Summer internship opportunities for 2022 at Active Space Technologies

Should you be interested in any of these opportunities, please contact us by sending an email to antonio.santos@activespacetech.com.

Internship: I-22		
Title: Testing digital electronics for harsh environments in aeronautics		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Aeronautics
The company is involved in the development of electronics for harsh environments. The project involves processing of massive datasets comprising temperature, vibration, and acoustic emission measurements for the aviation sector. One of the main objectives of the project is the development of digital electronics suitable to handle large amounts of data in harsh environments (e.g., temperature above 125 °C and strong vibration). The internship includes testing of digital board microcontroller/DSP programming (e.g., MSP430F2619S-HT and SM320F28335-HT from Texas Instruments). The intern shall have interest in digital circuits, namely microcontrollers, and low-level programming.		

Internship: II-22		
Title: Neural network development for voice analysis		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. To improve the human-to-machine interface, we intend to develop an algorithm suitable for detecting, processing, and analysing human voice. The objective of this internship is to develop, train, and validate a neural network suitable for processing speech, namely specific words used in the AMR control. The student will work with Vosk, Kaldi, and similar resources developed in Matlab, Python, or C++. Different idioms will be considered, namely Chinese, English, French, German, Japanese, Portuguese, Spanish, Russian. The student shall have interest in programming, artificial intelligence, and deep learning such as in convolutional neural networks. This multidisciplinary internship can involve interns with different background, from engineering and physics to linguistics and lexicography.		

Internship: III-22		
Title: Neural network development for robot detection		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. Among the most important enabling technologies under development, detection and identification of specific objects, namely robots and similar structures, is fundamental to ensure correct localization and mapping of the environment as well as to assist specific docking operations. The objective of this internship is defining a specific dataset and training a neural network for object detection, considering specific features such as shape, morphology, and colour. The student shall have interest in programming, artificial intelligence, and deep learning such as in convolutional neural networks.		

Internship: IV-22		
Title: Review of atmospheric electricity measurements and empirical models		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Space Science
Atmospheric electricity in planetary environments is highly dynamic and plays a critical role understating the gaseous envelope of the Earth and other planets. Although robust empirical models are available for the ionosphere (e.g., composition and dynamics), no reliable models and data are available from the mesosphere down to the surface. The main objective is developing an empirical model similar to that of the International Reference Ionosphere (IRI) to cover the gap down to the surface and publishing those results in highly reputed journals (e.g., Reviews of Geophysics). The student shall have interest in data analysis and review surveys as well as good writing skills.		

Internship: V-22		
Title: Development of web application for robot remote control		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Automation and robotics
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The most important motion architecture involves omnidirectionality, e.g., using Mecanum driving. In addition to automatic, in situ control, the robot shall be also controlled remotely to ensure easy interface with the user. The objective of this internship is designing and coding a very simple application interface, e.g., a few buttons and cursors to enable left-right, ahead-reverse, rotation, and emergency stop operations. The control code will be provided; hence, students shall focus their effort in designing, interfacing, and communications (e.g., Bluetooth). The student shall have interest in web design, applications development, and programming.		

Internship: VI-22		
Title: Aerogel experiment onboard the Infante satellite – microcontroller programming and software validation		Date: 1 July – 31 August (changes are acceptable)
Company: Active Aerogels		Field: Space
The INFANTE project aims at the development and in-orbit demonstration of a microsatellite dedicated to maritime surveillance, Earth observation, and communications; the satellite will also carry a few experiments onboard. The objective of the aerogel experiment is to investigate materials degradation in space. Project development combines three complementary branches that may be carried out concurrently: design of analogue and digital electronics as well as laboratory tests. Although the hardware and software activities have been concluded, optimization tasks are envisioned for improving design and ergonomics, reassessing the electrical design, and testing the software. Furthermore, the calibration activities can be improved significantly. The student shall have interest in analogue and digital electronics, microcontroller programming, and instrument calibration.		

Internship: VII-22		
Title: Development of neural networks for object detection of robotic structures		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. Among the most important enabling technologies under development, detection and identification of specific objects and structures is fundamental to ensure correct localization and mapping of the environment as well as to assist specific docking operations. The objective of this internship is building a photographic dataset and training a neural network to detect objects with specific features of the robot, e.g., shape, morphology, colour. The student shall have interest in programming, artificial intelligence, and deep learning such as in convolutional neural networks.		

Internship: VIII-22		
Title: Autonomous mobile robot – thermal modelling		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. To test robot functionalities, it is necessary to characterize the thermal environment of different subsystems. A numerical thermal model will be developed in finite elements to assist with data analysis, namely the heat budget and ventilation needs. Temperature measurements inside the robot are used to validate the empirical model of the robot. The intern shall have interest in heat transfer and modelling with finite elements.		

Internship: IX-22		
Title: Autonomous mobile robot – vibration modelling		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. To test robot functionalities, it is necessary to characterize vibrations of their elements. A structural model will be developed in finite elements to assist with data analysis, namely the vibration measurements recorded during a field campaign. Vibration measurements inside the robot are used to validate the empirical model of the robot. The intern shall have interest in structural analysis and vibrations as well as modelling with finite elements.		

Internship: X-22		
Title: Development of holonomic systems comprising omnidirectional wheels		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is designing holonomic motion systems that comprise omnidirectional wheels, e.g., mecanum. The student shall have interest in mechanical design and dynamics.		

Internship: XI-22		
Title: Miniaturization of thermal ablation instrument for space applications		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Space
Atmospheric entry is the movement of an object from outer space into and through the gases of an atmosphere, e.g., of a planet. In spacecraft design, ablation is used to both cool and protect mechanical parts and payloads that would otherwise be damaged by friction and extremely high temperatures. The objective of the present project is to improve the technology readiness level of an instrument developed for monitoring ablation processes of thermal protection shields during atmospheric re-entry. The student will contribute to improve the digital module of a state-of-the-art remote sensing instrument as well as its software used for control and signal processing suitable for onboard monitoring of ablation processes.		

Internship: XII-22		
Title: Investigation of aerogel powder settling for space applications		Date: 1 July – 31 August (changes are acceptable)
Company: Active Aerogels		Field: Robotics and automation
Active Aerogels is working in the synthesis and characterization of silica aerogel powders for space applications. The first objective of this internship is defining a suitable filling process of a cavity taking into account powder settling issues. The subsequent task is the characterization of the dielectric properties of the medium, namely the loss tangent, using a vector network analyser.		

Internship: XIII-22		
Title: Investigation of precursor reactions in aerogels		Date: 1 July – 31 August (changes are acceptable)
Company: Active Aerogels		Field: Robotics and automation
Active Aerogels is working in the synthesis and characterization of silica aerogels for ground-based and space applications. The objective of this internship is characterizing a chemical reaction involving an aerogel precursor. The student will experiment with and analyse specific reactions involving silanes, e.g., TEOS (TetraEthyl OrthoSilicate). The student will investigate some reactions, optimize stoichiometry, calculate the reaction rate and extent of reaction, and estimate the enthalpy and Gibbs free energy. The student shall have interest in chemistry and chemical engineering.		

Internship: XIV-22		
Title: Development of natural navigation technology for Autonomous Mobile Robots (AMRs)		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this internship is developing software suitable for AMR/AGV systems in the context of computer vision applications. The most important tasks include the development of algorithms for chasing/pursuit applications. The student shall have interest in artificial intelligence and computer vision. Knowledge of OpenCV and similar tools would be a plus.		

Internship: XV-22		
Title: Development of ozone sensor for UVC radiation monitoring		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems that involve ultraviolet radiation. Since UVC radiation can create ozone that is harmful to humans in large quantities, the objective is development a monitoring system for the robot that combines ozone and UVC sensors. This internship deals with the development of the ozone sensor. A typical ozone detector such as the MQ131 or 3SP-O3-20 components will be used. The student shall have interest in analogue and digital electronics, low-level programming, and instrument calibration. The internship is mainly intended for undergraduate students from physics or engineering.		

Internship: XVI-22		
Title: Development of UVC sensor for radiation monitoring		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems that involve ultraviolet radiation. Since UVC radiation can create ozone that is harmful to humans in large quantities, the objective is development a monitoring system for the robot that combines ozone and UVC sensors. This internship deals with the development of the UVC sensor. A typical UVC detector such as the GUVC-T21GH or 3535UVC1W components will be used. The student shall have interest in analogue and digital electronics, low-level programming, and instrument calibration. The internship is mainly intended for undergraduate students from physics or engineering.		

Internship: XVII-22		
Title: Implementation of recycling strategies of aerogel reactions		Date: 1 July – 31 August (changes are acceptable)
Company: Active Aerogels		Field: Robotics and automation
Active Aerogels is working in the synthesis and characterization of silica aerogels for ground-based and space applications. Aerogel reactions optimization requires assessment of not only reactants, products, stoichiometry, and energy balance but also recycling, reutilization, and separation of waste. The objective of this internship is characterizing chemical reaction considering this rationale. The student shall have interest in chemistry and chemical engineering.		

Internship: XVIII-22		
Title: Development of multi-gas sensors for in-situ and remote sensing robotic activities		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation for a wide range of applications. The objective of this work is designing, manufacturing, assembly and testing a multi-gas sensor. The project combines both hardware and software tasks. The gas sensors will be selected during the internship, and several students can be involved in the project as long as each one selects a different type of sensor. This sniffing sensor will then be integrated in a larger system, where different types of sensors are integrated. The student shall have interest in analogue and digital electronics as well as low-level programming. The project is particularly suited for students with a background in physics, chemistry or engineering (electrical, electronics, computer science).		

Internship: XIX-22		
Title: Testing and validation of ultraviolet sensor		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems that comprise UV radiation sources for disinfection applications. The objective of this internship is developing a 3D map of the radiation source. The internship is mainly intended for undergraduate students from physics or engineering.		

Internship: XX-22		
Title: Development of follow me capabilities for robotic applications		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is developing software tools for follow me implementation. The student will develop algorithms for detection of bar codes and QR-codes with specific cameras. The student shall have interest in programming, computer vision, and robotics.		

Internship: XXI-22		
Title: Development of a library to bridge ROS2 and web pages		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is to develop a library to enable ROS2 communicating over websocket in js (state of art: roslibjs, ros3djs). The student shall have interest in programming and robotics.		

Internship: XXII-22		
Title: Development of a ROS2 web components		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is to have a flexible and dynamic webpage to control and visualize the AMR, using web components. The student can use VUE, REACT, ANGULAR, Bootstrap or similar tools. The student shall have interest in programming and robotics.		

Internship: XXIII-22		
Title: Development of IoT platform for sensors		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is to create an IoT (internet of things) solution for a sensor platform. The sensor board must connect, via I2C, to ultrasound, PIR, ozone, UV, temperature and humidity sensors. Microcontrollers compatible with micro-ROS shall be used. The student shall have interest in programming and robotics.		

Internship: XXIV-22		
Title: Development of a Mobile Robot simulation model		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. Tools such as Gazebo and Unity are used to simulate an environment and a mobile agent, including its physical proprieties and allow seamless integration with software. Having a controlled apparatus free of uncertainties which inevitably emerge in real world testing is extremely helpful in both development and troubleshooting processes. The objective of this internship is to build a physical model of our AMR, including sensors such as encoders and depth cameras, and link the model to our software. Finally, a simple environment should be built so the model can be tested. The student shall have interest in programming, robotics and simulation tools.		

Internship: XXV-22		
Title: Development of Optical Character Recognition (OCR) software tools		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) technologies. Some of the most important technologies necessary to ensure high performance systems involve artificial intelligence. The objective of this internship is the development of OCR tools to detect and recognize characters of the Latin alphabet suitable for integration in mobile robots. The student shall have interest in programming, computer vision, and robotics.		

Internship: XXVI-22		
Title: Development of interactive application for IOS/Android platform to control Mobile Robots (AMRs) and Automated Guided Vehicles (AGVs)		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is developing an interactive application for IOS or Android platforms that is able to control a robot via Bluetooth technology. The student shall have interest in web development, programming, communications, and systems control.		

Internship: XXVII-22		
Title: Development of face recognition technology for Mobile Robots (AMRs) and Automated Guided Vehicles (AGVs)		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
Active Space Technologies is currently developing AMR (Autonomous Mobile Robot) and AGV (Automated Guided Vehicle) systems using natural navigation with navcam technology. The objective of this work is developing software suitable for AMR/AGV systems in the context of the whole project and computer vision. Face recognition is widespread in our daily life, covering many applications. The objective of the internship is developing algorithms to assist robots identifying key features in the scene, namely pedestrians. The student shall have interest in programming, computer vision, and robotics.		

Internship: XXVIII-22		
Title: ROS 2 sensor gateway		Date: 1 July – 31 August (changes are acceptable)
Company: Active Space Technologies		Field: Robotics and automation
AST develops and builds Autonomous Mobiles Robots (AMRs) for a variety of industries. Each product is unique and requires specialized functions. Some are implemented using ROS 2 (Robot Operating System, version 2) as a control structure. The work comprised in this internship includes design and implement of a microcontroller solution that shall connect to a ROS2 system with the micro-ROS platform (uROS) and allow control of the microcontroller peripherals through ROS 2 publisher and subscriber methods. In steps, the intern shall select a microcontroller compatible with ROS2 framework (AST suggests Teensy 4.1), install ROS in the microcontroller, connect to a Linux PC running ROS2 and develop routines to allow control of the peripherals. The intern shall have interest in linux programming, ROS system as well as microcontroller programming, I2C, SPI, Direct IO. Solution can be developed in Arduino or other programming environment.		