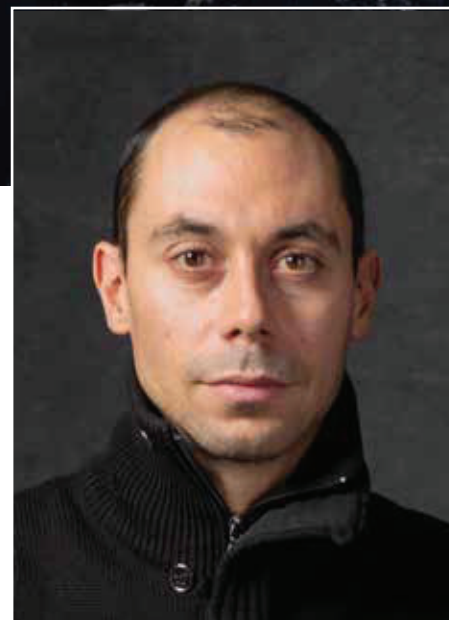




# Aviospace The Italian Aerospace & Defense Company

## interview with Eng. Gambacciani



Aviospace is an Italian company founded in 2004, active in the Aerospace & Defense industrial sector. The company headquarters is in the centre of Turin and employs about twenty people: most of them are qualified and skilled engineers, who work on the development of Aerospace Systems, from the conceptual phases, research and development, to the prototypes and flight parts, in partnership with major international agencies.

We met with Aviospace engineer Giovanni Gambacciani to learn about the essence of Aviospace and the challenges it faces in industry.

Gambacciani's enthusiasm towards his work and the industry is evident after the first question. Almost 40 years, since he graduated, with full marks at the University of Florence, as a mechanical engineer, Gambacciani began his career in development of diesel engines at FIAT-GM Powertrain (now FCA) where he gains a solid experience on CAE both in the fluid and structural environment.

Gambacciani moves from automotive to aerospace, joining Thales Alenia Space in the development of structures for space systems, focusing his work on structures, mechanisms, materials and all simulation methodologies and result testing. In 2010, he joins the engineering team of Aviospace, part of the Airbus Group (owner of Aviospace from 2010 to 2016), as Head of Thermo-structural division. Leading the team based in Turin on numerous exciting space transport projects, including: launchers, dwelling modules, capture of space debris, robotics, support to the ISS, etc. Some of which have been integrated or planned into the mission



launches. In the past few years, the company has reverted back to an independent company and it is undergoing a transformation, facing new challenges within new areas of aeronautics & defense and in industrial sectors with high technological content.

### Eng. Gambacciani, how do you approach a new project?

For us a new project typically consists of a complex system with very precise objectives and requirements. Very rarely, can we draw from our corporate or global background, since we are typically required to solve problems that have never been addressed before, or involving an environment not yet studied or understood. To be able to get to grips with such projects in an efficient way, we try to approach every challenge in the most integrated way possible, without splitting disciplines and immediately generating

an overall architecture that can satisfy the requests in a synergetic and integrated way.

However, in the space sector, due to a continuity trend in relation to past activities, customers and agencies tend to unpack everything in disciplines and in working groups. Therefore, it forces us to conceptually separate systems depending on their physics, or perhaps to deal with an aspect without being able to do the same with a complementary overview. As in Ade, for instance, the design is usually separated from analysis (attributed to different companies with different approaches), thus extending the development time without reaching a proper optimization. This approach generates a great limit, justifiable only in very large programs (for example when dealing with the development of a whole launcher). I hope that in the near future we will be able to evolve towards a different approach, fully exploiting the most modern methodologies and software tools that have broken a lot of communication barriers.

### **In your opinion, what is the contribution of the Internet of Things in the Aerospace sector?**

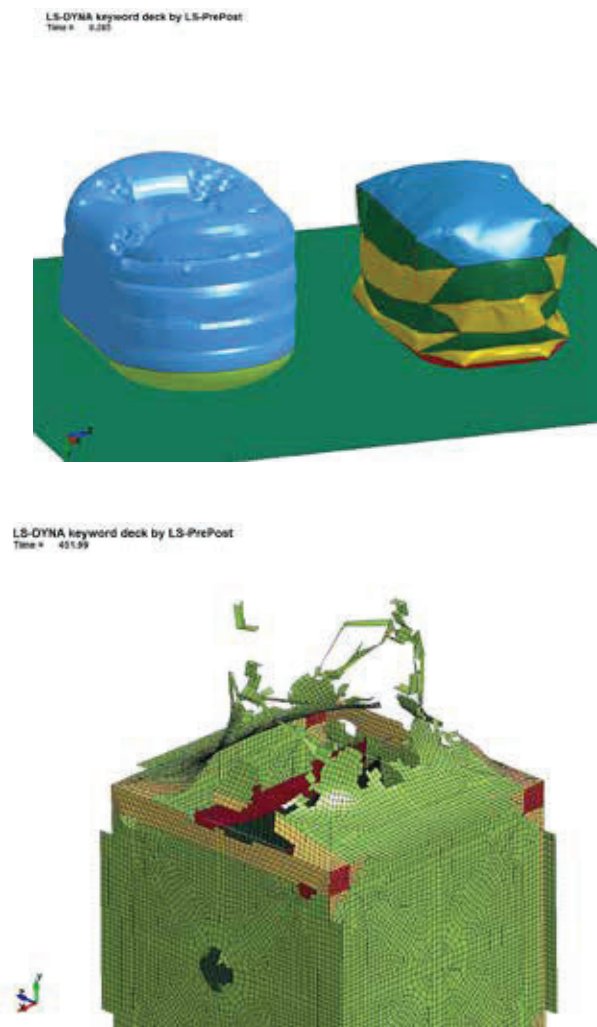
In reality aerospace has been a precursor of the IOT. Most of the facilities have always been equipped and constantly monitored either directly or through meta-models. Today we are developing structures integrating sensors during the construction phase. This can be easier for a composite part, while more challenging when dealing with metal or ceramic components that must work at very high temperatures.

### **Is Aviospace involved in IoT developments?**

Much more than involved. For example we are developing a system using inkjet technology to print electronic circuits directly on the structures. Such specific inks will allow for the status of the structure itself to be monitored, transferring heat, collecting and transmitting data, etc. In the space world, all systems are fully equipped but in recent years we have been experimenting the simplification of these means to acquire information. In a few words we are moving from the traditional technology based on harnesses, to systems that transmit data and signals in wireless mode: the complexity and the cost are reduced but there is an increase in the transmission difficulties. Unfortunately, the space environment is very complex in terms of radio emissions and we have to add the fact that the spatial structures are “closed” ones, often made of metal, which tends to shield the radio emissions.

### **What is the relevance and use of simulation activities in Aviospace and in your sector?**

The simulation and the calculation method for finite elements are born with the space race, and still today represent an unavoidable aspect of any space exploration program, but there are two different approaches. In the USA, the tendency is to do more experimental tests than simulations, relegating these to those cases not testable to ground, while in Europe we very often employ experimentation only to validate the developed virtual models. In my opinion, it's necessary to find a good compromise between



experimentation and simulation, and that is what you are trying to reach in Aviospace. Intense testing campaigns may need too much time and money, while virtualization without the contribution of a solid experimental data is little more than a videogame. For example if I do not know the precise characteristics of a material in a certain environment, I cannot simulate its behavior. In any case, any component must be qualified in an experimental way before the flight.

### **What are the goals of Aviospace and Giovanni Gambacciani for the near future?**

The company is currently approaching new projects in markets that were previously considered as marginal to space. Therefore we are expecting new challenges and challenges are never trivial. Even though we have a very good background, with aerospace at the highest level of engineering and we are used to facing extreme problems of any kind, but it is not so obvious how we can transfer knowledge to other areas and correctly meet other markets expectations.

Hand in hand with this business transformation, I would like, even my personal competencies and those of the working group I coordinate, to evolve accordingly, while maintaining the same approach and hunger for “excellence” that has characterized our work until now and that is essential for those who work in the space field, where nothing can be left to chance.