that it will help those facing this type of decision.

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*The information presented in this article draws on the experience gained by **ElettroMagnetic Services Srl** in the design, development and production of custom professional antennas using the **AntennaCustomizer** method.*

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

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