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Case

BuildAir:

To the sky and Beyond

INTRODUCTION

On a September evening in 2008, Javier Marcipar, founder and president of the board of BuildAir, was returning home from his office in Barcelona (Spain), and he was happier than ever.

BuildAir began by selling many types of inflatable structures for events. They quickly evolved to focus on complex structures for large events. Although their structures were alluring, they had not been able to make their business economically viable. Marcipar was excited because they had just delivered a large inflatable hangar extension to LAN Chile for airplane maintenance operations. Yet this new order brought up a dilemma for Marcipar: should he continue to make improvements to the products in order to sell glamorous structures for events, while fulfilling orders from new sectors such as the one from LAN Chile, or should he refocus the company to sell inflatable structures and hangars exclusively for the aeronautical sector. If he were to take this second road, many issues needed to be addressed: quality, safety, regulation, etc. and many changes should be introduced in the way BuildAir had to do business, particularly in its approach to marketing and sales. Which road should he take?

AUTHORSHIP
CREDITS

This case was prepared by Professor **Jordi Vinaixa** and Research Assistant **Winnie Vanrespaille**, both at the Department of Strategy and General Management in **ESADE Business School - Universidad Ramón Llull**. The writing of this case study was supported by the EIT InnoEnergy, funded by the European Union (Specific Agreement No. EIT/EIT_InnoEnergy SGA2020/1).

Javier Marcipar

Javier Marcipar had always been rebellious and headstrong. He left the city of Santa Fe, Argentina, where he had been raised, to study Civil Engineering at the National University of Rosario, more than 100 kilometers away from his hometown. Being independently minded, Marcipar wanted to get a job to pay for university rather than receiving money from his parents. Determined to do so, he found himself a job at Ingeniería Delrío, working for Professor Delrío on the study of metallic structures. Marcipar reflected:

> I was learning a lot more by working in the studies of metallic structures than I was by attending university courses. By working for Professor Delrío, I had become a specialist on metallic structures.

During the Buenos Aires World Congress on Computational Mechanics (WCCC) in June 1998, Marcipar attended a conference about inflatable structures. It was given by Professor Eugenio Oñate from the International Centre for Numerical Methods in Engineering (CIMNE), a partnership between the Catalonian Government and the *Universitat Politècnica de Catalunya* (UPC). He found the conference so fascinating, that he approached the CIMNE professor afterwards. Fortunately for Marcipar, professor Oñate told him that they needed an engineer for a research project about inflatable structures for the European Commission. The noticeable enthusiasm of Marcipar convinced professor Oñate to give him a scholarship for a Master program in Numerical Methods at CIMNE, which would enable him to work on the research project. For Marcipar, the timing could not have been better. He would finish his degree in February 1999 and the project would begin in April of that year. This gave him some two months to get a visa and move to Barcelona, where the head office of CIMNE was located.

INFLAST and Space-to-plain

The objective of the research project of the European Commission, INFLAST, was to investigate what engineering knowledge, using numerical methods, could be derived from the technology of zeppelins. INFLAST was a consortium of nine companies of which CIMNE was responsible for the design of a new generation of inflatable structures for on-the-ground applications. After one year, they had developed a software, able to calculate the exact cutting pattern for nearly any possible design of inflatable 3D structures. It was a non-commercial software based on the Finite Elements Method that they named “Space-to-plain”.

As the INFLAST project ended, the team had proved the power of the software by making a paper mock-up of a small structure that they later transformed into a real pavilion for the next congress of the European Community on Computational Methods in Applied Sciences (ECCOMAS), held in September 2000 in the World Trade Center of Barcelona (*see* **Exhibit 1**).

Creation of BuildAir

In September 2000, by the end of the ECCOMAS congress, Marcipar, his loyal collaborator and architect Vicente Sarrablo and four other professors of CIMNE, including professor Oñate, were sitting in their newly developed inflatable pavilion, amazed by both its beauty and its brilliant design. The moment was an epiphany for Marcipar. He realized that he could do something more with the Space-to-plain software. That thought, together with his entrepreneurial mindset of never wanting to be "just" a researcher, led him to enroll in a master's program in Business and Technology at the Ramon Llull University, Barcelona. Making the pieces fit like a puzzle, he was even able to use his final master's project to develop a business model based on inflatable structures, designed with the Space-to-plain software.

In the beginning of 2001 and with the financial help of the four CIMNE professors and some siblings and friends, Marcipar felt enough equipped to create **BuildAir Ingeniería y Arquitectura**, his first spin-off and CIMNE's second. BuildAir's mission was to design and sell customized inflatable structures for temporary and itinerant event accommodations.

Accommodations for Events

Depending on the type and desired outcome of an event, an accommodation can be of utmost importance. Some clients organized events that already had a specific accommodation; other clients needed to obtain one that could either be an existing building or a temporary structure. BuildAir was obviously interested in this second type of client.

Many companies used specific agencies for the organization of their events because it was a time-consuming activity that needed special industry contacts.[1] Consequently, BuildAir had to contact these event agencies to present their inflatable structures as an alternative accommodation. Soon, Marcipar discovered that presenting his company at event fairs was the fastest way to contact these agencies.

BuildAir's Early Years

At the time BuildAir began, no other company in the world was making the same kind of large and complex inflatable structures. Although BuildAir's structures were more expensive than other venues, they were able to attract some agencies with the fact that their structures were transportable and customized (*see* Product Characteristics in **Exhibit 2**). Once convinced, event agencies contacted BuildAir whenever they had a special event project that could include an inflatable structure.

1. For further information, see http://eventmanagement.com/companies/

At that moment, BuildAir had to prepare a price quotation, containing a preliminary design that included some basic architecture and engineering elements. This was a costly step of the process, and Marcipar hired CIMNE engineers and architects to perform these designs.

BuildAir did not have all the resources to manufacture their designs, and they needed to outsource the assembly of the structures. The process went like this: first, they bought the PVC-coated fabrics. Then, they hired a company to cut the fabrics as calculated by Space-to-plain software. Lastly, they hired a manufacturer to sew all the parts together. For this final part of the process, Marcipar had to explain to the manufacturer exactly how to sew the parts together to make the structure strong and esthetic. The final product, together with the other parts that needed to be purchased (air pump and tubing, anchoring structures, etc.), were then transported and installed at the event location. These transportation and installation services were also outsourced to external contractors.

As a validation of Marcipar's idea that there was a space in the market for inflatable structures, BuildAir landed their first project almost directly after starting up. It consisted of a pavilion for events, held year-round, to commemorate the *Institut Gaudí de la Construcció*. For this project, BuildAir relied on a company, Tecnodimensión, to complete the manufacturing (sewing) of the pavilion. The result was a marvelous structure, and their first client was satisfied.

Competition

At first, Marcipar and his team were pleased that BuildAir had entered a sector with almost no competition. No other companies had software like Space-to-plain, so at the time, the manufacturers of inflatable bouncy castles made simple kids' bounce structures through trial and error. These were the same companies that BuildAir used to manufacture their designs, and in 2003, Marcipar realized that this could be a problem. After several meetings with an event agency, they submitted a bid for a new project of an inflatable pavilion for a food company. The structure requested was less complicated than they were accustomed to produce, but, since the cost of the structure was modest, Marcipar was quite sure that the client would hire them. However, when he did not receive an answer from the client and after some insistence, he discovered that the client had hired another company for the structure. At first Marcipar assumed that they had opted for the alternative metallic structure; he was very surprised to hear that they bought an inflatable structure nearly identical to the one BuildAir had offered, but directly from Tecnodimensión.

Unfortunately, this was only the first of a series of lost bids. By teaching their manufacturing process to its suppliers, BuildAir had created their own competition. Although those suppliers did not possess the Space-to-plain software, they were able to manufacture simple structures on their own based on the specifications that BuildAir provided.

Evolution of BuildAir in the Events Sector

The competitive landscape made Marcipar realize that they had to leverage ownership of the Space-to-plain software to gain competitive advantage. From that moment on, they focused on large and complex designs for glamorous events (*see* **Exhibit 3**). BuildAir grew into a company with some 10 employees (*see* **Exhibit 4**) and Marcipar remembered those years as a very interesting period:

> The software enabled us to make structures that no one else was able to and the results were magnificent. BuildAir produced some 80% of all the inflatable structures for events in Spain, but the market just was not that big.

Working in this direction, BuildAir was winning more projects than their self-created competitors were. Although they were still losing many bids to cheaper metallic structures, BuildAir was at least winning most of the projects for big inflatable structures for high profile events in Spain.

Until 2007, BuildAir was selling through event agencies, which managed a limited budget for the whole event and often picked the cheapest structures. Metallic structures were always significantly cheaper (up to 10 times) than customized, inflatable structures. Consequently, they had to deliver many designs for projects that in the end were never realized. At the time, BuildAir was procuring only some 10% of their offers, resulting in 2 to 3 projects per year; and they did not want to raise the prices of their structures. As Marcipar stated:

> If we would have increased our prices, we would have lost even the few projects we had.

Moreover, they had to pay a big part of their budget to the manufacturers, which led to very low margins per project -between EUR 8,000 for small structures to EUR 35,000 for larger ones. Therefore, not much revenue was left for BuildAir's added value activities (engineering and architectural services). In this sense, although they had a lot of work, the profits were not what they should have been and BuildAir was losing money (*see* **Exhibit 5**).

The Search for a Viable Business Model

BuildAir began as a spin-off with the knowledge and start-up money from CIMNE. Additionally, Marcipar had never worked full-time for BuildAir. He did not want to use the revenues of the company to pay his own salary. So he continued to work for CIMNE while establishing BuildAir. This made things increasingly more complex. Dependance on a public-sector partner can result in difficulties in decision-making. As Marcipar recalled, this was both good and bad:

> We have made bad decisions for being too scientific and for being committed to the university. It has made us take much longer paths to arrive at the right product for the market. On the other hand, we also have made some good decisions for not having industrial partners. An industrial partner would not allow a company to lose money for eight years.

After some years of attempting to build and improve the business, BuildAir still was not economically viable; the company was still losing money.

In early January 2007, Marcipar received the financial results of their last project, an inflatable structure for a L'Oréal event. It was probably the most magnificent structure they had ever made, yet they still lost money. BuildAir would soon celebrate its seventh birthday, but Marcipar did not feel like celebrating. They had enough work and sales went well, but due to the less-expensive alternative of metallic structures, they always had to keep prices low. Although they created ingenious structures, Marcipar was well-aware that the aim of a business is not to simply exist, but to make money. However, the terrible fact was, in Marcipar's own words:

> The more we sell, the more we lose.

The partners urgently needed to analyze the achievements of BuildAir and to make decisions about its future. What should they do to increase the profitability of BuildAir? Should they try to reduce costs by changing the production process? Should they reconsider outsourcing and insource of some of the processes? Or should they try to look for other revenue streams?

The first thing they thought about was to reduce costs, but this would be difficult since there was little flexibility of fabric types and manufacturers and little leeway was possible here. They could try to reduce the time spent on the preliminary designs for quotations by targeting only clients with a higher probability of buying, but this would not be sufficient to make profit. Simply raising prices was not an option since their current clients were not willing to pay higher prices for their structures. At that stage, Marcipar realized that it was time to make some changes to his current business model. Should BuildAir vertically integrate and become an event agency? Or should he start looking for other clients with an essential need for large or unique inflatable structures, those that require proprietary software and engineers and architects, either in the event industry or in another sector.

While he explored many different types of customers and although he could not find the right application for their knowledge and assets, it became clear to Marcipar that the best application of BuildAir's structures would be to protect large and expensive assets or events. Finally, in 2008, the answer came in the form of an e-mail from the airline company LAN Chile (*see* **Exhibit 6**).

LAN Chile

The Maintenance, Repair and Overhaul (MRO) services for LAN Chile discovered BuildAir's structures on the company website and saw advantages to service their airplanes in the Arturo Merino Benítez Airport in Santiago de Chile. They needed a large temporary hangar that would fit an entire airplane to expand their existing hangars. LAN Chile's urgent need for this kind of structure was so high -and the competition nonexistent-, that they did not even negotiate prices. However, by accepting the project, Marcipar was taking a big risk. In his words:

> At first, I felt like LAN Chile's request was a gift from heaven; but the innovative challenge also scared me a lot. If a project like this went wrong, BuildAir would not only lose a lot of money, but also our reputation.

However, Marcipar's faith that his inflatable structures could be used for the LAN Chile project led him to decide to accept it. The project was, in fact, a success (*see* **Exhibit 7**). Not only did they finally make profit, but they also found a satisfied client. Nevertheless, this project was relatively small and consisted only in an extension to a hangar; the requirements concerning safety, installations, flooring, and others were not as high as the aeronautical industry projects usually required.

MRO Services

Airplanes were so valuable an asset, that it was of outmost importance for airlines to have them flying as frequently and as full as possible. The estimated cost of having a grounded airplane was USD 150,000 per hour.[2] MRO services were required both to follow International Civil Aviation Organization (ICAO) regulations and to maximize the availability of the airline companies' aircraft.[3] In fact, the expenditure for MRO services was very high (*see* **Exhibit 8**). Previously, MRO services in the aeronautical sector were performed under simple temporary shelters, usually metallic structures combined with fabrics. However, since aircraft availability was becoming paramount, MRO hangars became increasingly important. The hangars had to be able to evolve in response to a dynamic work environment, while controlling both capital and operating costs, and continuously ensuring safety and other regulations. As stated in the maintenance program, almost all planned types of maintenance required a hangar (*see* **Exhibit 9**).[4]

Aeronautical MRO services could be performed either by airline companies themselves, or by third parties, called MRO companies. Although organizationally it was more practical for airlines to perform MRO services in-house, many airlines outsourced these services because building regulations often prohibited the construction of new fixed structures.[5] However, the operational costs for outsourcing could get quite high. For these reasons, both airlines and MRO companies often used temporary metallic hangars. But these structures could not simultaneously attain what the inflatable structures could: transportability and strength. Structures typically were either light and transportable or strong but difficult to move. Furthermore, metallic structures required internal pillars, which encumbered the entrance and movement of aircrafts inside the

2. IAG Cargo Magazine (2018). Aircraft on Ground: How a Technical Fault Can Cost Millions. Retrieved from https://iagcargomagazine.com/2018/07/03/aircraft-on-ground-how-a-technical-fault-can-cost-millions/#:~:text=When%20an%20aircraft%20is%20grounded,Boeing%20aircraft%20in%20operation%20today

3. Ackert, S. (2010). Basics of Aircraft Maintenance Programs for Financiers. Retrieved from http://aircraftmonitor.com/uploads/1/5/9/9/15993320/basics_of_aircraft_maintenance_programs_for_financiers___v1.pdf

4. International Air Transport Association (2018). Aircraft Operational Ability. 1st edition, Montreal – Geneva

5. Canaday, H. (2018). Small Planet Big Outsourcer Now, But That Could Change – MRO strategy for a two-hemisphere low-cost carrier. Retrieved from https://www.mro-network.com/airlines/small-planet-big-outsourcer-now-could-change

hangar. Inflatable structures could reach the maximum height needed (up to 37 meters), for maneuvering aircraft.[6]

Moreover, inflatable hangars were the easiest structures to install and move since there was no need for cranes or foundations. To relocate an inflatable structure, an operator only had to stop the pumps, put the fabric in containers (*see* **Exhibit 10**), transport and mount the structure again by fixing it to the ground with a simple anchoring system (anchoring bags, earth screws, resin-set anchor bolts, etc.) and restart the pumps to inflate the structure. An additional advantage of the diverse anchoring system meant that BuildAir's structures could be installed on any type of ground.

Developing a Business in the Aeronautical Sector

If BuildAir were to develop a business in the aeronautical sector, there were many challenges that Marcipar must face:

- The unions of the pieces of fabric (woven polyester cloth with PVC coating) would need to be stronger since the structures would be used for longer periods (up to six years) and would have to operate under more extreme weather conditions (wind, rain, heat, etc.). Accordingly, the manufacturing certificates were more stringent.
- The quality standards of the connections, made by the local manufacturers, were not always high enough and Marcipar foresaw they would need much more time explaining exactly how the fabric needed to be sewn together.
- A change of strategy to reach new customers would be needed. The aeronautical client had nothing in common with the customers they had in the events sector. Instead of going to event fairs, Marcipar would need to attend aeronautical fairs to introduce his company. Additionally, they would need to develop a completely new sales strategy and hire salespeople with knowledge and experience in the aeronautical sector to sell projects for MRO hangars.
- Finally, Marcipar believed that selling inflatable hangars to the aeronautical industry was going to be a "winner takes all" kind of businesses. First, because it was a global business, and second, because he thought there would not be enough projects to support similar competitors. If BuildAir were to shift to this new customer segment, their mission should also change to become the world's leading supplier of large inflatable hangars.

With these thoughts churning in his mind, Marcipar understood that to develop a business in the aeronautical sector he would have to make some important decisions. He knew that he must resolve significant dilemmas:

- Should he refocus BuildAir's business to sell hangars to the aeronautical industry?
- If so, what would be his business model and organization? Should he continue outsourcing the manufacturing process? Would he be able to successfully implement all these changes?
- Would the change of customer segment to airlines and MRO companies require BuildAir to stop selling glamorous structures?

6. For further information, see https://www.mahaffeyusa.com/industries/aviation/

Exhibit 1. *Pavilion for the ECCOMAS congress at the World Trade Center of Barcelona*

Exhibit 2. *Product Characteristics of BuildAir's Inflatable Structures*[7]

Nr	Characteristics of BuildAir's inflatable structures
1	Customizable structures (different forms and colors, extendable, door elements possible…)
2	Easily and rapidly transportable (no foundations required)
3	Protect environment from external factors like theft and weather (can resist up to 150 km/h wind or snow load up to 100 kg/m²)
4	Fabric structure: eliminates corrosion, better passage of radio electrical signals
5	Temporary structure so no building permit needed
6	Very large structures without internal pillars (up to 75 meters width, 37 meters high and without length limits)
7	Long lifetime for temporary structures (more than 6 years)
8	Short delivery (some months) & mounting time (some days)

7. For further information, see http://www.buildair.com/

Exhibits Section

Exhibit 3. *Pavilion (1,700 m²) of BuildAir for the festival of Fashion, Cinema and Arts of 2006 in Barcelona*

Exhibit 4. *Organization Chart of BuildAir*

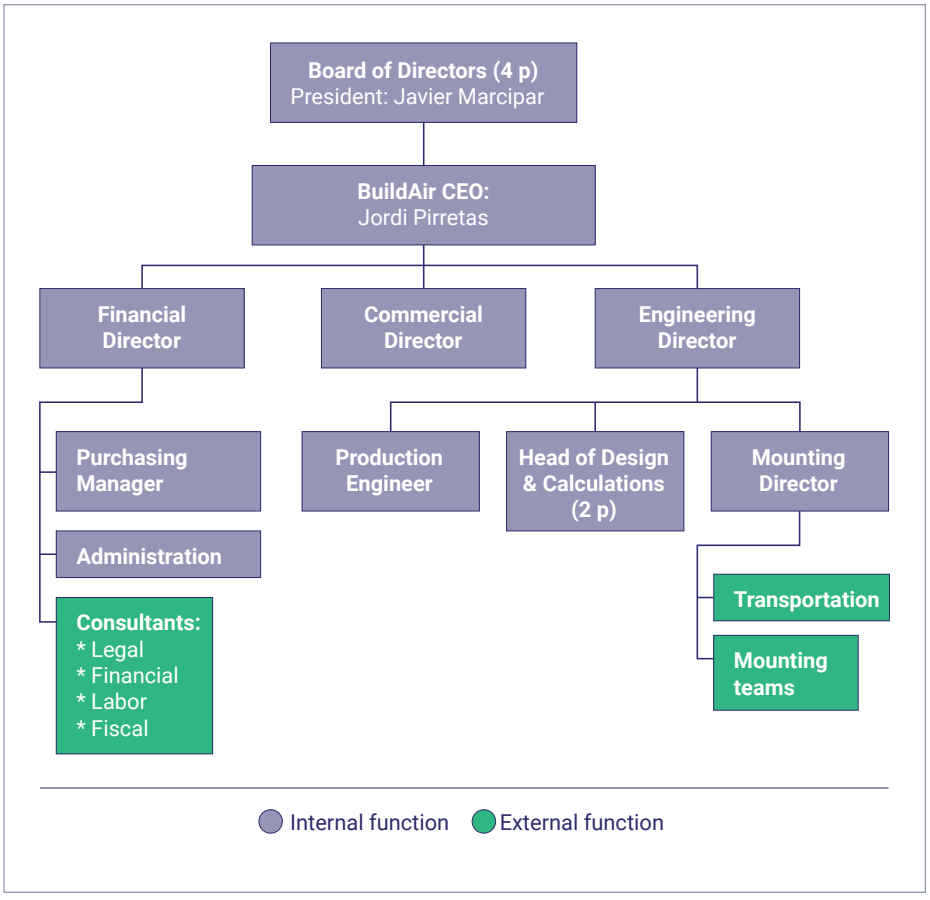

Exhibit 5. *Profits and Losses of BuildAir 2001-2005 (in EURs)*

	2001	2002	2003	2004	2005
Net revenues	100,500	86,000	191,500	106,000	188,000
Expenses (*)	110,000	137,000	263,500	150,000	211,000
Profits					
Losses	**(9,500)**	**(51,000)**	**(72,000)**	**(44,000)**	**(23,000)**

(*) These expenses include all direct and indirect costs, as well as amortization of fixed assets.

Exhibit 6. *LAN Chile e-mail*

MRO-Hangar LAN Chile Inbox ×

11:28 (2 minutes ago)

Dear Mr. Marcipar,

Let me first present ourselves to you. We are a Chilean airline Company, based in Santiago (Chile). In our base we are currently already performing MRO-services for our airplanes, but our current hangars are too small to cover the complete airplane.

By chance, we discovered on the internet that you were constructing inflatable structures for events. Now, we were thinking that this type of structures could help us to extend our current hangars as to be able to fit also the tail section of our airplanes. We were thinking about an inflatable structure on wheels so that we could move the structure to our different hangars without having to deflate it.

Would it be possible for your Company to supply us with such a structure?

Looking forward to your answer.
Kind regards,

LAN Chile Company

Exhibit 7. *Hangar for LAN Chile (Dimensions: 45 m. length, 20 m. width, 10 m. height)*

Exhibit 8. *World Spending on Maintenance, Repair & Overhaul (MRO) Services*[8]

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020
Line Maintenance	8.5	8.2	8.5	8.9	8.0	7.3	8.1	8.3	7.8	9.0	12.2
Components	6.9	6.7	6.9	7.2	7.4	7.9	8.7	9.0	7.8	9.8	13.2
Engines	10.4	10.5	10.1	10.7	13.5	17.1	18.8	18.5	18.0	21.2	26.0
Heavy Maintenance and Modifications	12.0	10.7	11.6	11.5	10.0	8.6	9.6	9.9	8.7	10.1	13.8
TOTAL:	**37.8**	**36.1**	**37.0**	**38.3**	**38.8**	**41.0**	**45.1**	**45.7**	**42.3**	**50.1**	**65.3**

8. International Air Transport Association (2011). Airline Maintenance Cost Executive Commentary. An exclusive Benchmark Analysis.

Exhibit 9. *Aircraft Availabilities, MPD and Hangar Requirements iv*

Planned Maintenance	Hangar required	Impact on Operations
Line	No	No
Light	Yes/No*	Yes/No*
Base	Yes	Yes/No*
Heavy	Yes	Yes

* Yes/No: depends on airline organization and maintenance program

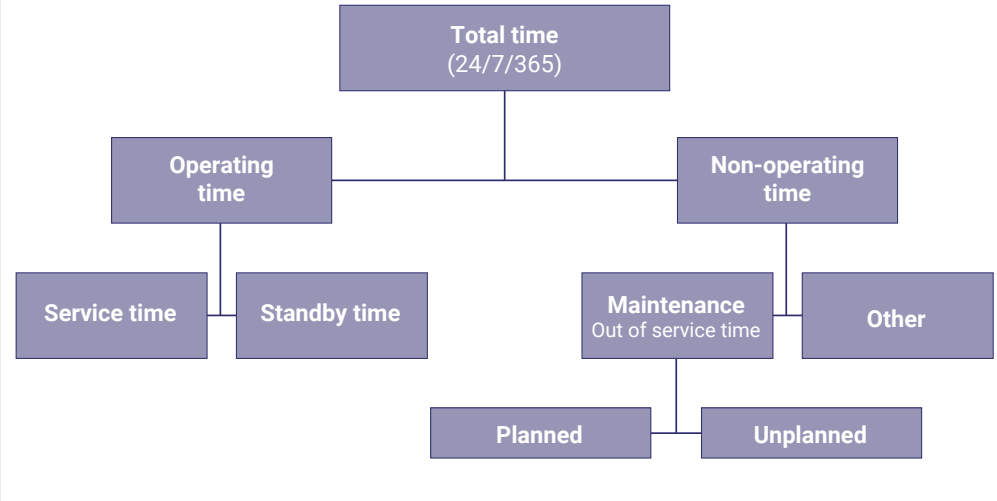

Exhibit 10. *BuildAir Structure Packed in a Standard Sea Container for Transportation*