Australian Government
Department of Defence
Science and Technology

DSTG Summer Vacation Placement Program

2021 - 2022

Proposed Summer Vacation Placement Projects

List of Abbreviations

Division	Abbreviation
Air Division	AD
Cyber and Electronic Warfare Division	CEWD
Intelligence, Surveillance & Space Division	ISSD
Joint Operational and Analysis Division	JOAD
Land Division	LD
Maritime Division	MD
Research Services Division	RSD
Science Engagement and Impact Division	SEID
Weapons and Combat Systems Division	WCSD

Research Stream	Abbreviation
Aerospace / Aeronautical Engineering, Naval Architecture Stream	AAENA
Chemical, Radiological, Biological, Food Sciences Stream	CRBFS
Computer Sciences, IT, Software Engineering, Telecommunications Stream	CSITSET
Electronic / Electrical Engineering Stream	EEE
Materials Science Stream	MS
Mathematics and Physics Stream	MP
Mechanical and Mechatronic Engineering (including Robotics) Stream	MMER
Psychology and Social Sciences Stream	PSS

Division	Location	Project Title	Project description	Desirable Skills	AAENA	CRBFS	CSITSET	EEE	MS	MP	MMER	PSS
AD	Fishermans Bend, Victoria	Validation of aircraft system identification methodologies	Flight vehicle system identification is a procedure for extracting a dynamic model of an aircraft from the measured response to specific control inputs. Applications include validation/improvement of physics-based simulation models, flight-control system development, and handling-qualities assessment. To further DSTG's research into flight-vehicle system identification methodologies, a sovereign system identification toolset has been developed within the Flight Mechanics group. This project will provide the student with fixed and rotary wing flight test data to exercise the toolset and validate its suitability for use in assessing ADF aircraft platforms and supporting DSTG research activities.	• Successful completion (by the commencement of the placement) of the following subjects to third year engineering level is highly desirable: preliminary aircraft design, aircraft performance, aerodynamics, propulsion. • Computational programming skills, Matlab, C or C++, Python, etc., are highly desirable • Excellent communication skills • Ability to work independently and integrate into a small team	X							
CEWD	Edinburgh, South Australia	Tools for deceptive cyber defence	In this project, the student will research and develop techniques for cyber defenders to redirect malicious traffic. These will be tested in the CybORG cybersecurity simulation framework.	• Software development skills and knowledge of the Python language. • Experience with, or an interest in, cybersecurity. • An ability to work in teams.			X					
CEWD	Edinburgh, South Australia	Memory and disk artefact similarity	As part of the Tactical Threat Response team, you will be helping to develop novel approaches to detect cyber threats on operational systems. One technique that requires further analysis is correlating memory artefacts to identify their source on disk. This project will investigate the use of the Kajura framework developed by DSTG to assess its suitability for this task and develop new algorithms that work on subsets of memory regions. You will use and learn about open-source disk and memory forensics tools; perform analysis on the data and experiment with different correlation techniques.	• Useful skills include: ○ experience in coding in Python, ○ interest or experience in computer forensics, ○ interest or experience in computer architecture, ○ interest in computer system security, ○ working collaboratively in a team environment.			X					
CEWD	Edinburgh, South Australia	Practical Adversarial Machine Learning	Adversarial machine learning (AML) aims to disrupt the effective use of machine learning techniques increasingly adopted in everyday life. This project will allow the student to gain knowledge of AML in the context of cyber security. Attacks on ML and possible defences will be investigated using existing toolkits. A practical study in a relevant field such as social media, wireless communications or similar will be provided to examine the threat, perform attacks, analyse their effects and offer defensive measures to counteract them.	• Coding experience in Python. • Knowledge of machine learning techniques, particularly classification algorithms. • Ability to work in teams and independently.			X					
CEWD	Edinburgh, South Australia	State inference and event prediction through real-time machine-learning analysis of packet capture from a video game	Leveraging data science techniques including statistical analysis and machine learning, research and develop methods to analyse real-time network packet capture from a video game. Build protocol-agnostic models to infer the state of the player, predict events in the game environment, and deduce player behavioural patterns and triggers.	• Experience with Python • Familiarity with or desire to learn about data science methods, including statistical analysis and machine learning • Familiarity with or desire to learn about network protocols, particular the TCP/IP stack Preference for working in a team (this is a two student project)			X			X		
CEWD	Edinburgh, South Australia	State inference and event prediction through real-time machine-learning analysis of packet capture from a video game	Leveraging data science techniques including statistical analysis and machine learning, research and develop methods to analyse real-time network packet capture from a video game. Build protocol-agnostic models to infer the state of the player, predict events in the game environment, and deduce player behavioural patterns and triggers.	• Experience with Python • Familiarity with or desire to learn about data science methods, including statistical analysis and machine learning • Familiarity with or desire to learn about network protocols, particular the TCP/IP stack • Preference for working in a team (this is a two student project)			X			X		

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CEWD	Edinburgh, South Australia	Inferring high-level game states in a computer simulation game via side-channel analysis and modelling	Apply mathematical or computer science modelling techniques as needed to build a model of a computer game that can infer high-level game states from low-level side-channel data. Demonstrate that the model is able to inform a user of what game states have changed at different points in the game.	• Experience with programming languages such as Python or C • Familiarity with or desire to learn about modelling methods, including statistical analysis and machine learning. • Familiarity with or desire to learn about how operating systems lay out applications in memory and associated data structures, along with how applications commonly store data in memory, and how to collect data samples at this level. • Preference for working in a team (this is a two student project)			X			X		
CEWD	Edinburgh, South Australia	Inferring high-level game states in a computer simulation game via side-channel analysis and modelling	Apply mathematical or computer science modelling techniques as needed to build a model of a computer game that can infer high-level game states from low-level side-channel data. Demonstrate that the model is able to inform a user of what game states have changed at different points in the game.	• Experience with programming languages such as Python or C • Familiarity with or desire to learn about modelling methods, including statistical analysis and machine learning. • Familiarity with or desire to learn about how operating systems lay out applications in memory and associated data structures, along with how applications commonly store data in memory, and how to collect data samples at this level. • Preference for working in a team (this is a two student project)			X			X		
CEWD	Edinburgh, South Australia	Summarisation Techniques for Assisted Red Teaming	Assessing the cyber defences of an ICT system can involve reading vast quantities of system documentation, much of which can be irrelevant from a cybersecurity perspective. Document Summarisation is a Natural Language Processing technique that ranks the importance of sentences in a document and creates a document summary by returning only the most important sentences. By modifying the algorithm to highlight important sections of text rather than extract them, cyber operators can ingest important information in a more efficient and more effective manner without losing the surrounding context of the sentence.	• Experience with programming, preferably with Python • Knowledge of Natural Language Processing • Knowledge of Machine Learning • An interest in linguistics			X			X		
ISSD	Edinburgh, South Australia	Propagation modelling for passive radar	Passive bistatic radar is an emerging capability that relies on existing emitters in the environment, such as radio, TV or satellite signals. Predicting the performance of these radars requires understanding how Radio Frequency (RF) signals interact with the atmosphere and surrounding terrain. The task involves the collection and analysis of real-world data and comparison of existing mathematical models of propagation.	• Experience with statistical analysis, RF systems, meteorology and Matlab and/or Python is desirable, although training will be provided and the scope of the work can be adjusted to suit the skillset of interested students.	X			X		X		
JOAD	Fishermans Bend, Victoria	Visualisation of air combat using augmented/virtual reality	This project will explore the use augmented/virtual reality to visualise air combat and associated tactical decision-making in an aerospace simulation environment. This task will used advanced visualization to display complex scenarios and associated data including: key tactical decisions, data flow, communications networks, and electronic warfare effects.	• Experience in coding, with a preference for Python and C++ • General software development skills: source control, testing, documentation • A strong interest in augmented/virtual-reality technologies • Strong written and verbal communication skills • Ability to work both independently and as part of a small team			X					

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JOAD	Fishermans Bend, Victoria	Wason selection task	This project examines the influence of instruction format on a person's conditional reasoning.	• Logical reasoning skills. • Ability to discuss logic and psychology with a team. • Ability to conduct experiments with individual human subjects, who may be located remotely or be present in person. • Ability to fulfil workplace health and safety requirements and ethics requirements. • Ability to read, discuss, and summarise journal articles on the Wason selection task. • Experience in writing reports.								X
JOAD	Fishermans Bend, Victoria	Method Selection	This project will answer the research question "How should AEW define the inclusion and exclusion criteria for its knowledge elicitation methods, so that we can establish and continually extend a method selection scheme?" or implement the scheme. There are multiple lists of knowledge elicitation methods and we wish to rationalise this for AEW to support seminar wargame.	• Ability to read, discuss, and summarise journal articles on the Wason selection task. • General coding skills, with a preference for JavaScript • Skills in one or more of the following: Human Computer Interaction, Design, Visualization or Computer Game Design • Interest in User Experience • Ability to work in teams	x		x					x
JOAD	Fishermans Bend, Victoria	Reasoning for AI	Psychology and AI have different views on reasoning logic. This project will look at combining the different views on reasoning logic from psychology and AI AI research uses conditionals, important in reasoning research, as the dominant knowledge representation. An AI system may regard the affirmation of the consequent as a means of overturning a previous conclusion. Affirmation of the consequent is: if P then Q. Q. Therefore, P. In contrast, psychology research emphasises negation and treats the affirmation of the consequent as a fallacy.	• Ability to read, discuss, and summarise journal articles on the Wason selection task. • General coding skills, with a preference for JavaScript • Skills in one or more of the following: Human Computer Interaction, Design, Visualization or Computer Game Design • Interest in User Experience • Ability to work in teams	x		x					x
JOAD	Edinburgh, South Australia	Colonial Legacies and Local Agency: Power Relations in the Pacific	Using a Pacific country as a case study, explore the dynamics of power relations and its impact on forms of influence and building societal resilience. This may include an examination of concepts and issues around ideas of neo-colonialism, post-colonial identities, social inequality, social stratification, and social and cultural capital. At a macro-level, considerations may also extend to how regional strategies like the 'Blue Pacific Continent" might help mitigate risks of power imbalance and/or improve capacities for agency and resilience in the pursuit of your chosen Pacific country's own interests and desire for development.	• Strong research skills- particularly qualitative research. • Qualifications in social sciences or humanities (e.g.. psychology, sociology, international relations) or a background in related fields. • Ability to work in teams (incl. multi-disciplinary teams).								X
JOAD	Edinburgh, South Australia	Battlebook	Take an existing service creating a battlebook for combat simulations from a database and make it a standalone service.	• Critical Skills: Software development skills with a focus on Java server implementation and Vue.js, good communication skills, ability to work in small (5-person) teams, motivated and goal focused. • This role is focused on the skill set needed for web creation as well as the ability to draw on data contained within a simulation repository database in the first instance with a potential extension relating to how we would get additional data that may need to be calculated via a mini export.			X					
JOAD	Edinburgh, South Australia	Vegetation Modelling	Take an existing "box" model of vegetation in a computer wargame simulation and first develop an improved canopy layer within that model and then exploring options to develop a more realistic vegetation model.	• Critical Skills: Software development, python scripting skills, good communication skills, ability to work in small (5-person) teams, motivated and goal focused. • Nice to have: experience with geographical information systems and/or simulation modelling.			X			X		

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JOAD	Edinburgh, South Australia	Modelling and Simulation of Collaborative Defence Systems	Performance prediction of collaborative defence systems as part of unit formations is of considerable importance to Defence. This project will involve development of a modelling capability to analyse directed energy defeat of swarms of drones.	• Mathematical modelling interest and ability, especially with stochastically driven phenomena. • Experienced user of Matlab and an interest in algorithm development and implementation.			x	x		x		
JOAD	Edinburgh, South Australia	Automate Scenario development and / or data analysis of constructive combat simulations.	Assist with the creation and / or analysis of constructive (combat) simulations, including scripting and software support tools.	• Required skills include: ○ General software development skills and familiarity with scripting languages, • Highly desirable skills include: ○ Aptitude for coding, particularly in Python, familiarity with GIT etc. • Desirable skills include: ○ Familiarity with Simulation ○ Programming experience in SQL, R, Lua ○ Basic mathematical understanding of statistics ○ Conceptual knowledge of data visualisation tools ○ Aptitude for GIS software, particularly QGIS and / or ArcGIS ○ Ability to write clear and concise internal documentation and user guides.			X					
JOAD	Fairbairn, ACT	Strategic Wargame	Assist evaluate conceptual models for international relations and develop a strategic wargame prototype.	• Background in political science (or similar), understanding of qualitative analysis and problem structuring methods								X
JOAD	Fairbairn, ACT	Group decision making	Conduct qualitative research into group decision making with a view to enhancing the ability to support SME based experimentation activities.	• Background in management, social or political science (or similar), understanding of qualitative analysis and problem structuring methods								X
LD	Fishermans Bend, Victoria	Flow Chemistry	The Chemical Agent Synthesis and Assessment Team supports Australia's ability to verify the alleged illegal use of chemicals controlled by the Chemical Weapons Convention. We do this by synthesising degradation products, precursors and metabolites of controlled chemicals. This project is for an engineering minded student with an interest in organic chemistry who will help us expand our synthesis capability to include the use of flow chemical synthesis. The student will provide hands-on assistance to build and verify basic flow systems and transition traditional batch chemistry reactions to flow. Please note this project will not require the use and handling of chemical agents.	• A basic understanding and interest in chemistry. • Ability to work in a team. • Familiarity with chemical lab safety. • Willing to learn new skills and take direction.		X						
LD	Fishermans Bend, Victoria	The effectiveness of a passive exosuit during military manual handling tasks.	Repetitive manual handling of heavy loads is a risk factor for low back pain. Exoskeletons or exosuits designed to reduce loading on the lower back could help minimise the risk of injury and resultant pain, or improve productivity during military manual handling tasks.	• Background in exercise/sport science, with an interest in biomechanics and/or physiology • Scientific writing skills • Ability to work in small teams and individually • Previous experience in human sciences data collection/analysis would be beneficial, but not necessary								
LD	Fishermans Bend, Victoria	Field Estimation Using Mobile Autonomous Robots	In the presence of CBRN (chemical, biological, radiological, and nuclear) attacks, being able to map out a contaminated area/field accurately and efficiently is an important task in allowing operations (e.g. humanitarian, disaster relief or military) to be carried out. We consider a setup that consists of multiple mobile robots, which can move around and take measurements that are shared	• Some knowledge of statistical estimation and/or particle filtering algorithms. • Experience with Python programming.			X			X		

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			with other robots, in order to construct a map of the contaminated area. We have considered the situation where the each robot has access to noisy binary measurements. By modelling the field as a sum of radial basis functions, the field estimation problem can be reduced to a parameter estimation problem, which may then be solved using particle filtering algorithms. Active sensing mechanisms for the robots to adaptively choose their next measurement locations, given the information currently collected, have also been considered. In this project, we seek to implement (in Python, and time permitting, in the Robot Operating System ROS) and evaluate the performance of various extensions of the developed algorithms. These extensions may include: 1) multi-level quantized measurements, 2) estimation of time-varying fields by incorporating wind sensor measurements, and 3) active sensing while the robots maintain a desired formation.									
LD	Fishermans Bend, Victoria	Swarm Flocking with Behaviour Selection	In this project, we will explore the integration of soft-consensus into hybrid-flocking. The results will be implemented in a Python-based swarm simulation. A multi-objective comparison study will be conducted between this new approach and prior flocking algorithms of other team members. There would be an opportunity to explore the academic publication process by submitting a paper on the findings of the project.	• Some familiarity with coding in Python (or similar languages) will be required. • Familiarity with multi-agent and swarm robotic simulations are also desirable.			X			X	X	
LD	Edinburgh, South Australia	Low probability of detection communication system	The Advanced Vehicle Systems (AVS) team is developing a low probability of detection (LPD) communication application. The LPD application utilizes distributed context awareness and distributed control to minimize the RF signature of radio systems through the automated adjustment of transmission power. A student working on this project would contribute to the transition of LPD algorithms from hardware in the loop simulation to robotic land platforms and participate in small scale field trials.	We are seeking a highly skilled and motivated student with a background in electronics, computer science, robotics, radio communications, mathematics or similar. A successful applicant should have the following characteristics; ○ Experimental skills, preferably in RF communications or electronic warfare. This project utilizes the Ettus and Silvus family of software defined radios. ○ General software development skills, scripting and source control/configuration management will be essential, with a preference for coding in python and the use of GIT. ○ Experience using the robot operating system (ROS), JSON, cURL and DDS may also prove useful. ○ As this project is developing a distributed autonomous controller, knowledge of autonomous systems or distributed control theory, particularly graph theory or topology control would be advantageous but is not necessary. ○ An ability to work in a small team and independently will be essential.			X			X	X	

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LD	Edinburgh, South Australia	Decision Making for Distributed Autonomous Vehicles	The Advanced Vehicle Systems (AVS) group of Land Division at DST is undertaking research and development of a distributed control system for military land vehicles called Ravos. The goal of Ravos is to realise automated reconfiguration, healing and optimisation of mission systems on these vehicles and between groups of vehicles. Ravos exploits contextual awareness of the environment in order to adapt in response to dynamic situations, such as adversarial actions and changing mission priorities. A core element of Ravos is its distributed decision making capability, which provides Ravos with the ability to coordinate control between different vehicles and efficiently reach decisions relating to key control aspects. This capability is being applied in a number of Ravos applications including recommendations for countermeasure deployment by vehicles against drone threats (unmanned aerial systems (UAS)) in order to maximise survivability. We refer to this application as counter UAS. The AVS group has considered and analysed a number of algorithms in the counter UAS application space. We have performed analysis in an OpenAI gym environment [1], which has mostly considered centralised algorithms. Although the environment can accommodate distributed algorithms, analysis of such algorithms has been limited. The aim of this project is to implement additional distributed algorithms for the counter UAS application and to compare their performance with existing distributed solutions that have been implemented, which are based on the Consensus-Based Bundle Algorithm [2]. An additional aim of the project is to extend the gym environment to account for more asynchronous settings to enhance the realism of simulations.	• Computer science skills. • Competency with Python would be beneficial.			X			X	X	
LD	Edinburgh, South Australia	Robotic Swarm Behaviours	This project uses the “Robotarium” testbed to explore the collective behaviours in swarm robotics. - Decentralized controls of multi-agent systems for the leader-follower, formation, consensus and parking collective behaviours are employed in this “Robotarium” testbed. - The unicycle dynamical model of the agents (small UGV) and its transformation into double integrator model is an integrated part of the testbed. - Both Python and Matlab “Robotarium” packages are to be implemented in this project.	• General software programming skills are required. • Ability to work in teams and independently • Exposure to Matlab and Python • Basic knowledge in “System Dynamic and Control” is an advantage, but not compulsory.			X			X	X	
LD	Edinburgh, South Australia	On-board sensors for drones	The Systems Integration and Tactical Networks (SITN) group is developing future tactical capabilities in aerial drones. The team has designed and built a 6 rotor drone utilising the open source arducopter control suite, with the plan to integrate on-board sensors. SITN is seeking 1 - 2 highly motivated students to build and develop a RF (Radio Frequency) capability to the drone. The first step is to integrate a tactical EW capability that is able to detect and locate the source of RF emitters (i.e. Wi-Fi access points, radars, tv transmitters, etc.). Under guidance from SITN staff the students will make use of SDR (software defined radios) devices and integrate into the drones on-board Raspberry Pi. A series of test flights will be scheduled to capture RF data that will be post processed to create algorithms to do detection and localisation. Stretch goals will look at moving the algorithms on-board, to enable a real-time capability.	• Signal Processing, software development (Python, C++, Java), embedded computers, drones and SDR (software defined radio) are all highly desirable.	X		X	X		X	X	
LD	Edinburgh, South Australia	360 degree video system for vehicles	The Systems Integration and Tactical Networks (SITN) group is developing future tactical capabilities for land combat vehicles. The team has a vehicle platform that is used for S&T experimental research into next generation capabilities. SITN is seeking 1 highly motived student to build and develop the 360 degree persistent surveillance system for the research vehicle. Under guidance from SITN staff the student will be involved in the installation of 8 commercial surveillance cameras. Time synchronising the cameras together and sticking the 8 camera feeds together to form a 360 degree persistent surveillance picture. Stretch goals will include applying AI / ML libraries (i.e. YOLO) to the surveillance picture to automatically classify objects in the scene.	• IT and computing systems, software development (Java), image processing and AI / ML techniques are all highly desirable			X	X		X	X	

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MD	Fishermans Bend, Victoria	Cavitation erosion behaviour of various materials for marine applications	Materials employed in the marine environment not only require superior mechanical properties but also resistance to underwater effects like corrosion and cavitation. Cavitation, a process in which tiny vapour-filled cavities in a liquid (bubbles) collapse generating a shock wave on the material surface, results in surface erosion of marine propellers. Hence, materials suitable for these demanding applications must have high cavitation resistance. In this project, a number of standard and advanced materials will be prepared and studied using an ultrasonic horn together with a new, purpose-built cavitation rig to determine material cavitation behaviour. The goals of the project are (i) to commission both the cavitation test rig and ultrasonic horn for measurement using known alloys, (ii) to measure the cavitation resistance of a range of high-strength and novel materials, including diamond-like coatings, (iii) analyse the erosion rate and cumulative mass loss rate of each material, aiding the ranking of the materials with desired properties.	• Experience with experimental measurements • Data collection and analysis • Familiarity with imaging and material characterisation techniques • Ability to work in a team and independently • Technical writing • Oral presentation					X		X	
MD	Fishermans Bend, Victoria	Determination of acoustic properties of materials in air	The interaction of sound with materials can be described in terms of reflection, transmission and absorption coefficients. Acoustic measurements of materials in air can be made in an acoustic impedance tube using extremely sensitive microphones. However, these measurements are highly dependent on the sample preparation, mounting and measurement method, and other experimental factors. This project will investigate the influence of experimental parameters on the reliability of acoustic property measurements of a range of materials in air at acoustic frequencies.	• Preparing and executing precise experimental measurements • Analysing, graphing and presenting data • Signal analysis • Ability to work in a team and independently • Technical writing • Oral presentation					X	X	X	
MD	Edinburgh, South Australia	Ocean Simulation Game Engine	Develop a geographic map based ocean sim/game that allows creation and control of Entities, scenario scripting and communication with other simulators via the Distributed Interactive Simulation (DIS) protocol.	• Software design and development skills. • Preferably some experience with modern C++ and the Qt language framework.			X					
WCSD	Edinburgh, South Australia	Distributed, Resilient Sensor System	The distributed, resilient sensor system would employ many smart sensors in order to provide a situational awareness service that is inherently resilient as it could react to the loss of any single sensor. Information from video and other sensors installed into each smart sensor 'at the edge' will be processed and disseminated through a dynamic information architecture, in response to emerging mission requirements. Focus is on the distributed software architectures that make this possible.	• Software programming, preferably in Python • Know or be prepared to learn: ○ Micro service software architectures ○ Publish-subscribe communication protocols ○ 3D coordinate systems ○ Video streaming			X					
WCSD	Edinburgh, South Australia	Microservice Orchestration Test Bed and Experimentation	As part of ongoing efforts within the Combat Cloud program DCMS AIA have been researching how commercial cloud native software solutions and architectures can be leveraged and utilised within the tactical environment to better manage the complex digital systems emerging. One area of focus is on service orchestration. Service orchestration involves the use of tools to control the creation, deployment and management of system services and software to assist administrators and users. This project is to create a digital test-bed that can be used to test various service orchestration solutions such as Kubernetes and Nomad in a controlled environment. The goal is to research the factors that form the creation of such a test bed, create a test bed environment and perform tests and analysis on various service orchestration solutions available.	• Software programming, preferably in Python • Know or be prepared to learn: ○ Microservice software architectures ○ Network emulation technologies ○ Orchestration technologies			X					
WCSD	Edinburgh, South Australia	Intelligent Decision Systems for Distributed Warfighting	The student will work as part of the Intelligent Tactical Decision Systems Discipline research team, which aims to understand and inform future distributed tactical warfighting systems. This may involve development of conceptual prototypes of integrated decision systems, enabling machine-to-machine and human-to machine decision making.	• Problem analysis and software prototyping. • Good communication skills, ability to work in teams, motivated and goal-focussed.			x					
WCSD	Edinburgh, South Australia	Collaborative Drones - Improvements to DSTG's indoor flight arena	Within the Weapons and Combat Systems Division at DSTG, Concept Demonstration and Experimentation (CDE) is focus of implementation and demonstration of collaborative un-crewed aerial systems (Drones). CDE has constructed an Indoor Flight Arena (IFA), incorporating an optical tracking system. This project will focus on improvements to the IFA including software development to implement improved drone communication methodologies, increase the ease of research integration and the production of repeatable / robust demonstrations.	• Software Development Skills (Python) Essential • General IT systems knowledge • Embedded Systems • Ability to work in teams • Willingness to participate in Field Trials • Good verbal and writing skills			x	x			x	