Advanced Certificate in Subsea Robotics and AI

Subsea Navigation And Localization

AUV, or Autonomous Underwater Vehicle, refers to a robotic system that operates underwater without the need for human intervention, used for subsea navigation and localization. Related terms include ROV, or Remotely Operated Vehicle, and ASV, or Autonomous Surface Vehicle. AUVs are commonly used for oceanographic research, hydrographic surveying, and offshore oil and gas exploration.

Acoustic Doppler Current Profiler, or ADPC, is a sonar system used to measure water currents and turbulence in the ocean. Related terms include ADCP, or Acoustic Doppler Current Profiler, and current meter. ADPCs are commonly used for oceanographic research and hydrographic surveying.

Acoustic Navigation, or AN, refers to the use of sound waves to determine the position and velocity of a vehicle or object underwater. Related terms include acoustic positioning and sonar navigation. Acoustic navigation is commonly used for subsea navigation and localization.

Acoustic Positioning, or AP, refers to the use of sound waves to determine the position of a vehicle or object underwater. Related terms include acoustic navigation and sonar positioning. Acoustic positioning is commonly used for subsea navigation and localization.

AHRS, or Attitude and Heading Reference System, refers to a sensor system used to measure the orientation and heading of a vehicle or object. Related terms include inertial measurement unit and gyroscope. AHRSs are commonly used for subsea navigation and localization.

AI, or Artificial Intelligence, refers to the use of computer algorithms and machine learning to enable autonomous decision-making and control of systems. Related terms include machine learning and deep learning. AI is commonly used for subsea navigation and localization.

ASV, or Autonomous Surface Vehicle, refers to a robotic system that operates on the surface of the water without the need for human intervention, used for subsea navigation and localization. Related terms include AUV, or Autonomous Underwater Vehicle, and ROV, or Remotely Operated Vehicle. ASVs are commonly used for oceanographic research and hydrographic surveying.

Attitude and Heading Reference System, or AHRS, refers to a sensor system used to measure the orientation and heading of a vehicle or object. Related terms include inertial measurement unit and gyroscope. AHRSs are commonly used for subsea navigation and localization.

Autonomous Underwater Vehicle, or AUV, refers to a robotic system that operates underwater without the need for human intervention, used for subsea navigation and localization. Related terms include ROV, or Remotely Operated Vehicle, and ASV, or Autonomous Surface Vehicle. AUVs are commonly used for

oceanographic research, hydrographic surveying, and offshore oil and gas exploration.

Bathymetry, or bathymetric mapping, refers to the measurement and mapping of the depth of bodies of water. Related terms include hydrographic surveying and topographic mapping. Bathymetry is commonly used for subsea navigation and localization.

Bottom Tracking, or BT, refers to the use of sonar and inertial measurement units to track the position and velocity of a vehicle or object relative to the seafloor. Related terms include acoustic navigation and terrain reference navigation. Bottom tracking is commonly used for subsea navigation and localization.

Camera, or optical sensor, refers to a sensor system used to capture images and video of the environment. Related terms include sonar and lidar. Cameras are commonly used for subsea navigation and localization.

Current, or water current, refers to the movement of water in the ocean or other bodies of water. Related terms include tides and ocean circulation. Currents are commonly used for subsea navigation and localization.

Doppler, or doppler shift, refers to the change in frequency of a signal due to motion of the signal source or receiver. Related terms include acoustic doppler and radar doppler. Doppler is commonly used for subsea navigation and localization.

DP, or Dynamic Positioning, refers to the use of thrusters and control systems to maintain the position and heading of a vehicle or object in the water. Related terms include station keeping and maneuvering. DP is commonly used for subsea navigation and localization.

Gyro, or gyroscope, refers to a sensor system used to measure the orientation and heading of a vehicle or object. Related terms include inertial measurement unit and accelerometer. Gyros are commonly used for subsea navigation and localization.

Hydroacoustics, or hydroacoustic sensing, refers to the use of sound waves to measure and map the environment. Related terms include sonar and acoustic sensing. Hydroacoustics is commonly used for subsea navigation and localization.

Hydrography, or hydrographic surveying, refers to the measurement and mapping of the depth and topography of bodies of water. Related terms include bathymetry and topographic mapping. Hydrography is commonly used for subsea navigation and localization.

IMU, or Inertial Measurement Unit, refers to a sensor system used to measure the acceleration and orientation of a vehicle or object. Related terms include gyroscope and accelerometer. IMUs are commonly used for subsea navigation and localization.

INS, or Inertial Navigation System, refers to a navigation system that uses inertial measurement units and algorithms to determine the position and velocity of a vehicle or object. Related terms include inertial

measurement unit and dead reckoning. INSs are commonly used for subsea navigation and localization.

Kalman Filter, or KF, refers to a mathematical algorithm used to estimate the state of a system from noisy measurements. Related terms include state estimation and filtering. Kalman filters are commonly used for subsea navigation and localization.

LBL, or Long Baseline, refers to a navigation system that uses a network of acoustic transponders to determine the position of a vehicle or object. Related terms include short baseline and ultra short baseline. LBLs are commonly used for subsea navigation and localization.

Lidar, or lidar sensing, refers to the use of light waves to measure and map the environment. Related terms include sonar and hydroacoustic sensing. Lidar is commonly used for subsea navigation and localization.

Long Baseline, or LBL, refers to a navigation system that uses a network of acoustic transponders to determine the position of a vehicle or object. Related terms include short baseline and ultra short baseline. LBLs are commonly used for subsea navigation and localization.

Machine Learning, or ML, refers to the use of algorithms and statistical models to enable autonomous decision-making and control of systems. Related terms include artificial intelligence and deep learning. Machine learning is commonly used for subsea navigation and localization.

Mapping, or cartography, refers to the process of creating maps and charts of the environment. Related terms include surveying and geographic information systems. Mapping is commonly used for subsea navigation and localization.

Magnetic, or magnetic sensing, refers to the use of magnetic fields to measure and map the environment. Related terms include sonar and hydroacoustic sensing. Magnetic sensing is commonly used for subsea navigation and localization.

Maneuvering, or maneuverability, refers to the ability of a vehicle or object to change its position and heading in response to commands or environmental conditions. Related terms include station keeping and dynamic positioning. Maneuvering is commonly used for subsea navigation and localization.

Mission Planning, or MP, refers to the process of planning and executing a mission or task using a vehicle or object. Related terms include route planning and trajectory planning. Mission planning is commonly used for subsea navigation and localization.

Multibeam, or multibeam sonar, refers to a sonar system that uses multiple beams to measure and map the environment. Related terms include single beam sonar and sidescan sonar. Multibeam sonar is commonly used for subsea navigation and localization.

Navigation, or navigational system, refers to a system used to determine the position and velocity of a vehicle or object. Related terms include inertial navigation and acoustic navigation. Navigation is commonly

used for subsea navigation and localization.

Oceanography, or oceanographic research, refers to the study of the ocean and its processes. Related terms include hydrography and marine biology. Oceanography is commonly used for subsea navigation and localization.

Offshore, or offshore operations, refers to activities or operations conducted in the ocean or other bodies of water away from the coast. Related terms include onshore and coastal. Offshore is commonly used for subsea navigation and localization.

PID, or Proportional-Integral-Derivative, refers to a control algorithm used to regulate the behavior of a system. Related terms include control theory and feedback control. PID is commonly used for subsea navigation and localization.

Positioning, or positioning system, refers to a system used to determine the position of a vehicle or object. Related terms include navigation and localization. Positioning is commonly used for subsea navigation and localization.

Propeller, or propulsion system, refers to a system used to generate thrust and propel a vehicle or object through the water. Related terms include thruster and engine. Propellers are commonly used for subsea navigation and localization.

Remotely Operated Vehicle, or ROV, refers to a robotic system that is controlled by a human operator from a remote location, used for subsea navigation and localization. Related terms include AUV, or Autonomous Underwater Vehicle, and ASV, or Autonomous Surface Vehicle. ROVs are commonly used for oceanographic research, hydrographic surveying, and offshore oil and gas exploration.

Sensor, or sensor system, refers to a system used to measure and detect physical parameters or environmental conditions. Related terms include transducer and detector. Sensors are commonly used for subsea navigation and localization.

Sidescan, or sidescan sonar, refers to a sonar system that uses sound waves to image and map the seafloor. Related terms include multibeam sonar and subbottom profiling. Sidescan sonar is commonly used for subsea navigation and localization.

SLAM, or Simultaneous Localization and Mapping, refers to a technique used to estimate the position and orientation of a vehicle or object while building a map of the environment. Related terms include localization and mapping. SLAM is commonly used for subsea navigation and localization.

Sonar, or sonar system, refers to a system that uses sound waves to detect and measure objects or environmental conditions. Related terms include hydroacoustic sensing and acoustic sensing. Sonar is commonly used for subsea navigation and localization.

Station Keeping, or SK, refers to the ability of a vehicle or object to maintain its position and heading in response to environmental conditions. Related terms include maneuvering and dynamic positioning. Station keeping is commonly used for subsea navigation and localization.

Subbottom, or subbottom profiling, refers to a technique used to image and map the subsurface of the seafloor. Related terms include sidescan sonar and seismic profiling. Subbottom profiling is commonly used for subsea navigation and localization.

Terrain Reference, or TR, refers to a navigation system that uses terrain features to determine the position and velocity of a vehicle or object. Related terms include inertial navigation and acoustic navigation. Terrain reference is commonly used for subsea navigation and localization.

Thruster, or thruster system, refers to a system used to generate thrust and propel a vehicle or object through the water. Related terms include propeller and engine. Thrusters are commonly used for subsea navigation and localization.

Topology, or topology, refers to the study of the shape and structure of objects or spaces. Related terms include geometry and spatial analysis. Topology is commonly used for subsea navigation and localization.

Trajectory, or trajectory planning, refers to the process of planning and executing a path or route for a vehicle or object to follow. Related terms include mission planning and navigation. Trajectory planning is commonly used for subsea navigation and localization.

Ultra Short Baseline, or USBL, refers to a navigation system that uses a network of acoustic transponders to determine the position of a vehicle or object. Related terms include long baseline and short baseline. USBLs are commonly used for subsea navigation and localization.

USV, or Unmanned Surface Vehicle, refers to a robotic system that operates on the surface of the water without the need for human intervention, used for subsea navigation and localization. Related terms include AUV, or Autonomous Underwater Vehicle, and ROV, or Remotely Operated Vehicle. USVs are commonly used for oceanographic research and hydrographic surveying.

Water Column, or water column, refers to the layer of water between the surface and the seafloor. Related terms include ocean and sea. Water column is commonly used for subsea navigation and localization.