

# The Antenna Case Study: A Scheduling and Coordination Challenge

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**Abstract.** Coordinating the manufacture of a small-batch, irregularly scheduled airplane part is a difficult task. The addition of subcontractors and aging parts makes this activity even more difficult. This case focuses on the problem of scheduling and coordinating the production of the irregular timeline of an airplane antenna. XYZ Aerospace manufactures an antenna for an aircraft and needs to respond to intermittent orders and strict deadlines. This case illustrates the coordination between a contractor (XYZ Aerospace) and its subcontractor (ABC Corporation) for manufacturing scheduling, issues that arise in scheduling when parts fail to meet testing requirements, and aging parts that expire before being able to be used for the manufacturing activity. In-depth group discussion and coordination are the tools used to solve this case. The case may be used in Supply Chain Management undergraduate and graduate courses as a learning tool for supply chain, manufacturing, and supplier and customer relationship management.

**Keywords:** supply chain, manufacture, supplier relationship management, customer relationship management, problem-solving, root-cause analysis, product lifecycle management, Lean and Six Sigma.

## 1. Background

XYZ Aerospace is based in Dallas, Texas, and employs 150 individuals with expertise in supply chain, manufacturing, quality, and engineering. Annual revenue is around \$100 million, deriving from several product lines. XYZ Aerospace has grown over its 40-year history based on a reputation of providing quality products that are produced on-time and within budget. As such, customer satisfaction is high, and many contracts are continuously renewed. Also, there are frequent follow-on efforts from current customers who want to continue growing their relationship with XYZ.

One of the products that initiated XYZ Aerospace into this business was an antenna assembly which is still produced today on a sporadic basis. While not a significant profit contributor to the company, XYZ has continued to produce the antenna due to the criticality of the product for its aircraft customers. It is an essential product from the standpoint of supporting

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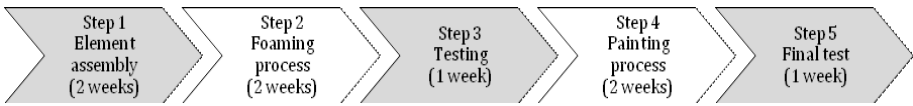
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customers and helping to grow future sales in other product lines. XYZ Aerospace is the sole provider of the antenna; thus, the customer relies entirely on them to supply it.

On average, XYZ receives orders for the antenna 2-3 times per year, and the contract is executed for quantities ranging from 10 to 20 antennas per order. Due to the relatively low quantity, frequency of orders, history of the engineering drawings, and manufacturability, this product has proven difficult to maintain over the years.

In addition, the antenna assembly requires significant outside processing; therefore, XYZ Aerospace is highly dependent on its supply chain and specifically on a critical subcontractor, ABC Corporation. Furthermore, each task must be completed in sequence, and only one part at a time can be manufactured through any particular step of the process. A simplified version of this process flow is described in Figure 1.

Figure 1: Antenna Assembly Process Flow



The grey-shaded arrows represent the process steps performed by XYZ Aerospace (Steps 1, 3, and 5), while the clear arrows represent the tasks that ABC Corporation performs (Steps 2 and 4). The notation of time below each task represents the processing time. Once a unit is through the element assembly process, another may begin, but only one unit may be processed in each step at a time.

The process to produce the antenna assembly required the following bill of materials described in terms of what XYZ Aerospace consumed as well as what ABC Corporation required.

Table 1: Bill of Materials for XYZ Aerospace

Part Number	Part Description	Quantity
100-002-300	Metal Base Plate	1
400-005-600	Electrical Assembly	1

Table 2: Bill of Materials for ABC Corporation

Part Number	Part Description	Quantity
700-008-900	Foam Insulation	As Required
110-012-130	Polymer Shell	1
140-015-160	Paint	As Required

## 2. Your Company Role

As the Supply Chain Manager for XYZ Aerospace, you are responsible for the oversight of all suppliers and subcontractors involved in the product, including their incorporation into the overall antenna as it is prepared for delivery to the end customer. The other manufacturer roles include quality, production, engineering, program management, and contracts.

Table 3: XYZ Aerospace Corporation Key Players and their roles

Role	Name	Description
Quality	Andrea Smith	Customer and Supplier Facing. Ensure Product meets Drawing Specifications
Production	Albert Green	Responsible for production of Element Assembly and Test Process Steps
Program Mgr.	Lauren McGinnis	Owns Profit and Loss for the product. Customer facing head
Engineering	John Edwards	Responsible for engineering development and drawings
Supply Chain Mgr.	George Banes	Owns all suppliers and subcontractors for the product
Contracts	Robert Ford	Customer and supplier facing to manage terms and conditions

Additionally, as the Supply Chain Manager for the end manufacturer, you need to be aware of the subcontractors' roles you may directly engage with, including quality, production, engineering, contracts, and other supply chain personnel.

Table 4: ABC Corporation Key Players and their roles

Role	Name	Description
Quality	Eugene Malloy	Customer Facing. Ensure Product meets Drawing Specifications
Production	Bill Grant	Responsible for Foam and Paint Process Steps
Engineering	Aagosh Patel	Responsible for engineering development and drawings for subcontractor processes
Supply Chain Mgr.	Mary Bluejay	Owns all suppliers for the subcontractor processes
Contracts	Ashely Richards	Customer facing. Manages terms and conditions and adherence to purchase order delivery dates

As the Supply Chain Manager, your primary task to kick the program off is to put forth a plan to complete the manufacturing of the antennas with a promised delivery date to the customer; the anticipated start date is January 1<sup>st</sup>.