



## The Australasian Society of Aerospace Medicine

### **“Developing Australia’s Space Industry”**

#### **The House of Representatives Standing Committee on Industry, Innovation, Science and Resources**

January 2021

This submission relates to the following areas outlined in the Committee’s Terms of Reference:

- Development of space satellites, technology and equipment;
- International collaboration, engagement and missions;
- Commercialisation of research and development, including flow on benefits to other industry sectors;
- Future research capacity, workflow development and job creation.

The submission acknowledges the Committee’s focus on methods the Australian Government can undertake to support and encourage the space industry while preserving and protecting the space environment.

### **Background**

The history of the Australasian Society of Aerospace Medicine began at the inaugural meeting of the Special Group on Aviation Medicine of the British Medical Association of Australia held in Melbourne, Victoria in 1949. The organisation grew in size over subsequent years until the Special Group's name was changed in 1962 to The Aviation Medical Society of Australia. In 1968, the Society held its first scientific symposium at the University of Adelaide, and in 1972 hosted the Second International Meeting on Aerospace Medicine in Melbourne. The Society was renamed the Aviation Medical Society of Australia and New Zealand (AMSANZ) in 1972 and then formally incorporated in 1978. In 1988 the 36th International Congress of Aviation and Space Medicine (ICASM), was held in conjunction with the Society's Annual Scientific meeting in Brisbane, Queensland. In 1996, the Australian and New Zealand branches of the Society split into two distinct legal entities with similar names - The Aviation Medical Society of Australia and New Zealand, and The Aviation Medical Society of Australia and New Zealand (New Zealand Inc.). This situation was resolved in 2003 when AMSANZ changed its name to the Australasian Society of Aerospace Medicine (ASAM).

Today the Australasian Society of Aerospace Medicine has 870 members from all over the world. The Society also produces the Journal of the Australasian Society of Aerospace Medicine twice a year, which has been a peer-reviewed publication since 2004.

## Space Medicine

Space Medicine has been fundamental to human spaceflight since the first manned spaceflights in the 1960's. The area is well recognised within the spaceflight communities of North America, Europe, Russia and Japan as crew health is fundamental to crew performance and mission outcomes. Within Australia, Space Medicine is a less known specialisation, however, as a nation we are home to several organisations and individuals who are recognised internationally as leaders in the field.

The Australian Space Agency (ASA) has recently recognised the Space Medicine expertise, skills and capabilities that exist within Australia and have formed the Space Medicine Technical Advisory Group which is exploring Australia's national capacity to contribute to the field. As the peak organisation for Space Medicine professionals within Australia, ASAM has been proud to partner with the ASA to develop a model of the competitive advantages that Australia offers to the field more broadly.

ASAM has also been proud to partner with the following organisations in the field of Space Medicine:

- ***Australian Antarctic Division*** – support for the world leading Space Medicine research and technology testing undertaken by the Polar Medicine Unit of the Australian Antarctic Program. After more than 30 years of collaborating with NASA, and 75 years of providing medical care to remote and isolated groups in a space analogue environment, the Polar Medicine Unit has become an international centre of excellence for Space Medicine, and ASAM is proud to support their work.
- ***The University of Tasmania*** – developing and hosting an internationally unique Masters level Space Medicine course, and a broader Massive Open Online Course (MOOC) for the Healthcare in Remote and Extreme Environments program.
- ***Centre for Antarctic Remote and Maritime Medicine*** – support for the development of Hobart as an international Space Medicine hub.
- ***Tertiary sector*** – hosting grants and scholarships to support Space Medicine research.
- ***Academia*** – publication of the Journal of the Australasian Society of Aerospace Medicine (JASAM) to highlight Australian research in the field.

## Terrestrial application

Although Space Medicine is focused on supporting human spaceflight, there are a range of terrestrial applications which are particularly applicable to Australia.

### Medical training

Most astronauts have limited medical training prior to entering the astronaut corps, however, they all undergo upskilling to support the provision of remote medical care to their colleagues during flight. Australian healthcare practitioners are world leaders in the provision of medical training to support rural and remote populations, and as international space agencies begin longer duration missions beyond low earth orbit, the opportunity exists to leverage the lessons learned in human spaceflight to provide further advances in medical care to rural and remote Australians.

### Remote medical support

Telehealth plays an important role in human spaceflight, for preventive health, healthcare monitoring and the management of medical emergencies. Australia is a world leader in telemedicine and significant national benefit could be achieved by adapting telemedicine technologies used in human spaceflight to terrestrial populations in rural and remote Australia.

### Psychological support

Remote psychological support is a key component of modern human spaceflight due to extended periods of psychological stress experienced by astronauts. Within regional, rural and remote Australia patients face significant challenges with accessing high quality psychological services. Utilising tools and techniques from the remote psychological support model developed for human spaceflight has the potential to improve the psychological support available for regional, rural and remote Australians.

### Food and nutrition

As human spaceflight extends beyond low earth orbit, food and nutrition become increasing important considerations. Food will be required to have a longer shelf life and an increased nutritional content. Utilising this technology terrestrially would benefit Australian Defence Force operations and humanitarian and disaster relief initiatives.

### Radiation protection

Radiation exposure poses significant challenges for longer duration spaceflight due to the potential short- and long-term biological consequences for astronaut crews. Radiation monitoring and protection technology developed for the Space Medicine field would benefit Australian radiation workers and Defence Force personnel.

### Autonomous therapies

As astronauts move beyond low earth orbit they will require improved autonomous technology as increased latency in communication will result in greater self-reliance of the crew. These technologies within both health and engineering could significantly advantage rural and remote communities within Australia.

### Bioinformatics and data analytics

Predicting and analysing medical data to treat or prevent medical events before an issue becomes significant will be essential for safe long duration human spaceflight. Implementation of these technologies across Australia could lower the burden of disease within communities and reduce the costs associated with extended periods of hospitalisation for preventable medical events.

## **What comes next?**

Individuals and groups within Australia already lead the world in many of the areas noted above. The advent of the Australian Space Agency and their alignment with NASA's recent Moon to Mars initiative provides the opportunity for those groups to contribute to the field of Space Medicine on the international stage, and in doing so, provide significant advantages for Australian society.

Although ASAM strongly supports these initiatives we also recognise that funding and unification of the field within Australia remains a challenge. We would encourage and welcome the development of a federally supported Australian organisation that could coordinate the research and development of technologies and initiatives to support long-

duration spaceflight. In the United States, the Translational Research Institute for Space Health (TRISH) is funded by NASA as a cooperative consortium that fulfils this role and collaborates directly with the space agency.

With world leading technology and respected international experts already living and working within Australia, we would recommend that the House of Representatives Standing Committee on Industry, Innovation, Science and Resources considers the development of an Australian Clinical Research Institute for Space Health. In a similar manner to TRISH, this organisation should be a standalone organisation, funded by the Australian Space Agency, and designed to promote Australian excellence in the field. This unifying organisation would better coordinate individuals already working in the field while also providing vision and oversight for how technologies and research could be utilised in a terrestrial setting to improve and support Australia.

Dr John Cherry

Director – Australasian Society of Aerospace Medicine (ASAM)

Chair – Space Life Sciences Committee, ASAM