MEETING REPORT

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REPORT ON THE 69TH INTERNATIONAL CONGRESS OF AVIATION AND SPACE MEDICINE

Stefan GAŹDZIŃSKI[1], Katarzyna SOWA[2]

1 Creative Neuroscience Lab – CNS Lab, Military Institute of Aviation Medicine, Warsaw, Poland
2 Department of Simulator Studies and Aeromedical Training, Military Institute of Aviation Medicine, Warsaw, Poland

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Author's address: S. Gaździński, Military Institute of Aviation Medicine, Krasińskiego 54/56 Street, 01-755 Warsaw, Poland, e-mail: sgazdzinski@wiml.waw.pl

Introduction: This report provides an overview of our attendance at the 69th International Congress of Aviation and Space Medicine (ICASM), held in Abu Dhabi, UAE. We have highlighted developments that are of particular interest to our institution. In certain cases, we have expanded descriptions and added relevant links to literature. The conference took place from 27th to 29th October 2023 and aimed to bring together experts and professionals in the field of aviation and space medicine to discuss the latest research, advancements, and challenges in science, medicine, and industry.

Keynote presentations: The conference opened with a series of captivating keynote presentations by renowned experts. Of great interest was, for example, the establishment of norms for genetic research in space and summaries of space programs concluded decades ago; the latter has already proven helpful in conducting studies in simulated microgravity on our human centrifuge.

Scientific sessions: The conference featured an array of scientific sessions covering a wide range of topics within medicine, including 10 sessions and three lunch symposia. The program included:

Plenary Session: Ernsting Panel
Session 1: Space Medicine
Lunch Symposium: Women in Aviation
Session 2: Aviation Medicine: Regulations, Travel, Safety
Session 3: Aviation Medicine Mental Health
Session 4: Space: The Space Medicine Physician
Industry Lunch Symposium
Session 5: Aviation Medicine Human Performance
Session 6: Aviation Medicine Continued Human Performance and Ophthalmology
Session 7: Space Medicine
Lunch Symposium: Musculoskeletal
Session 8: Aviation Medicine
Session 9: Aviation Medicine Medical Specialties

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In the first lecture of the conference, Dr. Joseph Dervay discussed physiological adaptations to weightlessness in space, as well as countermeasures undertaken throughout the history of spaceflight. Interestingly, it was noted that pharmaceuticals that stimulate DNA repair, such as B-group vitamins, are the best remedy against space radiation. Furthermore, spacesuits used for spacewalking can also serve as treatment vessels for decompression sickness that may occur during a spacewalk.

In subsequent talks, it was stressed that fatigue can lead to judgement impairment, including attentional lapses. Individual differences in fatigue vulnerability were discussed, with ongoing research into genes associated with fatigue resistance. Caffeine, a cool environment, bright light, an upright posture, and 10-15-minute breaks can serve as fatigue countermeasures. Managing rest is especially important on ultra-long-range commercial flights, such as from Singapore to New York, USA. Low pressure, low humidity, noise, and vibrations exacerbate fatigue. People typically underestimate their fatigue, and a strong drive to complete missions can worsen their self-assessment.

The most interesting topic covered in the second session was the Translational Research Institute for Space Health (TRISH), which funds scientific studies and technologies to help keep astronauts safe and healthy on deep space missions to the Moon, Mars, and beyond (https://www.nasa.gov/hrp/the-translational-research-institute-for-space-health-trish/). They employ multi-OMICS approach (genome, epigenome, transcriptome, proteome, metabolome, and microbiome approach) to evaluate threats and remedies for deep space missions. The standardized methodology has been used in a number of high impact manuscripts [1-7].

Session 3 highlighted a cognitive wellness and stress reduction program developed for Emirates Airlines pilots. This program, based on mindfulness approach, was evaluated through objective psychological tests, and individual results were shared with participating pilots to confirm their individual improvements. This approach has motivated the pilots to engage actively in this program.

Other presenters emphasized the need for a safety positive culture in the flight industry. They argued that clear return-to-work pathways must be established to prevent industry employees from concealing health conditions. Specifically, mental health issues must be destigmatized. The prevalence of depressive disorders and SSRI medication use among US Army personnel and American aviators reflects general population trends. In response, the US army implemented an SSRI antidepressant waver policy to ensure that affected personnel do not suppress treatable mild disorders.

The remaining sessions featured a range of scientific sessions covering diverse topics within aviation and space medicine. Of special interest, with respect to the research conducted at the Military Institute of Aviation Medicine, were the following three topics: 1) reanalysis of physiological data acquired on the skylab station in 1973 and 1974. During these missions, daily records of nutritional intake, body mass index, and vitamin and mineral supplementation for three astronauts were collected. Their blood samples, urine and feces were dried, frozen and brought back to Earth. Reanalysis of the data with refined software revealed some metabolic, energy consumption, mineral, and hormone changes not apparent in the earlier analysis (see 03-05 on page 37 in the abstract book). 2) use of artificial intelligence (AI), i.e., principal component analysis and decision trees to identify mild hypoxia based on based on EEG signal power during simulated flight with sensitivity >0.83 and specificity >0.91 (abstract 02-12 on page 29 in the abstract book), 3) establishing that hypobaric hypoxia affects cognition more than normobaric hypoxia; testing involved short-term memory, arithmetic calculations, visual and auditory vigilance, and executive timesharing required to perform the tasks simultaneously (02-13 on page 30).

Poster presentations

The conference included a poster session where researchers and practitioners showcased their work. The posters covered a diverse range of topics, including aerospace physiology, aviation medicine, and space psychology applications in aerospace settings. MIAM presented a poster entitled “Utilization of Human Centrifuge to Simulate Acceleration Profile of Rocket Launch and Atmosphere Re-entry, as well as Bobsled Track Experience: Proof of concept”.

Networking and collaboration opportunities

The 69th International Congress of Aviation and Space Medicine fostered an environment conducive to networking and collaboration among attendees. Throughout the event, numerous formal and informal networking sessions allowed participants to connect with experts in the field, exchange ideas, and establish potential collaborations. The conference also facilitated interactions with industry representatives, government agencies, and research organizations, providing a platform for knowledge sharing and partnership development.

Industry exhibition

A dedicated exhibition area housed industry-leading companies, research and educational institutions, and technology providers. Exhibitors showcased their latest advancements in aerospace medicine, medical equipment, and aviation safety tools (i.a. flight simulators). This exhibition provided attendees with valuable insights into emerging technologies and opportunities for collaboration between academia and industry.

CONCLUSION

The conference successfully contributed to the overall development and promotion of aerospace medicine, paving the way for future research collaborations and advancements in the industry. Abstracts from conference are available online: https://www.iaasm.org/members/documents/ICASM23-Abstract-Book.pdf.

AUTHORS' DECLARATION

Manuscript preparation: Stefan Gaździński, Katarzyna Sowa. The Authors declare that there is no conflict of interest.

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