75th International Astronautical Congress (IAC), Milan, Italy, 14-18 October 2024.

IAC-24-E11.2

Building Tomorrow's Space Workforce: A Design-Thinking Approach

Darcey Watson[a], Mandi Dimitriadis[b]

[a] The Andy Thomas Space Foundation, Level 3, McEwin Building, Lot Fourteen, North Terrace, South Australia, Australia 5000, d.watson@andythomas.foundation
[b] *Makers Empire, Suite 30, Marnirni-apinthi Building, Start Up Hub, Stone & Chalk, Lot Fourteen, North Terrace, Adelaide, South Australia 5000, mandi@makersempire.com*

Abstract

Providing unique and impactful learning and development opportunities for both teachers and students is critical to exposing them to the breadth of career opportunities available, particularly across rapidly developing industries, such as space. With a strong heritage but a comparatively new position as an economic and workforce development industry of the future, teachers from across Australia remain relatively unaware of the potential pathways for their students. As such, Australia is in a unique position to upskill and empower teachers and students simultaneously, ensuring that both groups benefit from enriching learning and development opportunities.

As part of the Andy Thomas Space Foundation's Education Fund, The Kids In Space National Program, now in its second year, is an Australian-first program designed to inspire the next generation of space workforce leaders. In engaging this cohort, the program targets both teachers, through accredited professional development, as well as students, utilising design-thinking principles to address current and future space-related challenges in Australia. This program, delivered by Makers Empire, will in 2024, build on the success of the first year of activities, which impacted around 10,000 primary and middle school students, hundreds of teachers and 70+ schools in every state and territory across Australia, as co-sponsored by the Australian Space Agency.

The 2024 program has already experienced a 29% increase in applications from across the nation. With additional funding secured through industry partners, the program will increase its impact to an estimated 100 schools. Results from the initial national rollout showed that 96% of participating teachers are now confident with space education. With additional metrics investigating career awareness included in the second-year rollout, further definition around space career awareness and the development of optimal education strategies will be obtained.
Keywords: Space Education, Design Thinking, Australia, Professional Development, Inspiration, Innovation

Acronyms/Abbreviations

ATSF or The Foundation: The Andy Thomas Space Foundation
ME: Makers Empire
GDP: Gross Domestic Profit
STEM: Science, Technology, Engineering, Mathematics
ICSEA: Index of Community Socio-Educational Advantage

1. Introduction

The Andy Thomas Space Foundation, Australia's National Space Not-for-profit, provides educational opportunities from Primary through to Postgraduate, PhD, and Beyond alongside industry engagement and outreach activities such as the Australian Space Forum. Across multiple previous and continuing programs, the Foundation has engaged with Makers Empire, an education technology company focused on design thinking and STEM education, with a comprehensive digital platform to empower student learning and teacher professional development capabilities to support.

Kids in Space is an education program for primary school students that introduces them to the space industry and challenges them to develop solutions to space-based problems using design thinking processes and 3D technologies. The program aims to use space as a vehicle to inspire young students, build awareness for current and emerging developments within the space industry, and introduce space as an exciting, growing, and viable career option. The program was piloted in South Australia in 2021 and delivered across the state in 2022. In 2023 the Kids in Space program was rolled out nationally in all Australian states and territories. In its first year as a national program, over 10,000 students from 71 schools across Australia participated in the Kids in Space program, with 175 teachers completing the professional learning component of the program and implementing it with their students [1]. Kids in Space has become a popular and highly sought-after learning

opportunity for schools and over 650 expressions of interest were received from schools for the 2024 program. 14,500+ students and 250 teachers from 116 schools benefitted from the 2024 program.

With the space industry continuing to grow, and significant investment being made by governments and industry stakeholders in Australia, the importance of a healthy pipeline of diverse, skilled and passionate workers is being increasingly recognised. The Kids in Space program represents an opportunity to inspire the future workforce and contribute to the future skills pipeline. Consequently, it was decided to adjust the content and learning experiences included in the 2024 Kids in Space program to provide a greater influence on space industry careers and job opportunities.

2. Background

2.1 STEM and Design Thinking Skills

Kids in Space is based on STEM (Science, Technology, Engineering, and Mathematics) learning principles supported by the methodologies of design thinking. These skills and experiences are critical for students as they foster essential problem-solving abilities and drive innovation and creativity. The analytical and systematic approach ingrained in STEM education equips students with the tools to tackle complex problems, while design thinking encourages creative, user-centered solutions through empathy and iterative processes. Together, these skills open up a multitude of further education and career opportunities, particularly in high-demand, innovative fields such as space. The emphasis on collaboration and communication inherent in both STEM and design thinking prepares students for effective teamwork and the ability to articulate complex ideas clearly. The interdisciplinary nature of STEM, combined with the versatile application of design thinking, ensures a holistic understanding and approach to problem-solving, preparing students to address future global challenges and fostering an entrepreneurial mindset. The integration of STEM and design thinking skills is crucial for developing critical thinking, evidence-based decision-making, and maintaining global competitiveness, producing well-rounded individuals ready to succeed in a rapidly changing world.

2.2 Australian Industry and Workforce Developments

Australia's STEM workforce (STEM-qualified occupations) sits strongly at around 1.75 million people in 2023, with 15% of those being female [2]. STEM applicable careers are seen across most of Australia's leading industry sectors including Mining, Health & Education and Finance [3].

Whilst these markets are heavy contributors to the current economy, the growing local space industry has shown its potential to increase Australia's position on the global stage as well as contribute heavily to a global market that's estimated to be worth US$1.8 trillion by 2035[4]. For Australia to seek a share of this total market value, capabilities across workforce and technology must be increased.

With the Australian Space Agency in its 6th year of operations and having identified key priority areas across Leapfrog R&D, Space situational awareness, Robotics and automation, and Access to space, the critical requirement for a highly skilled and innovative next generation of workforce leaders is clear [5]. And whilst Australia has recently supported the training of our first Astronaut trained under the Australian flag, a beacon of hope, perseverance and adventure for Australian students to look up to, we further note the importance of showcasing other less well-known space industry careers and their prevalence in Australia. This desire to educate students about not only the careers of tomorrow but the aligned roles that are required to enable space technologies or missions, is to ensure that students are confident to follow their passions and find their own place in space.

As such programs like the Kids In Space Program have been established to raise awareness of the industry, its opportunities and growth potential so that tomorrows workforce leaders can be empowered by the power of space as a tool for inspiration today.

2.3 Critical Roles of Students and Teachers

The Kids in Space program involves learning components for both participating teachers and the students they work with. Teachers attend a two-day professional learning course where they hear from space industry experts in their region, develop pedagogical approaches for implementing design thinking, and learn how to use 3D modelling and 3D printing tools.

Teachers are supported to design units of inquiry-based learning where students respond to one of the following challenges:

1. How might we use space technologies to solve problems on Earth?
2. How might we help scientists and astronauts live and work in space?

Over the period of a school semester, students then work through a range of learning materials and activities and work in teams to develop their solutions to one of the inquiry questions. The program concludes with a

student-led showcase where selected teams of students present their solutions and ideas to an authentic industry, education and peer audience.

2.4 Target Audience

The focus on space careers in this program for primary school students supports the belief that career education should start as early as possible and coincide with the primary school years, a critical period where children strengthen their future aspirations, goals, and values. Early exposure to various careers helps shape their understanding of the world, inspiring them to pursue goals that align with their developing interests and beliefs.

3. Method

3.1 Program Improvements Since Inaugural Program

The 2024 program was based on the program delivered in previous years with adaptations made to strengthen the focus on space industry careers. Additional resources, content and connections were added to support teachers in growing their own awareness of space industry careers and in supporting their students' awareness, and interest in the space industry from a careers and future opportunities perspective.

The professional learning program was expanded to include sessions with space communicators from the Australian Space Discovery Centre. These sessions involved the space communicators sharing their own experiences and pathways into the space industry, as well as highlighting case studies of Australian people who are currently working in the industry in a wide range of roles. These sessions were supported by the comprehensive new resources developed by the Australian Space Agency focussed on creating awareness of space-based careers, study and future opportunities.

New content was added to the Kids in Space Challenge Course introducing students to a range of space industry careers and real-world applications of space technologies and developments. This content included videos made in collaboration with the Australian Space Agency, interactive quizzes based on the video content, and reflection activities for students to share their thoughts and ideas about working in the space industry.

Australia's newly trained astronaut, Katherine Bennell-Pegg, supported the development of these new resources and shared her own career experiences on her trajectory to becoming the first Australian astronaut to be trained under the Australian flag. She made connections for the students between what they are learning at school and opportunities to be involved in the space industry and emphasised the importance of hard work, commitment, and follow interests and passions.

Katherine also appears on a video to introduce the design challenge to the students, providing authenticity and a real-world context for the program.

3.2 Teacher and Student Development Key Factors for Success

Feedback, and continued and growing support from all stakeholders suggests that the Kids in Space program is highly valued and successful. Analysis of feedback and metrics suggests that the program meets the professional learning needs of teachers and is engaging and purposeful for students. The professional learning program is based on key elements of successful adult learning in that it provides ongoing learning, collegiate learning, and learning that is embedded in practice. Teachers are provided with space industry knowledge, pedagogical and content knowledge as well as comprehensive resources to support them in implementing the program with their students and developing their own skills and confidence at the same time.

The Kids in Space program provides a highly engaging learning experience for participating primary school students. It uses an inquiry-based approach, enabling the learning to be contextualised to students' local contexts and their own interests and aspirations. The program draws on current technologies to engage students in rich STEM learning through real-world contexts. The program also provides opportunities for students to share their learning with authentic audiences and provides a genuine platform for student voice to be heard and valued. The student learning showcases allow students to present their ideas to a wide audience, including the opportunity to meet and receive feedback from space industry experts.

3.3 Sponsorship and Industry Support

Through the growing support of additional sponsors, grand funding and in-kind supporters, the KIS Program has been able to significantly increase its impact and reach across Australia in 2024. With a number of geographic sponsors participating in the program, through both corporate sponsorship, philanthropy and grant funding, resulting in additional schools being able to participate in existing cohorts, or the development of entirely new cohorts in geographically specific areas.

Through this increased support and the existing funding provided by the Andy Thomas Space Foundation and Australian Space Agency, the program has grown by 62%, supporting 116 schools and hundreds of teachers across 8 states and territories. Resulting in a total impact student number in 2024 of around 14,500+ students, 49% of which are located in regional, rural and remote areas and 44% of schools with an Index of Community Socio-Educational Advantage (ICSEA), supporting the Foundations fundamental goal of supporting students who wouldn't otherwise have access to space education.

This additional support namely came from:

- The Victorian Governments SPP Grant, allowing for an additional regional cohort of ten schools in Ballarat, Victoria.
- i-LAuNCH Trailblazer who supported a regional cohort in Toowoomba, Queensland.
- Catholic Education South Australia, supporting a Catholic school's cohort in South Australia.
- The Northern Territory Department of Education, Melbourne Archdiocese Catholic Schools, and Milner Road Foundation each supporting additional school positions across the Northern Territory, Victorian and South Australian cohorts respectively.

Whilst these industry, government and philanthropic supporters have assisted in growing the reach of the program, they too have assisted in supporting increased access to space industry expertise, career opportunities and pathways, STEM education and outreach as well as providing a growing audience to share with students the criticality of space as an industry to support the lives and livelihoods of Australians. As the program aims to encourage students to consider opportunities across a range of different space, STEM and other pathways that all ultimately contribute to the space industry. Pathways that aren't often recognised immediately as a pathway within the industry, such as marketing, international relations, trades and more, it is critical that students are given encouragement and confidence to pursue their passions and goals, understanding that there is a place in space for all.

4. Results

4.1 Program Summary

The 2024 program has directly involved 13,254 students and benefitted many more across participating schools, from diverse backgrounds and school contexts as depicted in Figure 1 below, based on information available at the time of publishing this paper.

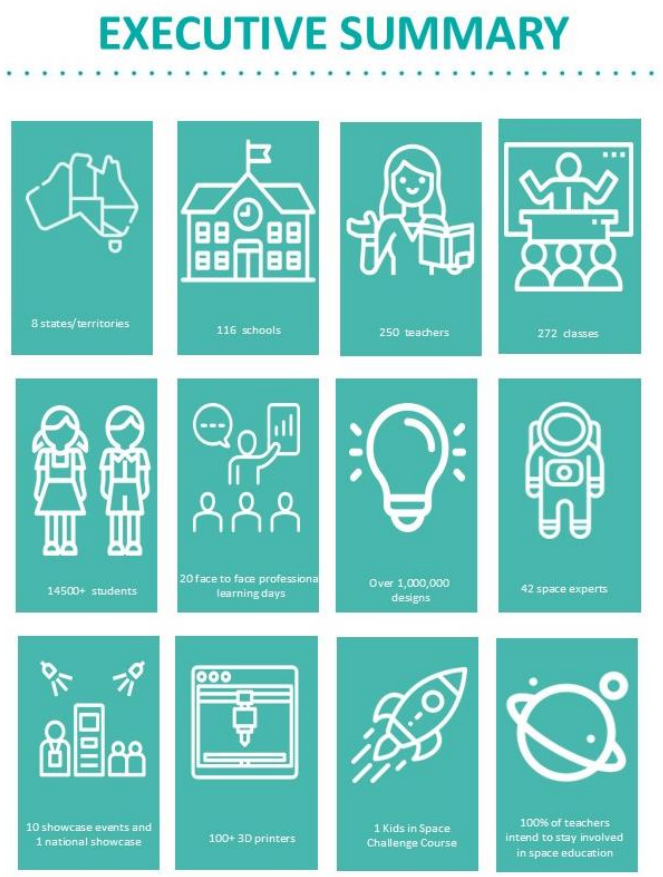

Figure 1 Executive Summary of the 2024 Kids In Space National Program

4.2 Program Impact Results

With the additional focus on space industry careers, additional data was collected during the 2024 Kids in Space program to measure changes in the awareness of both teachers and students. Questions were added to the pre and post-program surveys for teachers and students.

Student surveys were embedded in the Kids in Space Challenge Course providing a seamless and contextualised platform for student responses. Students were asked to list as many space industry careers as they could and the skills they believed people working in the industry might need. They were also asked to indicate whether they were currently interested in pursuing a career in the space industry.

Survey responses were collected from 382 students prior to their commencement of the Kids in Space program and 233 students after they had completed the program.

An analysis of the survey responses is included below:

Question 1: List as many space careers as you can think of?

Responses from both sets of students focussed heavily on the more well-known roles associated with the space industry such as astronauts, engineers, and scientists. However, the responses collected from students after participating in the program indicate a notable inclusion of a wider range of careers, more accurate use of career titles, and a greater inclusion of space industry roles based on Earth.

The post-program responses included a greater emphasis on roles such as:

Medical Roles:
Doctor, Medical, Nutritionist: Some students recognise the need for healthcare professionals in space missions, showing awareness of the biological and health-related aspects of space exploration.

Technical and Support Roles:

Satellite Controller, Mission Control, Mechanic, Builder, Repairs, Tester, Tracker: These responses reflect an understanding of the technical support necessary for space missions, indicating that some students are aware of the behind-the-scenes roles that are critical to space exploration.

Creative and Communication Roles:

Photographer, Videographer, Graphic Designer, Communicator, Space Communicator, Marketing: A few students mentioned creative and communication roles, which indicates a growing recognition of the importance of media, documentation, and communication in the space industry.

Legal and Administrative Roles:

Space Lawyer, Lawyer, Space Developer, Head of Space Agency, CEO, Boss: These responses show some awareness of the legal, managerial, and administrative aspects of the space industry.

Specialised Science Roles:

Astrobiologist, Astro Geologist, Archaeologist, Oceanographer: These reflect a broader understanding of specialised scientific roles that are involved in space exploration and the Earth based applications and relevance of the space industry.

While the post-program responses heavily focus on roles like astronaut, engineer, and scientist, the presence of roles like doctors, lawyers, photographers, and even chefs show a growing awareness among primary school students of the diversity of careers in the space industry, as illustrated in Figure 2. This indicates that educational efforts to expand students' understanding of space careers beyond the most well-known positions are having an impact, though there's still room for further exposure to the wide range of opportunities available in the space sector.

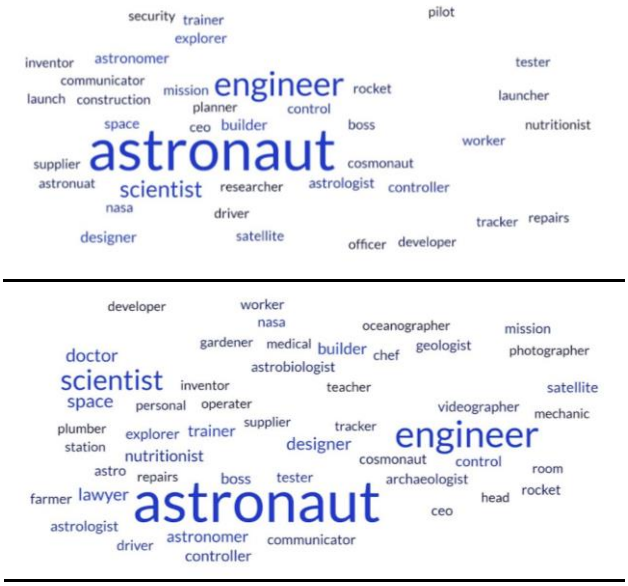

Figure 2: Pre (top) and Post (bottom) Program Space Career Word Maps

Question 2: List the skills you think you would need to work in the space industry.

Prior to participating in the program, student responses focussed heavily on relating intelligence to being able to work in the space industry, with smart, brainy and clever being the most common responses. A number of students identified teamwork, problem-solving and critical thinking being important skills. Interestingly, 8 students skipped this question and 43 gave responses such as not sure and don't know.

All students in the post program survey completed this question. When compared with the pre-program group, their responses showed a significant increase in connecting STEM skills to space industry careers. Mathematics (maths and math), science, and engineering skills were among the most common responses. Dispositional skills such as commitment, determination, curiosity, creativity and resilience as well as soft skills such as teamwork, problem-solving, collaboration, communication, and critical thinking were much more commonly provided in the post-program survey. Students also included responses such as SCUBA diving and plant cultivation indicated that students were connecting their research and program work to specific skills involved.

Responses to this question indicated an increased awareness of the skills that might be important for people working in the space industry and increased

connection to the skills students are developing at school, particularly in STEM.

Question 3: Do you think you would like to work in the space industry one day?

Students were asked to respond with either yes, maybe or no, to this question. Students in the post-program survey showed a slight increase in yes responses and a very significant shift from no responses to maybe responses, indicating a shift in openness to considering space industry careers as future options. See Figure 3 below.

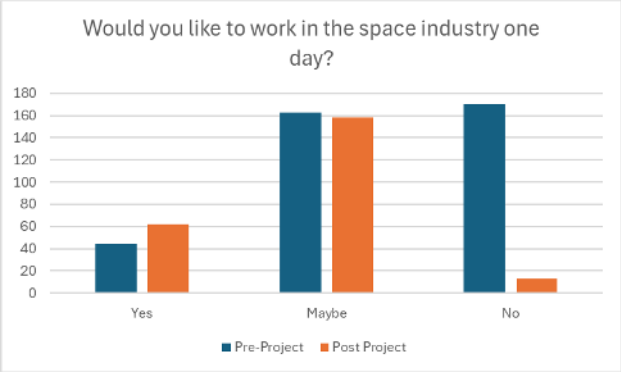

Figure 3: Space Career Interest Pre and Post Program

At the time of writing this paper, pre- and post-program survey responses were available from 34 teachers for comparison and analysis. Teachers were asked to list as many space industry careers as they could and the skills they believed to be important and relevant to the space industry. They were also asked to consider the transferability of the skills they had listed to other industries.

In the pre-program survey, teachers primarily listed the well-known space careers of astronauts, scientists, and engineers with some listing specific engineering fields such as mechanical, environmental, mechatronic, chemical, and aerospace. A smaller number of teachers listed more diverse careers including astro physicists, computer programmers, and medical professions. Two respondents said that they were unsure and eight indicated that they knew the space industry would involve many more careers than they were currently aware of. In the post-program survey, teachers included a more diverse range of space industry careers in their responses. These included Earth based roles such as medical and legal professions, specialised science roles, and technical and support roles, indicating an increased awareness of careers and job roles involved in the space industry. Interestingly, student survey responses included a much more comprehensive and diverse list of careers than teachers either were able or chose to provide.

In the pre-program survey, teachers primarily listed skills related to STEM disciplines, or simply listed science, technology, mathematics, and engineering as skills. None of the respondents listed dispositional or soft skills. Eight respondents provided generic responses indicating that many skills would be needed but did not list any specific skills.

Although STEM skills were also included in the post-survey responses, there was a very significant increase in responses that listed soft skills such as communication, teamwork, collaboration, critical thinking, and problem-solving, as well as dispositional skills including curiosity, resilience, risk-taking, confidence, and creativity. Post-program responses appear to indicate that teachers were thinking more deeply about the breadth of the space industry and the diverse skillsets and human contributions required to continue to progress and develop the industry.

When asked about the transferability of skills required in the space industry to other industries, pre-program participants focussed heavily on other STEM fields with engineering being the dominant response. There were similar themes in the post-program responses, although teachers named more specific industries including automation and robotics, defence, technology and software development, aerospace and aviation, environmental science and research fields.

4.3 Ongoing Research Considerations

4.3.1 Establishing a Baseline Knowledge

In a preferred research setting, student subject choices throughout their remaining primary and secondary education could be tracked, as well as their career pathway decisions following high school, whether that be to continue through tertiary or trade studies, to entering the workforce or pursuing other options. However, longitudinal studies are difficult and costly to pursue, with a 10-13 year waiting period often required before indicative or conclusive results can be obtained when the trial commences at the age of around eight. Exclusive of the costs and logistics in completing the tracking, many other barriers such as privacy, disinterest of students and families and unexpected situations can result in the studies losing traction well into the study.

However, baselines can be established through the obtained program metrics and survey data to identify a baseline of student and teacher knowledge prior to and post completion of the Kids In Space Program. These

baselines can then support the programs basis of changing students' perceptions and understanding of space, its benefits on Earth and career opportunities available to today's students. The teacher knowledge baselines prior to, and post completion further indicate the likely continuation of program themes and teachings. A key element of the program, the two days of accredited teacher professional development training, is designed to ensure that the learnings are able to be replicated year on year despite the schools not completing the formal program on multiple occasions. Assisting to build a workforce of space and STEM confident teachers to uplift and empower today's students to become tomorrow's workforce leaders.

4.3.2 Long Term Study Potential

As the program continues to grow, the Foundation and Makers Empire are utilising available information and metrics to contextualise the ongoing impact on students and teachers from within each cohort in the hopes of identifying suitable long-term study options to identify conversion rates of students completing the program vs those that continue to engage in further study around space and STEM fields into the future. Whilst the program remains in its establishment phase, it is critical to determine the key metrics which can support in consolidating and optimising the program for impact on both students and teachers.

5. Discussion

5.1 Program Successes and Areas for Improvement

The Kids In Space Program, whilst in its second year of a national rollout, has been running as a model since 2021 with multiple smaller scale pilot programs ran ahead of the scale-up.

Throughout the growth of the program many iterations have been seen, with lessons learnt and new challenges faced as the Foundation and Makers Empire continue to prioritise providing educational support and opportunities to communities in Australia whom would otherwise not have access to such education.

The increased focus on space related careers within the Kids in Space program appears to have had the desired effect or broadening the awareness of both students and teachers of the diverse and emerging roles required to support and grow Australia's space industry as well as the opportunities represented by the industry. Further iterations of the program could aim to strengthen the connection between space industry careers and the skills and dispositions students are developing through engagement in space education and STEM programs such as this one.

The program has had a significant impact on student awareness with clear evidence showing a greater understanding of the broad and diverse nature of the space industry and the careers involved. The program has also prompted a positive shift in students' interest in possibly pursuing a career in the space industry.

The program has also achieved a positive impact on teacher awareness of what the industry encompasses and greater recognition that the space industry offers a very real future pathway for the students they work with. Teachers have also made deeper connections between the STEM learning experiences they provide for students and the skills and dispositions required in the space industry and other STEM fields.

The areas for improvement identified throughout the course of the most recent program iteration includes:

- Inclusion of locally relevant content: Whilst the program currently features extensive information about the Australian Space Industry, inclusive of organisations and experts, based on the outcomes of other aligned programs, a future improvement may be the expansion of this information to include regional specific information. This regional specific information may include state and territory key capabilities or notable organisations, or may be more comprehensive still with each region included in the program being highlighted in a specific way. The inclusion of additional regional cohorts often comes as a direct result of additional sponsors supporting certain regional areas, and so selection of areas and level of detail may vary depending on the resourcing allocated.
- Addition of space industry webinars: Throughout the program, students find great excitement in their ability to meet with and learn from space industry experts. These experts whom are mostly engaged through either short content within the challenge course or the State/territory/national finals have such rich information to share with students, about not only their own pathways into space but about the role in which their organisations play. As such the next iteration of the program will aim to include a number of webinars, each available to all of the students in the program – ensuring equitable and frequent access to space industry professionals. Furthermore, this additional activity might further

contextualise for students the importance of a national approach to the space industry as they are able to engage and see their peers from across the nation striving to address the similar challenges.

- Previous and current iterations of the program have highlighted the genuine passion and excitement of teachers in educating their students on the opportunities available through the space industry. It has further highlighted the interest from teachers in forming collegial bonds and sharing their learnings, successes and challenges within the program, enabling them to collaborate, share ideas and troubleshoot issues with one another. This natural alumni development has enabled students from across years to provide advice and further establish themselves as space ambassadors within their schools and communities. A formalisation of this alumni group would be highly beneficial for future iterations of the program and will future support the development of a community of educators well versed on space industry education, enabling the development of best practice approaches and deep support for continued presence and focus within the national curriculum.

Whilst the program as it is now has shown significant improvements to teacher confidence levels and student engagement within the class. It remains critical to continue to iterate and develop the program to ensure that students are receiving the best quality education available.

5.2 *Impact on Best Practice Development*

The Kids In Space National Program is the largest space education program in Australia, supporting students, teachers and their communities across each corner of the nation. Since the programs national rollout in 2023, around 24,500 students have benefited and hundreds of teachers have received accredited professional development training to develop and extend their knowledge of the growing Australian space industry and the upcoming workforce opportunities.

The program itself employs a relatively simple approach which ensures that students and teachers are able to adapt and focus the program to best highlight what interests them, aligns to current curriculum requirements and engages students of all different learning levels – offering inclusive, dynamic – allowing both prescriptive and non-prescriptive learning. This simplicity in program design not only enables for each component to be successfully implemented but enables the program to fit seamlessly into the classroom, avoiding unnecessary stress and additional work on already stretched teachers. This further prevents a need for arduous lead times for program commencement, reducing the likelihood of teachers needing to swap throughout the program or students becoming disengaged.

Through the Kids In Space Program and supporting research components completed, the Foundation and Makers Empire aim to continue to share the learnings, successes and challenges of the program, ensuring that other education providers are able to seek further information, advice, or avoid identified problems through their own independent and/or aligned programs. Similarly, the Foundation and Makers Empire see sharing such information and learnings as an opportunity to similarly learn from the efforts and approaches of others.

Education is a team sport, and with missions and values aligned to promoting access to and interest in the space industry and resulting careers, the Foundation aims to expand its collaboration with other education stakeholders to further share our learnings and continue to develop world leading programs to encourage and inspire our next generation of workforce leaders.

5.3 *Importance of Transferable Skills*

In an ever-growing age of new and emerging technologies, it is critical to ensure that both students and teachers are being adequately equipped with the skills and processes to learn such technologies and remain up to date. Space as an industry encapsulates a plethora of different required skill sets across the spectrum from intra and interpersonal through to technical and diplomatic skills. As such, students and teachers must be empowered to learn and teach an approach as opposed to a solution, enabling students to apply their knowledge to whatever the task might be. A number of space industry roles and technologies have large crossover capabilities with other industries, whether that be AI and automation, mining, manufacturing, etc. Ultimately leading to a requirement for the new generation of skilled workforce ready students to have a dynamic and comprehensive toolbox of skills which can be applied to a diverse range of industries and specialties.

6. Conclusions

The Andy Thomas Space Foundation in collaboration with Makers Empire, and the support of

other program partners, including the Australian Space Agency, State Governments and industry members, aim to continue to grow and expand the impact of the Kids In Space Program, striving to provide access to all primary students across the nation.

In order to ensure a passionate, skilled and hard-working future workforce, timing is critical to impact young minds and contextualise opportunities within the space and STEM field - enabling students to determine the path they would like to follow.

In order to continue growing and supporting the expansion of the Kids In Space Program across Australia, the Foundation and Makers Empire will look to more heavily engage with:

- Regional and remote communities
- Students living in socially disadvantaged areas
- First Nations students
- Women and Girls
- Neurodiverse - through the Aurora Program

Furthermore, a revised focus on the collection of metrics around student and teacher participation, as well as impact on local community can assist in further consolidating the program offering and achieving increased impact across the nation. This will further support goals around public outreach and the engagement of parents and caregivers, ensuring that students have ongoing support and maximise opportunities for entry to a space career.

Acknowledgements

- The Andy Thomas Space Foundation Team including, Chair of the Foundation - Michael Davis AO, Executive Director - Peter Nikoloff, Director - Andy Koronios, Director – Catherine Roberts AO CSC and Director – Julia Dreosti
- The Makers Empire Team including, CEO – Jon Soong.
- The South Australian Government, SASIC and Defence SA for their generous contributions to supporting the Foundation and particularly the expansion of the Kids In Space Program
- The Australian Space Agency for their partnership on the national roll out of the Kids in Space National Program
- The Australian Space Discovery Centre for supporting their unwavering support of the Foundations Education Fund programs and engagement with the Kids in Space National Program.
- The Victorian Government Department of Education - SPP Grant
- i-LAuNCH Trailblazer
- Catholic Education South Australia
- The Northern Territory Department of Education
- Melbourne Archdiocese Catholic Schools
- Milner Road Foundation
- Participating schools for hosting professional development and student showcase activities.

References

[1] D Watson, M Dimitriadis, Space as a tool for inspiration: an innovative approach, IAC-23,E1,1,2,x75632, 74th International Astronautical Congress, Baku, Azerbaijan, 2023, 2-6 October

[2] Australian Government | Department of Industry, Science and Resources, STEM- qualified occupations, https://www.industry.gov.au/publications/stem-equity-monitor/workforce-data/stem-qualified-occupations

[3] Reserve Bank of Australia, Composition of the Australian Economy, https://www.rba.gov.au/education/resources/snapshots/economy-composition-snapshot/#:~:text=Industry%20Share%20of%20Output%20key,5.7%25%2C%20Construction%207.1%25. 7 August 2024

[4] A Acket-Goemaere, R Brukardt, J Klempner, A Sierra, and B Stokes, McKinsey & Company, Space: The 1.8 trillion opportunity for global economic growth, https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/space-the-1-point-8-trillion-dollar-opportunity-for-global-economic-growth. April 8 2024.

[5]Australian Space Agency, Advancing Space - Australian Civil Space Strategy 2019-2028, https://www.space.gov.au/sites/default/files/media-documents/2023-11/Advancing%20Space%20Australian%20Civil%20Space%20Strategy.pdf. April 2019

[6] Australian Government, STEM Equity Monitor Data Report 2022, https://www.industry.gov.au/sites/default/files/2022-09/stem-equity-monitor-data-report-2022.pdf

[7] Australian Government, Office of the Chief Scientist, Australia's STEM Workforce, https://www.chiefscientist.gov.au/sites/default/files/2020-07/australias_stem_workforce_-_final.pdf. July 2020.