

## Editorial – Is the future of aviation in space?

Dear members of the International Aerospace Community,

Flying like birds and leaving Earth's atmosphere behind have long been the object of man's dreams. Thus, when balloons braved the skies and machines heavier than air began to cross our planet from one end to the other, new plans emerged: to orbit the Earth, to establish a lunar colony and to inhabit Mars. On 12 April 1961, cosmonaut Yuri Gagarin made his historic flight on board the spacecraft Vostok-1. The flight lasted only 108 minutes, but it proved long enough to change the course of aerospace science: the starry sky that had long challenged human imagination was explored by a manned mission for the first time. In that same decade, another historic achievement marked space conquest: on 20 July 1969, astronaut Neil Armstrong was the first man to step onto the lunar surface. Since then, several other missions have extended man's reach into space. Inhabiting Mars, however, remains an unfulfilled dream.

Neither of these achievements would have been possible if space had not been previously mastered through the knowledge gained from the exploration of Earth's atmosphere with balloons, airships and airplanes. It was these investigations which allowed for the accumulation of enough experience to dare reach beyond. And mankind has indeed reached *beyond*: today, in addition to the classic space vehicles, there is a growing influx of *spaceplanes* (used by the private industry to take ordinary citizens into orbit).

In much the same way as the first flights in aviation history, the exploration of the cosmos by space tourism is still restricted to a small group of individuals. Taking into account the evolution and the ever-growing popularity of aviation – nowadays, more than 2 billion airline tickets are issued annually – a similar growth is expected to be seen in space exploration.

Take a straight line upwards and we leave behind terrestrial ground with its mountains and seas, to break through the different atmospheric layers until the air disappears altogether and we reach the outer vacuum. It has been a long path, full of risks, fear, successes and failures. From the machines lighter than air to those heavier, from spacecraft to future planetary colonies, we follow our explorer instincts, driven by the challenge and our inevitable quest to overcome.

Having briefly reflected on the past and future of aviation, we move on to present the texts that have been put together in the seventh issue of AVIATION IN FOCUS. Of the seven articles featured in this edition, two belong in the Aviation and Language section, three in the Aviation and Safety/Security, Aviation and Technology, and Aviation and Law sections, and the remaining two in the Aviation and Space section. As well as the articles, this issue features an interview with Dr. Joan Vernikos, former Director of Life Sciences at NASA (1993-2000), on the topic of gravity. Entitled **Gravity: learning about life on earth by going into space**, the interview was undertaken by Prof. Thais Russomano, MD/PhD and coordinator of the MicroG Centre (PUCRS/Brazil).

The first article, **The importance of the English and Spanish languages in civil aviation training** – written by Adriana Teixeira de Castro, Camila Souza de Andrade, Fernanda Alves e Silva and Gabriella Mikaloski Pinto da Silva, from the National Civil Aviation Agency of Brazil (ANAC/Brasil) – talks about the importance of proficiency in English and Spanish in the training of aviation professionals, or, more specifically, in the training of the employees of the Brazilian agency (ANAC).

The second paper, **Aviation humor: precious cargo, dangerous goods**, was written by Patrícia Almeida de Rezende (ANAC) and Mariana Marques de Moraes (UFRJ) examines aviation humor through a brief survey of the themes broached, of the linguistic resources used in the production of humor, and of the semantic and contextual implications able to provoke laughter. The results of this study corroborate that jokes about passenger behavior are among the most frequent ones.

In the third paper, **Should we pursue inter-rater reliability or diversity? An empirical study of pilot performance assessment**, David E. Weber (Griffith University/Australia), Wolff-Michael Roth (University of Victoria/Canada), Timothy J. Mavin (Griffith University/Australia) and Sidney W. A. Dekker (Griffith University/Australia) explore the reasoning behind this assessment process as stated by experienced pilots who evaluate safety-critical pilot performance. Using a theoretical model of performance, three pairs of airline captains assessed a captain and a first officer in two video scenarios. The results show that assessors apply the same or similar reasons to arrive at different assessments or use different reasons to arrive at the same assessment. In addition, conclusions about inter-rater reliability and efforts intended to increase it are drawn here.

The article under the Aviation and Technology section, **The Development of a Database for the Study of Medical Occurrences in the Brazilian Airspace** – written by Ricardo Vieira Santos, Ana Eliza Pereira Bocorny, Ricardo Bertoglio Cardoso, Thais Russomano, and Helena Willhelm de Oliveira, from the Microgravity Center (MICROG Center/PUCRS/Brazil) – discusses the development of a database that supports studies on medical occurrences aboard aircraft operating in Brazilian airspace. To that end, the airports used by Brazilian airlines, along with the referral hospitals near these airports, have been mapped, and the most pivotal medical events aboard aircraft have been identified. By these means, this work intends to better outline the reality of airlines in regards to their medical care on board.

**Aircraft noise: the issue of noise pollution in Porto Alegre examined under a legal light**, written by Justine Junges Dal Pozzo (PUCRS/Brazil), is the following article, in the Aviation and Law section. This paper discusses aircraft noise, a type of pollution extensively legislated which is gaining prominence in the vicinities of airports on account of the legal responsibilities it entails. The case of Salgado Filho International Airport (Porto Alegre/Brazil) is the focus of this study.

The section Aviation and Space brings two texts. The first one, **:envihab: Facing intriguing challenges of human spaceflight and inspiring future challenges of medicine on earth – the brand-new research facility of the DLR Institute of Aerospace Medicine of the German Aerospace Center in Cologne, Germany** – written by Bernhard Koch, Elke Rabbow, Dirk Poddig, Friederike Wuetscher and Rupert Gerzer, from the DLR Institute of Aerospace Medicine/Germany – aims to present a new modularly designed facility for medical research called *:envihab* (= environmental habitat). Its purpose is to study under strictly standardized conditions the complex problems presented by a closed life-support system and the interactions between humans and the environment, and possible countermeasures. The main goal of *:envihab* is to contribute, through hypothesis-driven research, to scientific insight and technological progress so as to provide solutions to the most important issues related to life on Earth. The research facility aims to deliver industry-relevant results of scientific progress along with economic advantages and to encourage public debate about important future-oriented questions regarding human life. The collected data can then be used as a starting point for modeling tasks that will be required in all areas of medicine in the future.

The second text, **Haemodynamic Monitoring in Space**, was written by Sergi Vaquer (Critical Care Center. Parc Taulí Hospital/Spain) and J. Mesquida (Critical Care Center. Parc Taulí Hospital/Spain). This paper seeks to provide an overview of the physiological

determinants of cardiovascular function and its adaptation to weightlessness, as well as précis the pathophysiological phenomena that define shock states. It also aims to review the existing haemodynamic monitoring capabilities in orbit and to explore new points for their improvement.

We do hope you enjoy reading the texts that have been put together in this issue of the journal.  
Have fun!

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Prof. Dr. Cristiane Krause Kilian  
Prof. Dr. Thais Russomano

Editors