



CUAVA STRATEGIC PLAN

2020 - 2022

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1. EXECUTIVE SUMMARY

The ARC Training Centre CUAVA started officially in mid-December 2017 with a funded period of five years. Led by the University of Sydney, CUAVA currently has 12 partners, including four industry partners, three government labs, three Australian universities (Sydney, UNSW, and Macquarie), and two American universities. Together, CUAVA and its partners are developing the required human capital, technical capabilities, and commercial products to grow a world-class Australian industry in CubeSats, UAVs, and related areas. We are training a generation of specialised Australian workers in cutting-edge advanced manufacturing, satellite and UAV technology, science, engineering, Earth applications, entrepreneurship, and commercialisation. CUAVA plans to launch one CubeSat into space and fly one UAV campaign per year, in order to demonstrate, test, and develop our new systems, instruments, technical solutions and services. We are addressing key deficiencies in communications, propulsion, and imaging capabilities, allowing us to produce novel data, products, and services for crucial Earth observation (e.g., coastal health, agriculture, and minerals), GPS (e.g., sea state), and space weather applications.

This Strategic Plan, intended to be a living document, begins with a summary of CUAVA's mission and ethos statement, strategic objectives, and the actions and goals intended to achieve these objectives. Foci include the recruitment and training of students and postdoctoral fellows to develop the desired human capital and committed people for Australia's space and UAV sectors, a relatively regular schedule of CubeSat launches and UAV campaigns to provide opportunities for a set of new instruments and payloads aimed at solving particular research problems and enabling future commercial and/or public good services, and engaging extensively with the existing Australian space and UAV sectors and with the public so as to develop the sectors and demonstrate their relevance for careers, significant contributions to society, and commercial potential. Identifying risks and their mitigation strategies, as well as strategic opportunities to develop and leverage CUAVA's successes, is vital. The risks appear moderate and their mitigation approaches reasonable, while the strategic opportunities to engage with future commercial, academic, and government groups, both domestic and international, are very exciting and show multiple opportunities to grow CUAVA significantly.

CUAVA's governance structure and procedures are relatively simple, with a Directors team, Management Committee, and Advisory Board. Development of community is vital when building a team of disparate entities and interests, addressed here via shared research and flight projects, regular community events, and a major focus on Equity and Inclusion – while our PhD students have appropriate ratios this is not true for our postdoctoral fellows, CIs, and PIs, so as CUAVA grows we seek to improve these ratios and make CUAVA a strongly desirable and visibly equitable and inclusive part of Australia's space and UAV sector ecosystems. The proposed succession plan will improve these ratios, while long-term success for CUAVA



itself requires extensive engagement with the public, industry, and government through our comprehensive outreach initiatives.

Key Actions Summary

ARC TRAINING CENTRE CUAVA			
Key Actions	2020	2021	2022
PhD programme	<p>Attract and recruit excellent PhD candidates, with a focus on attracting domestic students.</p> <p>Establish mentoring programme March 2020</p> <p>Media Training workshop</p>	<p>Attract and recruit excellent PhD candidates.</p> <p>Media Training workshop</p> <p>Evaluate and continue mentoring programme.</p>	<p>Graduate, attract, and recruit excellent PhD candidates</p> <p>Media Training workshop</p>
CubeSat launch	<p>CUAVA-1 delivery July 2020</p> <p>CUAVA-1 launch October 2020</p> <p>CUAVA-2 development starts March 2020</p>	<p>CUAVA-2 launch late 2021</p> <p>CUAVA-3 development early 2021</p>	<p>CUAVA-3 launch</p> <p>CUAVA-4 development and launch</p>
UAV Campaign	<p>UAV-1 campaign late 2020</p> <p>UAV-2 campaign initiation and design</p>	<p>UAV-2, UAV-3, development and launches</p>	<p>UAV-4 development and launch</p>



2. OUR MISSION

Our economy, security, and society increasingly rely on access to space for vital data and services. However, a skilled workforce is required to grow the sector and capitalise on global opportunities. CubeSats are a new class of small satellites, which with UAVs are disrupting the international satellite market, are of great commercial value, and have very low costs. The Centre aims to create a cadre of trained workers for sustainable Australian, advanced manufacturing, space and UAV industries of national importance; fundamentally change the capabilities and applications of CubeSats, UAVs, and their instruments (plus those for larger satellites) for Earth observations, GPS, satellite communications, and space weather purposes; and progress these devices to create a major commercial value with wide applications across these and other areas.

3. OUR ETHOS

We have created an environment in which Centre citizenship and participation are prized. We foster an atmosphere of inclusiveness and learning, and welcome those from all backgrounds. We embrace principles of equity and diversity in all of our endeavours. We strive for our research to be impactful, to be innovative, and to shape the future of the Australian Space Industry and Research. We will achieve this through collaborating generously and creatively with our partners and seeking opportunities for cooperation with those who have goals aligned with ours. We always strive to be collegial in our personal interactions and to conduct ourselves with integrity and in accordance with relevant University codes and expectations.

Our core values are:

- Inclusiveness
- Creativity
- Innovation
- Collaboration
- Cooperation
- Collegiality
- Integrity



4. STRATEGIC OBJECTIVES

CUAVA aims to develop the required human capital, technical capabilities, and commercial products to grow a world-class Australian industry in CubeSats, UAVs, and related products. We will train a generation of specialised Australian workers in cutting-edge advanced manufacturing, satellite and UAV technology, science, engineering, Earth applications, entrepreneurship, and commercialisation. We will also address key deficiencies in communications, propulsion, and imaging capabilities, allowing us to produce novel data, products, and services for crucial Earth observation (e.g., coastal health, agriculture, and minerals), GPS (e.g., sea state), and space weather (e.g., ionospheric activity) applications.

The Centre's Aims are:

- Aim 1: Systems - To fundamentally change the accessibility and functionality of CubeSats by developing advanced, commercialised, plasma thruster, Gigabit/s communication, and snap-together CubeSat systems.
- Aim 2: Instruments - To develop novel, miniature, world-leading imagers for satellites and UAVs, especially hyperspectral imagers based on advanced photonic approaches, and variable spacecraft drag devices that enable major advances in Earth observations and characterisation of Earth's time-varying space environment.
- Aim 3: Products - To apply the new systems and instruments and our existing GPS expertise on CubeSats and UAVs to answer important research questions, develop new eData / mining algorithms, and provide powerful new commercialisable data and products that address crucial aspects of coastal, marine, agriculture, forestry, mining, and terrestrial and space weather applications.

A rigorous but innovative approach is adopted for each student's training program, which consists of 2 courses, 1 start-up / entrepreneurship experience, 1 flight experience, and a thesis research project. The courses are chosen from Sydney University and UNSW's existing Honours / postgraduate courses, 1 in the student's area of expertise (e.g., advanced robotics, remote sensing, or space physics) and 1 in business, management, or law. The start-up / entrepreneurship experience is a 1-semester Sydney University course which involves the student being part of a 4-6 person team that identifies and develops a technological, commercialisable solution to a significant space problem and then pitches it to a start-up incubator / accelerator – both previous courses have led to at least 1 student team winning a place at an incubator. The flight experience will be a joint student team project with American partners Texas A&M or RIT or else active participation in the Centre's annual UAV or CubeSat flight teams, obtaining complementary expertise to the student's research project. As such, each flight experience will involve project design, build, integration, test, and operational work. Students graduating from the Centre will be well-rounded and ideally prepared for working in industry with strong research and problem-solving skills. The Centre's trained



students, postdocs, CIs, PIs, and partner organisations are expected to develop into global players in space-related research, industry, data, and services.

CUAVA aims to have 1 CubeSat launch and 1 UAV flight campaign per year on average, with a “fly early fly often” approach to make rapid progress and identify commercial and research opportunities.

By the conclusion of our funding cycle in December 2022 we envision that:

- CUAVA will have made a clear and real difference in developing world-recognised Australian space and UAV sectors;
- CUAVA will have trained significant human capital for and developed specific technologies and products for a real, indigenous, Australian space capability, both scientific and commercial, based on CubeSats and UAVs;
- both CUAVA and this space capability will have strong demonstrated economic, national, and societal benefits;
- all individuals and partner entities in CUAVA will have profited strongly from their participation;
- CUAVA will position itself either to re-apply for funding or to evolve towards a Cooperative Research Centre (CRC), a Centre of Excellence (CoE), or an industry-science cooperative or institute.

5. GOALS AND ACTIONS

5.1 Train the next generation of workers in cutting edge manufacturing, entrepreneurship, and commercial space and UAV applications.

Actions:

- (a) Recruitment of high-quality domestic PhD students to the CUAVA programme will be on-going in 2020/21. *(ongoing 2020 - 2021)*
- (b) Establish a successful mentoring programme for our students that incorporates both academic and industry mentoring, and is assessed and improved following feedback from mentors and mentees. *(March 2020)*
- (c) 2 advanced undergraduate / graduate level courses per HDR student in field of expertise, industry, business, and space / UAV sectors. Within first 2 years of their candidature typically.
- (d) Entrepreneurship course with start-to-pitch projects for all Centre students. Students should complete this within the first 2 years of their candidature, typically. *(Ongoing)*
- (e) Biennial Media Training workshops for Centre students, PDFs, PIs and CIs. The initial workshop held in 2018 was extensive and held over 4 days. It was very worthwhile training, but in order to make it more accessible to a wider section of CUAVA people the next workshop will have an altered format.



The programme will be split in half with the first session held in 2020, and the second session following in 2021.

(June 2020)

5.2 Launch 1 CubeSat launch and 1 UAV campaign per year for 5 years.

Actions:

- (a) CUAVA-1, which will be our inaugural CubeSat, is in its final stages of development and is due for delivery in July 2020. Launch is scheduled for October 2020.
(October 2020)
- (b) CUAVA-2, which will carry legacy COTS parts and bus, but enhanced payloads will begin development in March 2020 with an anticipated launch in late 2021.
(December 2021)
- (c) CUAVA-3, which will have a new bus, some new instruments and hardware (ideally a plasma thruster and a tether), and some enhanced payloads from CUAVA-1 and -2 will begin development in early 2021 with an anticipated launch in late 2022.
- (d) UAV-1 is expected to be launched in the second half of 2020.
- (e) UAV-2 is expected in the first half of 2021.
- (f) UAV-3 is expected in the first half of 2022 but may be moved up.

5.3 Engage undergraduate students, PhD students and postdoctoral people, the public, the space industry, and the new Australian Space Agency in developing the Australian Space and UAV sector.

Actions:

- (a) Yearly “hackathon” on Earth observation, GPS/GNSS, space or UAV project topic for participants from high school to university students, professionals, and the public.
(starting 2020)
- (b) Participate in and co-lead Sydney Space Industry / Sector breakfast & lunch clubs, with expert talks. The Directors and CUAVA CI / PIs outreach efforts are ongoing and extensive.
(ongoing)
- (c) Engage with Space Industry Association of Australia (SIAA), Advanced Manufacturing Growth Centre, and relevant CRCs, including the SmartSat CRC. *(ongoing)*
- (d) Engage with Chief Scientists / Engineer and Governments of NSW, ACT, and Commonwealth.
(ongoing)
- (e) Our relationship with the Australian Space Agency is good. The Director has regular teleconference with Aude Vignelles, Executive Director at the Australian Space Agency, and they publicise CUAVA news and events. The Director will continue to leverage this relationship for funding and enhancement opportunities for the Centre and Space. *(ongoing)*



5.4 Develop new instruments, technology, and products to solve crucial problems and fundamentally change the capabilities and applications of CubeSats, UAVs, and their instruments (plus those for larger satellites) for Earth observations, GPS / GNSS, satellite & UAV communications, and space weather.

Actions:

Centre research on Projects 1.1, 1.2, 1.3, 2.1, 2.2, 2.4, and 3.1-3.5 generating

- (a) New space-qualified plasma thrusters for satellites.
- (b) New certified high-speed communications hardware for UAVs, CubeSats, and other sats.
- (c) New plug-and-play CubeSat hardware and space weather control systems.
- (d) New compact imagers and combined hyperspectral imagers and spectrographs.
- (e) Flight-tested, refined, and retractable spacecraft tethers.
- (f) New calibration and validation capabilities for Earth observations
- (g) New commercial and scientific analysis capabilities for remote sensing / Earth observations.
- (h) New GNSS/GPS-based capabilities for radio occultation and sensing sea-state.

(all ongoing).

5.5 Progress these devices to create major commercial value with wide applications across the foregoing areas.

Actions:

- (a) Assess industry state-of-the-art and the current and potential opportunities for our proposed devices.

The Director is in discussions with the IP Group in order to progress this for at least two Centre devices being developed for CUAVA-1.

(ongoing)

- (b) Engage within the Centre and with external industry partners, SIAA, and Government to identify commercial opportunities and paths to market.
- (c) Progress partner devices and new Centre initiatives to commercial standard within appropriate structures (inside partner, joint venture, new start-up, etc.) and iterate as required.
- (d) Develop the market and business opportunities via targeted workshops, conferences, and industry groups.

5.6 To develop a world-class Australian industry in CubeSats, UAVs, and related products.

Actions:

- (a) Provision of trained people with expertise across space/UAV hardware and applications, business, and entrepreneurship to develop Australia's space and UAV sectors.
- (b) Provision of cutting-edge hardware, software, and analysis capabilities that solve crucial research problems and unlock major commercial value with the space and UAV sectors.

- (c) Developing and achieving the potential of Centre's industry partners, by engaging with Centre students, partners, and CIs and with external people, companies, and groups stimulated by the Centre's training, research, commercialisation, and outreach programs.
- (d) Developing new start-ups, joint ventures, and businesses that involve Centre people and externals stimulated per (c).
- (e) Linking with the space and UAV industries, industry groups, the Space Agency, and multi-level Government to drive policy, identify needs and opportunities, and build true national capabilities.

6. RISKS AND MITIGATION

RISK ANALYSIS			
Identified Risk:	Impact/Probability	Risk Rating	Risk mitigation strategy
Loss of key personnel	Major / Unlikely	Medium	Having a succession plan in place will alleviate uncertainty if key leadership team members are lost. Establishing Standard Operating Procedures for administrative processes which are made centrally available will mitigate loss of management.
Failure to recruit enough high-quality PhD students	Major / Moderate	Medium	Design appropriate targeted recruitment marketing aimed at attracting high-quality local candidates. Utilise marketing expertise in relevant USYD departments to publicise CUAVA PhD programme.
Increase in launch costs	Moderate/ Likely	Medium	Redirect other areas of the budget in the short-term and seek other sources of funding in the medium-term.
Launch date slippage	Major / Likely	High	The Space-BD contracts allow slippage in launch date at either no cost or minimal cost. This is likely for our future contracts.
Payload failure	Major / Moderate	Medium	Rigorous pre-launch testing should mitigate most risk, and cubesat design will mean failure of one payload will not jeopardise the entire satellite.
Payload delivery slippage	Major / Likely	High	Milestones with clear deadlines will be built into the Project Management schedule, and will give enough allowance for potential satellite design modifications at each stage. Failure to meet payload milestone deadlines may result in payload bump to later flight.

Dispute or breakdown of relationship with COTS parts suppliers.	Major / Unlikely	Medium	Investigate whether in-house development of parts is viable or seek alternative suppliers.
Loss of IP	Major / Unlikely	Medium	Staff and Student training on IP management, ongoing discussions on IP management as part of collaborations, and attention to legal agreements.
Regulatory delay or change	Extreme / Moderate	High	Seek advice from University solicitor who specialises in this area, and incorporate requirements and deadlines into Project Management milestones.
Competition from SmartSat CRC	Moderate / Likely	Medium	Pursue projects inside SmartSat CRC but also outside the CRC with its and our own industry partners. Develop our own collaborations, satellite and UAV projects, and industry development programs that are outside the CRC and more beneficial to us. Attract other investment that is complementary or competitive with the CRC.
Breakdown of relationship with Partners	Extreme / Moderate	High	Seek support and guidance from other partners in approaches to any disputes arising. Where this fails then seek mediation through the Sydney University DVC-R and Research Portfolio, If irreparable breakdown occurs, seek assistance from the University of Sydney Office of General Counsel.

7. IDENTIFYING STRATEGIC OPPORTUNITIES

The Director has identified the following as potential strategic opportunities for CUAVA, and beyond the end of term for the Centre:

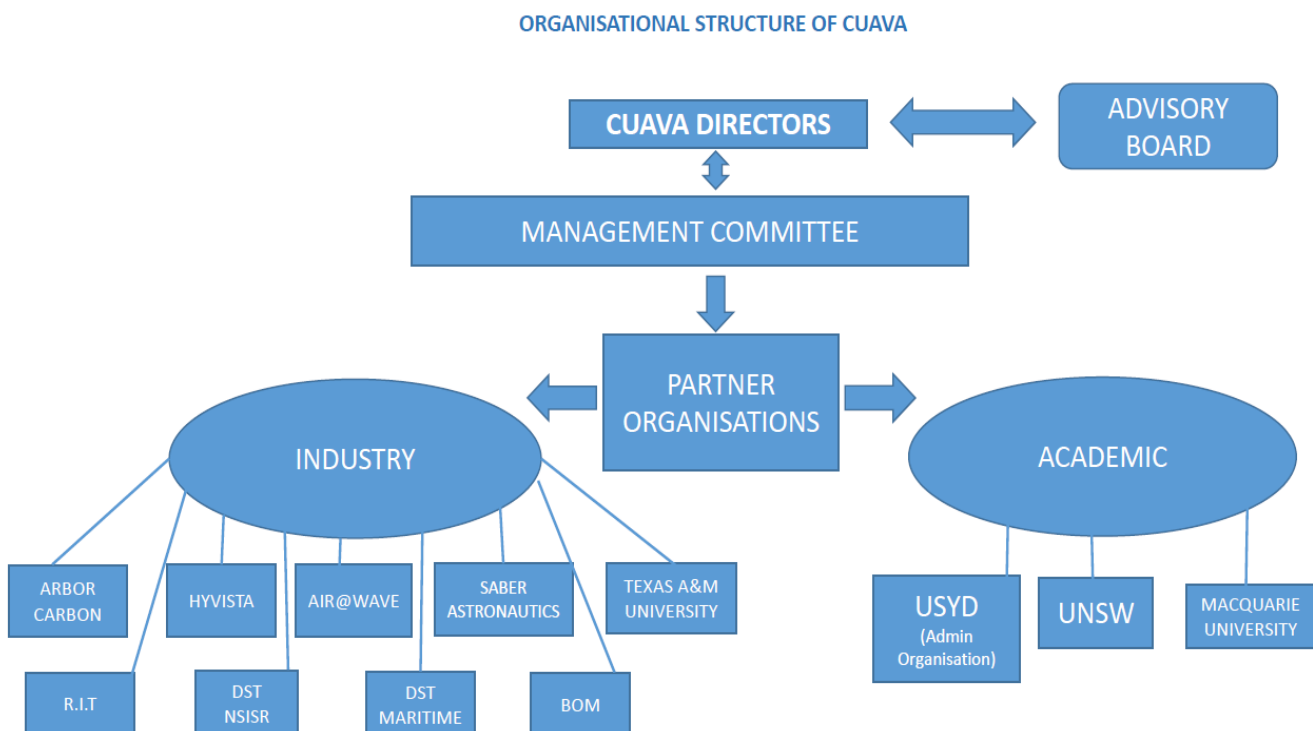
- Spectral Aerospace: Mr Ben Koschnick, Co-Founder of start-up Spectral Aerospace, is working with the Director to deliver a flight-test on CUAVA-1 of Spectral Aerospace's algorithm to appropriately average hyperspectral data into desired bands on command. This will use CUAVA-1's existing onboard computer to accelerate Spectral Aerospace's development program, deliver a test of the associated base IP, remove the large cost and long time for Spectral Aerospace to develop and fly a dedicated CubeSat, and enable CUAVA to gain some cash, develop a partnership with a new start-up, make progress against KPIs, and open up a new strategic direction for CUAVA and next-gen CUAVA.

- HEO Robotics: Dr Will Crowe has expressed an interest in collaborating on hyperspectral imaging, propulsion and perhaps a CubeSat within an Advanced Manufacturing Growth Centre or future ISI proposal. This has potential for a CUAVA-3 payload, and also for development of a next-gen CUAVA.
- Professor Phil Bland (Director of Curtin's Space Science and Technology Institute) and the Director have agreed in principle for an exchange of imagers and flight opportunities on CubeSats, likely CUAVA-3. This has potential for a future partnership in next-gen CUAVA.
- Dr Nick Carter and Sarah Pearce (CSIRO Astronomy and Space Science) and the Director in discussion about a planetary science-focused CubeSat to Mars suggested by JPL.
 - Recent Moon-Mars initiative announced by the PM make this seem very likely.
 - Could also give rise to a set of lunar-focused CubeSats funded by the same project.
 - Hyperspectral imager, radiation counter, and perhaps a plasma wave receiver are the likely instruments we might provide, in order of decreasing probability.
 - Likely a direct approach to CSIRO management and Government for funding. Could involve Curtin and Australian industry as well.
- The Director has proposed a Sydney Institute for Space Industry & Research (SISIR) initiative within USYD to enhance the sector for the benefit of all concerned. The draft proposal has been positively received by relevant Schools, Faculty and DVCR. This is most likely to be given consideration next year. The proposal's draft budget is of order \$10 M over 4 years.
- At the recent Group of Eight (Go8) Space Summit the Director proposed that the Go8 develop a multi-generational Go8 CubeSat constellation, with each university providing 1 satellite per generation in collaboration with industry, to address both scientific/ engineering and commercial goals in the areas of Earth observations / remote sensing, GPS/GNSS, Space Situational Awareness / Space Weather, and Satcomms. A QB50-like approach is proposed, meaning that each satellite would carry at least 1 payload and 1 satellite (bus) system for a set provided by the Project, as well as other payloads and satellite payload desired by the particular satellite's team. CUAVA could play a leadership role. The proposal was for 2 generations funded by the Go8 members and 1 or 2 by the Space Agency and Commonwealth. This idea for a project to unify the Go8 was included in the Summit's summary talk and is considered attractive by several Go8 members.
- The Director believes that CUAVA should consider leading an Agency International Space Investment initiative that explores a QB50-like multi-generational CubeSat constellation led by Australia that would have other nations as partners and would address both scientific/ engineering and commercial goals within Earth observations, GPS/GNSS, SSA / Space Weather, and satcomms. Within Australia's program satellites would be provided by partnerships involving universities, companies, and government labs etc. Potentially NASA may be receptive to a partnership proposal.
- The State of NSW announced a Space Development Strategy with 2 competitive parts, development and operation of the National Space Industry Hub for 4 years and the development and operation of a pilot space industry qualification satellite in 1.5 years (with 2 potential further such flights). The Director

is investigating how CUAVA and its partners and collaborators can apply for both of these, likely with CUAVA leading the qualification project (focused on flight heritage for industry partners) and CUAVA participating with Saber, Delta-V, and Moonshot to deliver the Industry Hub and the associated incubator / accelerator / industry training. The earlier envisaged NSW-focused flight program similar to the foregoing Go8 and ISI projects is now not in the NSW Development Space Strategy, but seems a plausible future direction.

8. GOVERNANCE

8.1 Organisational Structure





8.2 Directors

CUAVA Directors are:

- Professor Iver Cairns, Director
- Professor Andrew Dempster, Deputy Director
- Assoc. Professor Eleanor Bruce, Assistant Deputy Director

CUAVA Directors meet weekly and report back to the Management Committee.

8.3 Management Committee

The membership composition of the Management Committee was stipulated in the research proposal put forth to the primary funding body, the Australian Research Council, and agreed in the subsequent Multi-Institution Agreement (MIA).

Management Committee membership is comprised of:

- Director, Deputy Director, and Assistant Deputy Director,
- 1 representative from each of the Industry Partners, with the two Divisions of DST Group considered separate partners,
- 2 additional representatives from the administrative organisation, The University of Sydney,
- Centre Operations and Research Administration Manager.

The Management Committee meet monthly and provide the Training Centre's Directors advice, validation, and support of activities, decisions and strategies intended to achieve the aims of the Training Centre.

Current Management Committee members:

- Assoc. Prof. Charles Bachmann, Rochester Institute of Technology (Partner)
- Assoc. Prof. Paul Barber, ArborCarbon (Partner)
- Assoc. Prof. Eleanor Bruce, University of Sydney (Assistant Deputy Director)
- Prof. Iver Cairns, University of Sydney (Director and Committee Chair)
- Prof. Gregory Chamitoff, Texas A&M University (Partner)
- Dr Terry Cocks, Hyvista Corporation (Partner)
- Prof. Andrew Dempster, University of NSW (Deputy Director)
- Dr Bradley Evans, DST Group - Maritime Division (Partner)
- Dr Jason Held, Saber Astronautics (Partner)
- Assoc. Prof. Roy Hughes, University of Sydney and DSTG Honorary Fellow (Admin Organisation)
- Dr David Lingard, DST Group - NSISR (Partner)



- Dr Jon Lawrence, Macquarie University (Partner)
- Ms Reign MacMillan, University of Sydney (Centre Operations Manager)
- Mr Paris Michaels, Air@Wave Communications (Partner)
- Dr Murray Parkinson, Bureau of Meteorology (Partner)
- Assoc. Prof. KC Wong, University of Sydney (Admin Organisation)

8.4 Advisory Board

The purpose of the Advisory Board is to provide the Training Centre's Directors with objective advice, insights, and recommendations towards achieving the aims of the Training Centre. In order to be independent, the Advisory Board exists outside of the Centre, and serves at the behest of the Centre Directors. The Advisory Board is intended to focus on broader strategic matters, but has no fiduciary obligations or oversight. Individual members of the Board may be approached for technical advice if needed. However the purpose of the Board is not to get involved in the technical detail; instead they are asked to provide high-level strategic guidance drawing on expertise and links that may not already be within the Centre.

Meetings are to be held bi-annually, with one contiguous with the Centre's annual workshop. There are up to 7 members of the Advisory Board including the Chair, Deputy Chair, and up to 5 additional Board Members. Membership of the Board is determined by the Management Committee and is reviewed every two years.

Current Advisory Board members:

- Dr David Dall, Department of Agriculture (Chair)
- Mr Mike de La Chapelle, Boeing
- Prof. Maryanne Large, University of Sydney
- Dr Naomi Mathers, International Centre for Complex Project Management (Deputy Chair)
- Dr Craig Mudge, University of Adelaide
- Prof. Andrew Skidmore, Twente University and Macquarie University
- Mr Greg Tyrrell, Australian Association for Unmanned Systems

8.5 Progress Meetings

Progress meetings are held 3 – 4 times a year. All Chief Investigators, Partner Investigators, Postdoctoral Researchers and Centre Personnel are invited to this meeting to discuss progress on Centre projects and launch campaigns. Each project CI / PI must give a verbal progress report and submits a progress survey response. This facilitates cross-project communication and collaboration and allows the Directors to track progress against funder KPIs for ARC Annual Reporting.



9. EQUALITY AND DIVERSITY

CUAVA doesn't yet have the critical human mass needed to establish its own Equality and Diversity Committee. However, we are committed to these principles and will participate in the School of Physics Equity and Diversity Committee and apply University policy and best practice to our own. The goals of the School of Physics Committee are to devise policies, priorities and actions for the School of Physics (and for CUAVA as part of the School), to promote equity of opportunity and access across all areas of the School, to make our work environment supportive of all staff and to actively remove diversity biases, both conscious and unconscious. Their aim is to implement, monitor and continually improve their Equity and Diversity programs.

10. SUCCESSION PLAN

Following is the current plan for succession in each of the operational and project areas of the Centre:

Management Role	Current Appointee	Potential Replacement
Centre Director	Iver Cairns	Eleanor Bruce
Deputy Director	Andrew Dempster / Eleanor Bruce	Elias Aboutanios / Joe Khachan or Sergio Leon-Saval
Centre Manager	Reign MacMillan	Stefan Manidis
Training Centre Engineer	Xueliang Bai	Joon Wayn Cheong (UNSW)
Project 1.1 Leader	Joe Khachan	Iver Cairns / Weitang Li (PI) / Xiaofeng Wu
Project 1.2 Leader	Paris Michaels (PI)	Air@wave TBC / Iver Cairns
Project 1.3 Leader	Iver Cairns	Xiaofeng Wu / Andreas Antoniadis (PI)
Project 2.1 Leader	Sergio Leon-Saval	Chris Betters / Jon Lawrence (MQ)
Project 2.2 Leader	Sergio Leon-Saval	Chris Betters / Jon Lawrence (MQ)
Project 2.3 Leader	Eleanor Bruce	Brad Evans / Chip Bachman (PI)
Project 2.4 Leader	Jason Held (PI)	Andreas Antoniadis (PI) / Iver Cairns / Andrew Dempster (UNSW)
Project 3.1 Leader	Eleanor Bruce	Brad Evans / Roy Hughes / Kevin Davies / Chip Bachman (PI)
Project 3.2 Leader	Eleanor Bruce	Brad Evans / Roy Hughes / Kevin Davies / Chip Bachman (PI)



Project 3.3 Leader	Andrew Dempster (UNSW)	Joon Wayn Cheong (UNSW) / Elias Aboutanios (UNSW) / Roy Hughes
Project 3.4 Leader	Andrew Dempster (UNSW)	Joon Wayn Cheong (UNSW) / Dave Neudegg (PI) / Kirco Arsov (PI)
Project 3.5 Leader	Jason Held (PI)	Andreas Antoniadis (PI) / Iver Cairns

11. OUTREACH AND CITIZENSHIP

11.1 Outreach

Outreach activities directed to students, industry, government, academia, and to the general public are important for:

- (a) Attracting new students and collaborators into CUAVA,
- (b) Catalysing and improving our own ideas and programmes with aligned groups for the benefit of CUAVA and in the interests of developing national capabilities,
- (c) To increase the public's support for the space and UAV sectors.

The Outreach activities that we aim to undertake include:

- Recruitment events at Sydney University and Macquarie University (plus UNSW if desired)
- Giving talks at AYAA Futures, CoSPAR and other suitable student conferences.
- Use feeds to our CUAVA Mission Operations Centre (at Saber or Sydney University), so the public can experience the reality of Australian satellites and the data we collect.
- Attendance and active participation in conference and industry events focused on the space and UAV sectors (whether in Australia or elsewhere)
- Starting a monthly social get-together for start-ups and other SMEs in the space and UAV sectors in Sydney.
- Have CUAVA people, including students, do engage with the media and use the CUAVA news and blog pages, and social media to tell people about our work.
- Participate actively in consultation events related to the Australian Space Agency, the Australian Academy of Science and the Australian Academy of Technology and Engineering, and other professional and industry groups.
- Consider doing public outreach events such as “satellite viewing events”, similar to Astronomy Society groups, at places like Sydney Observatory; this could be done by eye in reasonably dark locations, with or without apps like Heavens Above, or could involve cameras and telescopes.



11.2 Citizenship

CUAVA is comprised of people who are in widely dispersed locations. One of the challenges that groups of this nature face is establishing a sense of identity and belonging. In order to foster better group cohesion, we have established the notion of the CUAVA Community. This has been facilitated by the creation of monthly CUAVA Community Gatherings, which is a primarily casual networking event for all CUAVA people, but also offers the opportunity for students to give research talks, network with Industry partners, and collaborate more broadly with other members of CUAVA. We will also hold a CUAVA Picnic on a weekend in November, which will be an opportunity for all members of the CUAVA Community to socialise outside of work.

Branded t-shirts were distributed to everyone that attended our annual workshop. The CUAVA Community wear their shirts when representing the Centre at public events or conferences, or whilst doing fieldwork. Not only does this create a sense of belonging, but it also promotes our brand and improves the effectiveness of our outreach efforts, particularly when CUAVA members also engage with social media at the same time.

12. MARKETING AND COMMUNICATION

12.1 Marketing Objectives:

- Raise profile of CUAVA within University, Industry, and Publics areas.
- Attract students, collaborators and investors.
- Establish our brand through development of website, social media, and promotional material.

Actions:

(a) Engage with Sydney University Marcomms to develop a more targeted marketing external strategy. At present promotional efforts are disseminated directly to stakeholders and reliant on their marketing channels. This makes it impossible to measure the efficiency of marketing efforts, and almost certainly keeps information from getting out more widely than it could.

(April 2020)

(b) Develop a full suite of promotional material in the style of our new PhD flyer. This should include a 4-page brochure which has information on CUAVA projects included.

(April 2020)

(c) Produce some tangible display items for exhibitions and conferences, such as a 3D printed CubeSat, which will create more visual interest in our exhibition displays.

(ongoing)



The CUAVA website has been operating since 2018, and now has some additions made to include more information on the CubeSat projects. Included there are direct links and downloadable information on how to apply for a scholarship in response to the difficulty some prospective students have had in finding the correct information on the Sydney University website. There is a blog on our website where events, news, and media releases are posted along biographical information on our partners and their organisations. We use the CUAVA website to direct inquiries from the general public and other interested parties, and as our primary mode of providing information on our activities and brand.

12.2 Communication Objectives

- Publicising news and events.
- Support and promote timely, strategic, and efficient use of Centre resources.
- Disseminating information to ensure all stakeholders are aware of relevant updates, concerns, actions needed.
- Managing expectations and maintaining engagement.
- Collecting feedback from stakeholders.

The Centre Stakeholders are:

- CUAVA Directors
- CUAVA Management Committee
- CUAVA Advisory Board
- CUAVA Chief and Partner Investigators
- CUAVA Staff and Students
- Australian Research Council
- Sydney University Research Portfolio
- Sydney University School of Physics (Head of School, School Manager, School Executive Officer)
- Sydney University Faculty of Science
- Sydney University Faculty of Engineering
- Sydney University School of Geosciences
- Sydney University School of AMME
- RAAP and other donors / funding bodies

12.3 Communication Action Plan

Implementation and evaluation:

This communication action plan will be revised on an ongoing basis by the Centre Operations Manager and will be evaluated by the Centre Directors.

Timing	Channels	Key messages / content / purpose	Audience	Responsibility
Ad hoc	Email, Website, Twitter, University / School twitter and website	Media releases	All Stakeholders, University community, Government and Industry groups, General Public, News outlets	Operations Manager
Monthly	Email	Management Committee meetings, agenda	CUAVA Management Committee	Operations Manager
Monthly	Email	Management Committee minutes circulation	CUAVA Management Committee, Advisory Board	Operations Manager
Monthly	Email	Sydney CI meetings, agenda, minutes	CUAVA Sydney Chief Investigators	Operations Manager
Bi-monthly	Email	Progress meetings and progress survey responses	CUAVA Staff, Chief and Partner Investigators, Postdoctoral Researchers	Operations Manager
Annually	Email, TEAMS site	CUAVA Workshops	CUAVA Directors, Management Committee, Advisory Board, CUAVA Chief and Partner Investigators, CUAVA Staff and Students	Operations Manager
Ad hoc	Email, TEAMS site	CUAVA Speaker Series	All stakeholders, targeted groups, Events email group, relevant Sydney University depts (Marcomms, Global Engagement, Development, Scholarships)	Operations Manager, Speaker Host
Monthly	Email, TEAMS site	CUAVA Community Gatherings	CUAVA Directors, Management Committee, CUAVA Chief and Partner	Operations Manager



			Investigators, CUAVA Staff and Students	
Annually	Email	Reports to funding bodies	ARC, RAAP	Director, Operations Manager
Ad hoc	Email, Website, Twitter, University / School twitter and website	Event publicity	All stakeholders, targeted groups, Events email group, relevant Sydney University depts (Marcomms, Global Engagement, Development, Scholarships)	Operations Manager, Directors
Biannual	Email	Advisory Board meetings	Advisory Board members, CUAVA Directors	Operations Manager
Ad hoc	Email, Phone	PhD Programme inquiries	Prospective students	Operations Manager, Directors, CI / PIs
Ad hoc	Twitter, Blog, Email	Updates on CUAVA activities	All Stakeholders	Operations Manager