



Australian UAV Service Guide to Surf Life Saving Club Use of UAVs



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Re: Australian UAV Service Guide to Surf Life Saving Club Use of UAVs

Surf Life Saving NSW's Australian UAV Service (**AUAVS**) has recognised the need to provide guidance to Surf Life Saving NSW Branches and Surf Life Saving Clubs about how the UAVs can be readily utilised by Surf Life Saving Clubs (SLSCs). This *Guide* covers all applicable regulations, people and training, assets and maintenance, and operations of uncrewed aerial vehicles within the context of Surf Life Saving NSW and provides a Standard Approach to SLSC UAV enablement. A broad cross-section of SLSNSW staff, and Branch executive members were engaged in preparing and reviewing this report, and this *Guide* has the approval of the SLSS and SLSNSW Boards.

The report was written within the context of Australia's Civil Aviation Safety Authority CASR Part 101 Manual of Standards.

This *Guide* provides an exciting opportunity for Surf Life Saving NSW (SLSNSW) and Surf Life Saving Clubs (SLSCs) in NSW to continue to deepen their collaborative working relationship with regard to our mission of increased public safety. This *Guide* also has the potential to set the foundations for an ongoing close working relationship with regard to uncrewed aerial vehicles (UAVs) between SLSNSW and NSW SLSCs into the future.

For all enquiries on this Report please contact Paul Hardy (phardy@surflifesaving.com.au) or 0438 664 622.

Kind regards,

Paul Hardy

Australian UAV Service, SLSNSW

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1. Terminology

A list of common acronyms used in the AUAVS Guide to SLSC use of UAVs:

AGL – Above Ground Level

AOC – Air Operator's Certificate

AROC – Aeronautical Radio Operators Certificate

ATC – Air Traffic Control

ATSB – Australian Transport Safety Bureau

AUAVS – Australian UAV Service

BVLOS – Beyond Visual Line of Sight

CASA – Civil Aviation Safety Authority

CRP – Chief Remote Pilot

EVLOS – Extended Visual Line of Sight

FPV – First-Person View

LEO – Location Equipment Officer

NM – Nautical Mile

OIP – Operator Induction Program

RePL – Remote Pilot Licence

RPA – Remotely Piloted Aircraft

RPAS – Remotely Piloted Aircraft Systems

SAR – Search and Rescue

SLSC – Surf Life Saving Club

SOP – Standard Operating Procedures

UAV – Uncrewed aerial vehicle

VLOS – Visual Line of Sight

2. References

Below are a list of documents, for further reference.

- UAV Standard Operating Procedures (SOPs): *attached as reference document*
- Outline of SLSNSW Training Requirements and Processes: *attached as reference document*

3. Background

The Australian Uncrewed Aerial Vehicle Service (**AUAVS**) is an operational unit of Surf Life Saving Services Pty Ltd (**SLSS**), a wholly owned subsidiary of Surf Life Saving NSW (**SLSNSW**). The AUAVS is the provider of the largest coastal uncrewed aerial vehicle (**UAV**) (drone) surveillance program in the Southern Hemisphere.

AUAVS began with the intent of using UAVs as a means for shark mitigation along the NSW coastline. Since 2017, AUAVS has partnered with NSW DPI to provide marine wildlife surveillance and coastal safety activities along the NSW coastline, as one of the risk mitigation methods trialled under the SharkSmart program. UAVs delivered by AUAVS under the SharkSmart program rapidly showed great success in both the mitigation of dangerous marine creatures and the safety of the beach users and were formally included as a primary mitigation method in 2019. This breakthrough demonstrated how a UAV can respond quickly as an agile tool that provides a unique vantage point to search large areas in addition to spotting rips and other environmental hazards.

The ongoing and overwhelmingly positive feedback from independent community engagement conducted by NSW DPI has resulted in operations at 50 key locations along the NSW coastline today. As the capabilities and standard of service delivered by AUAVS grew, AUAVS gained attention from external who requested assistance to conduct operations to ensure the safety and shark mitigation during various community events and competition.

Throughout this time AUAVS has included and engaged volunteers throughout the state as part of the volunteer's membership program. Volunteers have been able to operate UAVs provided as part of the NSW DPI Shark Mitigation at the selected 50 locations to gather additional situational awareness on patrols and provide water safety for carnivals and events. By implementing UAVs into SLSCS and allowing volunteers to train and operate UAVs, AUAVS has found that it has opened Surf Life Saving to a more diverse cohort of community members, people that may not have traditionally been able to become a lifesaver due to physical ability or age can become involved. This has resulted in a new category of members that can be utilised for UAV operations as opposed to relying on members that are already involved in the SLSC.

4. Operations at a SLSC:

UAVs provide an aerial perspective that allows lifesavers to monitor large areas of the ocean quickly and efficiently. With the help of high-definition cameras and thermal imaging technology, UAVs can detect rip currents, sharks, and other hazards that may be less visible to the human eye. UAVs can also assist in locating missing swimmers and provide a bird's-eye view of the ocean for better search and rescue operations. By incorporating UAVs into their operations, SLSCs can improve their response times, reduce the risk to lifesavers, and enhance the safety of the community.

An UAV Operational Zone is setup on a beach with a 30mx30m exclusion zone (a CASA requirement), often situated behind the IRB area. From there the Pilot/Operator can take off, conduct patrols and gather information on the beach to pass onto the Patrol Captain or Lifeguard.

UAVs at SLSCs are not intended to replace other SLS operations but enhance them as another tool for Patrol Captains or Lifeguards to use for situational awareness and decision making.

Below are some ideas of operations UAVs can perform at your beach:

- Shark Patrols
 - Throughout normal weekend patrol duties
 - Prior to and during any in water training sessions
- Hazard identification
 - Rip Identification
 - Foreign object investigation
- Safety / Risk Assessment
 - Can identify areas that might need to be identified in a beach safety assessment prior to a patrol, training session or event.
- Search and Rescue (SAR)
 - Search patterns for missing people in water
 - Land based searches.
 - Identification of missing children / parents
- Risk reduction for lifesavers
 - UAVs can be utilised to investigate hazards and conduct searches during large swell or dangerous conditions that may pose a risk to lifesavers or lifeguards
- SLSC growth / retention
 - UAVs provide an opportunity for those not wishing to be involved in an aquatic role on patrol to become involved with a SLSC and become an integral part of a patrol team
 - It is an opportunity for older members of the SLSC to stay involved on patrol when they reach a stage that they may not be able to physically remain proficient.
- Pathways for young SLSC members
 - Opportunity for younger members to become involved in a new and evolving industry that may lead to opportunities with AUAVS and other organisations down the path.

5. Regulations

All UAV operations in Australia are regulated by the Civil Aviation Safety Authority (CASA) who set out laws and regulations that must be abided by all operators. AUAVS and SLSNSW have incorporated these into our UAV Standard Operating Procedures, ReOC Library and ReOC Manual (Library and Manual only relevant to complex operations approved by AUAVS).

5.1 Standard Operating Procedures

The UAV Standard Operating Procedures (SOPs) provide instructions for the operation and management of Uncrewed Aerial Vehicles (UAVs) and all persons involved in the operation of UAVs that are operating under Surf Life Saving New South Wales as Excluded Commercial Operators, under the following SLSNSW awards:

- UAV Operator (non-RePL)
- UAV Pilot (RePL)

Award proficiency is a requirement of using any SLSNSW UAVs.

Most SLSC's operate in unrestricted airspace (Class G) and do not require pilots to have an RePL.

A RePL is required for pilots at SLSC's whose operations are within 3NM (nautical miles) of an operational Airport (Class C) or operate within Restricted Airspace, e.g., military airports etc and the aircraft being flown is heavier than 250 grams. The SLSC can reach out to AUAVS for a location specific airspace assessment by emailing uav@surflifesaving.com.au, alternatively the SLSC can check the airspace via [ok2fly](#) an online airspace checker.

In order to avoid large costs in training RePLs (approximately \$2,000.00 per student), UAVs under 250 grams can be used, for instance the Mavic Mini 3 Pro which weights 249 grams and would only require a UAV Operator to fly it. AUAVS currently uses the Mavic Mini 3 Pro in its fleet in similar situations and have delivered several commercial events using this product. Please note there are a small number of SLSCs within close proximity to airports that may not be able to facilitate the use of sub 250-gram UAVs due to it being directly within the runway splay of the airport – an example of this is Coogee Beach.

SOPs are subject to change at any time and should be considered non-current once printed. The most up-to-date version is available via the SLSNSW [UAV webpage](#) and via the Document Library in the SLSNSW [AVCRM portal](#).

These SOPs are aligned to the Standard Operating Conditions outlined in [Civil Aviation Safety Regulations, Part 101](#), however, for ReOC Operations, the ReOC Operations Manual takes precedence in all circumstances.

5.2 Agreement Overview

To proceed, the SLSC and AUAVS will be required to sign an agreement (Appendix 1), a summary of which is outlined below.

AUAVS will:

- Provide all required equipment, including UAV Kit, Cleaning Kit, (outlined below in Appendix 1), upon payment of initial invoice;
 - *Note: Equipment provided to SLSCS will be at the cost incurred to acquire the equipment by AUAVS.*
- Ensure that the UAV assets are maintained and repaired in a timely manner;
- Provide the SLSC with any AUAVS specific care & maintenance procedures for the UAV;
- Provide guidance on the implementation and use of UAVs within the SLSC;
- Provide the SLSC with all relevant documentation and inform the SLSC on any updates to standard operating procedures.

The SLSC will:

- Ensure all minimum equipment is purchased and setup appropriately;
- Ensure that only qualified persons from the SLSC use the UAV and that it is used in accordance with standard operating procedures;
- Ensure that flight records are maintained and recorded through AVCRM at the completion of any operations;
- Ensuring the UAV is only utilised for the provision of patrol services and training;
- Ensure that the UAV is cleaned after each use and stored in accordance with normal post-operation and provided care & maintenance procedures;
- Report any maintenance and repair issues with AUAVS staff in a timely manner;
- Provide the AUAVS with any SLSC specific access procedures;
- Ensure the UAV is securely stored at the conclusion of patrol and required items are on charge.

6. People and training

6.1 Roles and Responsibilities

UAV Operator

The UAV Operator in command of the aircraft is responsible for:

- Creation of pre and post flight logs via AVCRM
- Conduct of flight in accordance with company procedures;
- Safe operation of the aircraft;
- Acting in accordance with company procedures;
- Follow the Standard Operating Conditions as defined by CASA's legislation.
- Ensure thorough cleaning post flight is completed and batteries with 30% charge or less are placed on charge.
- Batteries are to be inspected prior to charging as per Battery Management Procedure.

Club UAV Officer

This role is required for a SLSC to own a UAV. The Club UAV Officer must have held a UAV Operator Award (completed OIP) for at least 2 seasons and have a minimum of 30 flight hours. The AUAVS team can assist in identifying any members in a SLSC who may already meet these requirements.

The Club UAV Officer's responsibilities include:

- Assisting the UAV Maintenance Officer to maintain and service the UAV's and all associated equipment at the SLSC
- Support and guide the local UAV Operators/Pilots
- Ensuring the UAV Operators / Pilots are building capability
- Conducting Beach inductions for new UAV operators / pilots
- Rostering UAV operators/pilots
- Liaising with AUAVS Maintenance Officer, Club Captain and or DOL & Branch UAV Coordinator

Essential Skills

- Well-developed oral and written communications skills;
- Strong stakeholder management skills
- Proven ability to work independently and part of a team;
- Excellent computer skills in a number of Microsoft Office applications;
- Self-motivated with a can-do attitude;
- Proven ability to prioritise tasks and multitask;
- Excellent interpersonal skills at all levels;
- Ability to maintain a high degree of confidentiality;
- Excellent organisational skills;
- Proven ability to exercise effective judgment, sensitivity, creativity to changing needs and situations;

Desirable Skills and Knowledge

- RePL
- A background within Surf Life Saving and / or thorough understanding of lifesaving operations.
- An understanding of radio technology / equipment;

Club Captain / Club Director of Lifesaving

The Club Captain / Club Director of Lifesaving will oversee the operation of UAV's, including:

- Oversight of UAV program at the SLSC;
- Oversight and support provision to the Club UAV Officer;
- Ensure integration of UAVs into existing Lifesaving operations/patrols;
- Ensuring adequate space for storage and charging of equipment in a safe location.
- Regular communication with Club UAV officer, ensuring smooth running of the UAV program within the SLSC.

Branch UAV Coordinator

The Branch UAV Coordinator is a volunteer position responsible for supporting all SLS UAV membership operations within their respective SLS Branch.

The Branch UAV Coordinator will oversee the operation of membership UAV's, with Key Activities including:

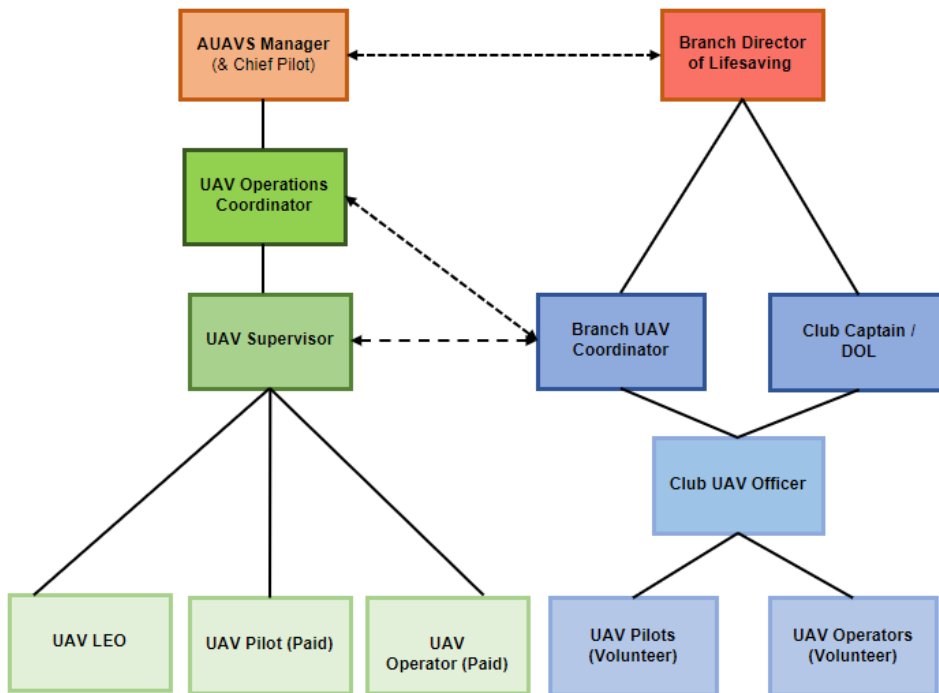
- Rostering overview of all volunteer UAV Operators and Pilots within their Branch;
- Regular communication with Surf Life Saving Clubs within their Branch including asset utilisation arrangements;
- Regular communication with volunteer UAV Operators and Pilots in the effective function of UAV operations;
- Assist with maintenance logistics where required and asset storage of volunteer utilised assets;
- Ensure all media enquiries surrounding UAV operations are directed to the Media team, Media Duty Officer and/or SLSNSW State Operations Centre;
- Assistance in scheduling of training programs, recency flights and annual proficiency checks for volunteers;
- Ensure any data collection requirements are undertaken and maintained;
- Provide assistance to volunteer UAV Members and Clubs;
- Creating opportunities for UAV operations and recruitment beyond regular beach patrols by establishing a presence at branch and club events such as carnivals, ocean swims and open days;
- Ensure UAV Operators and Pilots (volunteer) comply with relevant policies and SOPs;
- Widespread promotion and recognition of the SLS UAV operations;
- Develop ongoing relationships with relevant SLSNSW Branch Presidents, Directors (Lifesaving and Education), clubs and members;

5.2 Reporting

UAV Operators/Pilots report to the Club UAV Officer, who in turn reports to the Club Captain / Club Director of Lifesaving.

The Club Captain work with the Location Equipment Officer (LEO) and Branch UAV Coordinator.

Please see below a suggested reporting structure



**Lateral (horizontal) lines between Branch UAV Coordinators and UAV Supervisors for example are a communication line and not a reporting line*

5.3 Training

UAV Operator Induction Program

All new volunteer member UAV Operators/Pilots are required to pass a 2-day Operator Induction Program prior to conducting UAV operations. The Branch UAV Coordinator is responsible for managing volunteer UAV OIPs for Operator Candidates within their Branch in consultation with Branch Director of Education as agreed. The UAV Instructor Handbook should be utilised as a guide for booking and conducting an OIP. This course is delivered by UAV Instructors at a ratio of 5 students per instructor. This involves a knowledge component and practical activities to run attendees through AUAVS operations and beach flying specifics. The entire program is a fantastic way to develop member knowledge of UAV theory/Air Law, types and components of UAVs, AUAVS standard operating procedures and is a great chance to get to know the team and ask any questions.

Your local branch may have Volunteer UAV Instructors that are able to facilitate and train Operator Induction Programs, this typically comes at no cost except for land usage where necessary.

To organise a course through your branch please reach out to your Branch UAV Coordinator.

The SLSC will be required to provide a location for both theory delivery (single room with tv and HDMI cable) and outdoor areas in Class G airspace practical activities (field work and beach activities).

UAV Instructors

Our experienced UAV Instructors are specifically qualified to deliver relevant training courses for volunteer members across the state. They are capable of delivering the Operator Induction Programs, a course required for all new UAV Operators/Pilots within the AUAVS, along with annual proficiency checks. Every Branch has trained UAV Instructors.

AUAVS has a number of Volunteer UAV Instructors stationed throughout the state. Branches should utilise these experienced UAV Instructors to deliver volunteer programs, allowing SLSCs the ability to organise and run their own UAV OIP training. Please advise AUAVS if a Branch requires more volunteer UAV Instructors to support delivery and we can discuss options around training specific Instructors for the SLSC in the long term.

Each year branches are typically allocated some spots at no cost to upskill some high performing volunteer operators and pilots to UAV Instructors. Outside of this, SLSCS can nominate suitably qualified and experienced pilots (must hold RePL) to be trained as a UAV Instructor, with the cost to be covered by the SLSC.

7. Assets and Equipment

UAVs

We recommend that SLSCs purchase a minimum of two aircraft to ensure that there is always a UAV accessible if one requires maintenance or repair.

Any UAVs purchased solely by the SLSC will be available for use only to the SLSC and will not be accessible by AUAVS, unless an agreement between the parties contrary to this has been entered.

UAVs do not have to be purchased through AUAVS; however, they must be purchased brand new through an Authorised DJI Retailer and comply with AUAVS maintenance requirements. The aircraft must be stickered in SLS Branding with guidance provided by AUAVS, SLSCs may wish to purchase this through AUAVS. It must be noted that AUAVS highly recommends purchasing UAVS through AUAVS, due to the purchasing power available to procure assets at discounted prices, typically less than that readily available to consumers. AUAVS undertakes a request for quotation annually to assess the most financially viable provider for UAVs, maintenance and support services.



UAVS are replaced after a maximum of 3 years. After 3 years of service, there may be opportunity for resale/trade-in, to be managed by AUAVS. Income from trade-ins will be credited back to the SLSC.

There are two options for the purchase of aircraft, that being the DJI Mavic 3 Enterprise (1,050g) or the DJI Mavic Mini Pro (249 grams). AUAVS preference is the DJI Mavic 3 Enterprise due to its increased durability, increased flight time and ability to attach payloads such as speakers which has proven imperative in rescue and shark sighting situations.

It must also be noted that as per AUAVS Standard Operating Procedures the Mavic 3 Enterprise has a maximum VLOS range of 500m from the UAV Pilot/Operator as opposed to a Maximum VLOS range of 300m on the Mavic Mini 3.

As per AUAVS SOPs all UAVs in the SLSNSW fleet must be serviced once per year or every 150 flight hours.

The below table summarises the key differences in both aircraft:

	Mavic 3 Enterprise	Mavic Mini Pro 3
Image		
AUAVS SOPS VLOS	500m	300m
Take-off Weight	1,050g	249g
Payloads	Speaker, Lights, RTK Module	N/A
Max Speed	21m/s	16m/s
Flight Time	45 min*	34 minutes*
Max Hover Time	38 min*	30 min*
Wind Speed Resistance	12 m/s	10.7 m/s
Operating Temp	From -10 to 40 D/C	From -10 to 40 D/C
Obstacle Sensors	6	3
CMOS Camera	4/3	1/1.3
Pixels	48MP	48MP
Zoom	8x (x56 Hybrid)	4x
Notes	*In ideal operating conditions with new battery	*In ideal operating conditions with new battery

Annual Fees:

Each SLSC will be required to purchase an annual subscription to AVCRM for their SLSC. Clubs will not be able to utilise branch AVCRM accounts due to the need to separate operations to ensure ongoing compliance standards can be met. Clubs will also be required to pay a small annual fee for insurance and CASA registration.

UAV Repairs, Spare Parts and Replacements

If a UAV is damaged during operations AUAVS will endeavour, if possible, to have the UAV replaced under Warranty or DJI Enterprise Care through the maintenance service provider.

Crashes or damaged that are deemed to have been a result of Pilot/Operator error may incur additional cost to the SLSCs.

If an accident or incident does occur, it must be reported [here](#).

Summary of Costs

Please contact AUAVS for a costings document, which is updated annually in line with AUAVS annual industry Request for Quote.

8. Sponsorship of Equipment

AUAVS and SLNSW understand that the above costs may provide a barrier to some clubs who wish to purchase UAVs. For many SLSCs', sponsorship is an avenue that is a necessity when purchasing new equipment.

AUAVS and SLNSW support this and can provide options that might make the purchase of UAVs more appealing to sponsors.

Please note that all sponsorship agreements must be made between the SLSC and sponsor, AUAVS and SLNSW must not be named in the agreement.

Sponsorship options:

- Please note all custom designs come at an additional cost which will be quoted on an individual basis;
- Custom A-Frame warning sign (requirement) with sponsors logo and name on it
- Custom skinning on the DJI Mavic 3 Enterprise
 - Logo of the Sponsors on the drone in addition to SLS Colours
- Custom High-Vis Vests with sponsors logo on it
- Custom Landing pads with sponsors logo
- Custom UAV Tents with Sponsors Logo

9. Future Vision and Projects

AUAVS is involved with a wide range of projects throughout New South Wales and Australia. These projects may provide opportunities for pilots to become involved. Below is a short description of a select number of projects.

Emergency Response - Coastal

UAVS are being regularly requested and tasked by NSW Police and SLSNSW State Duty Officers to conduct search and rescues and provide situational awareness for critical incidents. AUAVS typically utilises Mavic 2 and Mavic 3 Enterprises for an initial response, deploying larger and more weather capable assets DJI M30 and M300RTK to support more prolonged deployments.

AUAVS is currently in the process of developing a Standard Operating Procedure for the utilisation of UAVs in Search and Rescues and critical incidents, which will be distributed to all relevant stakeholders once complete.

Flood Response

Since 2020 AUAVS and SLSNSW have been engaged by the NSW SES to provide on-water and UAV teams in support of major flood events through the agreement of interagency requests and memorandums of understanding.

Typically deploying casual staff AUAVS has had staff attend six major flood events, including one from October-December 2023 which saw two teams continually deployed in the field for the entirety of the event.

UAVS are utilised in flood events to provide situational awareness, assist in risk assessments, gather intelligence and generate orthomosaic models (3D Models) for the NSW SES Geospatial Intelligence Systems Team.

Long Range Project

The AUAVS Long Range UAV Project (Project) funded by NSW Government aims to safely trial multiple beyond visual line of sight (BVLOS) capable platforms with extensive range and endurance to examine their effectiveness for multi-use operations in public safety and emergency response in coastal and inland environments.

The AUAVS hopes to demonstrate how a long-range BVLOS platform could be incorporated as a 'layered' solution on top of our existing coastal delivery at 50 locations under the DPI partnership and the additional 35 self-funded UAVs provided in SLS Emergency Response Vehicles. The Project anticipates that Long Range capabilities will enable a vastly increased amount of coastline to be covered, adding to the present service delivery of visual flight at these locations, and changing the nature of SLS public safety provision moving into the future. It is also expected that a long-range capability would significantly improve mobilisation and response for time sensitive operations whilst minimising cost and risk to worker safety.

The Project aims to test and evaluate the capabilities of a variety of platform types and models of operations to deliver a report on their effectiveness in three key areas:

- Shark detection and ID
- Search for missing persons
- Natural disaster situational awareness

RePL Licensing Project

The AUAVS is progressing a project to license content, acquire the relevant resources and recruit qualified personnel that will enable internal delivery of Remote Pilot License courses to our staff/volunteer members as required. This will enable efficient and cost-effective delivery of the license to upskill staff and increase our capabilities in required locations throughout the state. The project will also enable the AUAVS to expand its training and education section for commercial partnerships and future opportunities.

Lifesaver Drone Outreach Program (LDOP)

This Face-to-Face School Incursion brings Surf Life Saving Pilots into schools and other education settings to provide those U16 an experience of what it's like to be a drone pilot/whiz.

The Australian UAV Service delivers LDOPs in partnership with SheMaps, who wish to see more women in the uncrewed aviation industry.

Students and kids learn how to use a drone safely, and to solve issues with drones and learn coding.

In 2022, there were seven courses delivered around ACT/NSW, with around 500 students completing the program. AUAVS is looking to expand its horizon with delivering more courses in 2023 and beyond.

AUAVS can deliver this course to SLSCs for a fee, please reach out to us for further information.

Newsletter

Find out more about our development and capability growth by signing up for our monthly newsletter [here](#).