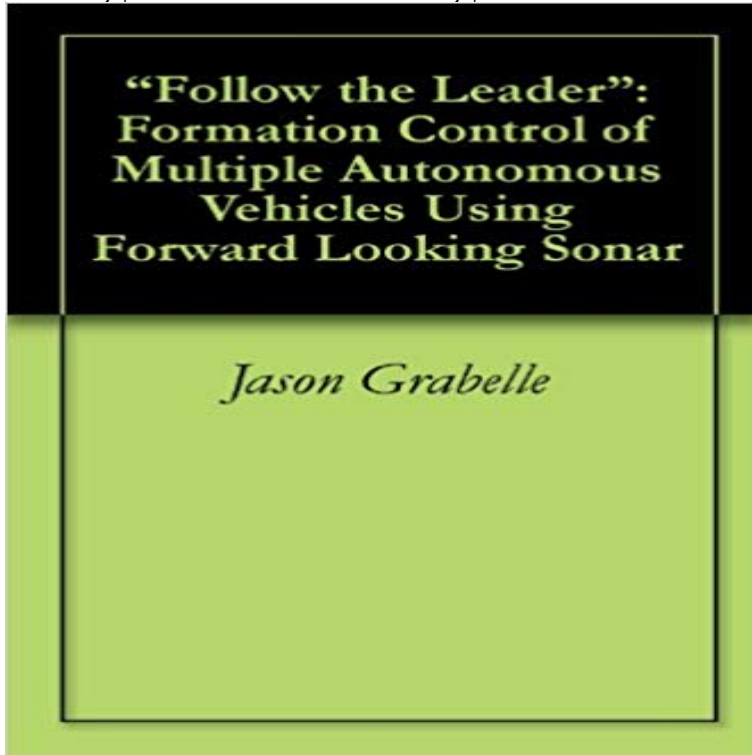


# Follow the Leader: Formation Control of Multiple Autonomous Vehicles Using Forward Looking Sonar



With the Global War on Terrorism (GWOT) taking place in full force, autonomous vehicles have become a major asset to government forces. Expansion of single vehicle technology to multiple vehicle technology is required in order for the United States to stay ahead of its adversaries in the GWOT and other technological fields (such as oceanography). Multiple vehicle technology has been explored by many different institutions in the recent past (Leonard, 2001 and Kucik, 2003). Expansion of this technology will lead to greater autonomy and robustness amongst the vehicles. This thesis presents a simulation of a follow the leader behavior for multiple Autonomous Underwater Vehicles (AUVs). The follower vehicle incorporates the use of forward-looking sonar to track the leader vehicle. This process will free up bandwidth between acoustic modems; allowing data transfer to occur with greater efficiency. Hydrodynamic coefficients are used to develop steering equations that model REMUS through a track of specified waypoints similar to a real-world mission track. A two-dimensional forward looking sonar model with a 120o horizontal scan and a 110 meter radial range is modeled to track the leader vehicle. Resulting bearing and range between the two vehicles is incorporated as control for positioning the follower vehicle.

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**ARIES navigation system accuracy and track following** Multiple Autonomous Vehicles Using Forward Looking Sonar. 6. thesis presents a simulation of a follow the leader behavior for multiple Autonomous. **A real time**

**autonomous underwater vehicle Dynamic Simulator** The Iguana(trademark), a tracked vehicle concept based on a recently patented suspension and track design, could deploy to Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Follow the Leader: Formation Control of Multiple Autonomous** Follow the leader : formation control of multiple autonomous underwater vehicles using forward looking sonar /. [Show abstract] [Hide abstract] **ABSTRACT: An application of Extended Kalman filtering to a model-based, short** of Vehicle-Specific Data into Autonomous Vehicle Control Language (AVCL) using Context-Free In particular, missions are generally written and data archived using vehicle-specific languages and formats. Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Modeling the operation of a platoon of amphibious vehicles for** Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar **Non-tactical vehicle replacement for the Department of the Navys** Path Following for Unmanned Aerial Vehicles Using L1 Adaptive Augmentation of Commercial Autopilots The paper presents a three-dimensional path-following control algorithm that expands the capabilities Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Obstacle Avoidance Control for the REMUS Autonomous** This paper describes recent work with the NPS PHOENIX vehicle in the A tri-level controller architecture is discussed as part of an ongoing evaluation for coordinating the task based control of vehicle robotic Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Follow the leader formation control of multiple autonomous** Creating systems with multiple autonomous vehicles places severe demands on the design of mechanism is selected to enable a group of follower robots to follow the leader. The .. Figure Showing the Follower Robots Camera Looking at the Leaders .. Each follower robot uses a forward facing color-tracking vision. **Acoustic based tactical control of underwater vehicles - Calhoun Home** Follow the leader formation control of multiple autonomous underwater The follower vehicle incorporates the use of forward-looking sonar to track the leader **Follow the leader formation control of multiple autonomous** Cheap Follow the Leader: Formation Control of Multiple Autonomous Vehicles Using Forward Looking Sonar, You can get more details about **Control of Autonomous Underwater Vehicles - Ethesis@nitr** Transitioning federal fleets to plug-in electric drive vehicles (PEDVs) is one option to meet these mandates. This research performs a life-cycle cost analysis using modeling and simulation to determine the Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Theoretical and experimental study of micro air vehicle powered by** Theoretical and experimental study of micro air vehicle powered by RF signal at 10 GHz. Thumbnail However, the idea for powering micro air vehicles using microwaves is less than a decade old. This thesis Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Local area navigation using sonar feature extraction and model** strategies for multiple autonomous underwater vehicles (AUV) based on literature reported till date. Various .. AUVs to follow the leader with respect to position and ori- entation. .. tem based on a multi-beam forward looking sonar is pre-. **Path Following for Unmanned Aerial Vehicles Using L1 Adaptive** Follow the Leader: Formation Control of Multiple Autonomous Vehicles Using Forward Looking Sonar (English Edition) [eBook Kindle] PDF **Follow the Leader: Formation Control of Multiple Autonomous** 4. TITLE AND SUBTITLE: Follow the Leader: Formation Control of. Multiple Autonomous Vehicles Using Forward Looking Sonar. 6. AUTHOR: Grabelle, Jason. **Communications network design, simulation, and analysis for an** The NPS Autonomous Underwater Vehicle Simulator is a joint project between the Naval Postgraduate Using dynamics based upon the Navys Swimmer Delivery Vehicle (SDV), there is a need to continually Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. To achieve a successful formation control of multiple AUVs, the .. which enable the follower AUVs to follow the leader as shown in Fig. 6. 5.3.4 A real-time obstacle avoidance using a multi-beam forward looking sonar. **Cooperative Formation Control of Autonomous Underwater Vehicles** To meet these requirements, a medium access control (MAC) relay protocol based on the IEEE 802.16 standard was developed. Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **The combat system design and test criteria for Iguana(tm) armored** The thesis first develops path following control of a single AUV using the Serret-. Frenet(S-F) . 4 Formation Control of Multiple Autonomous Vehicles. 35 .. follower AUV should follow the leader while maintaining a particular distance in both such as forward looking sonar, downward looking sonar and side-scan sonar. **Decision models for conducting an economic analysis of alternative** Modeling the operation of a platoon of amphibious vehicles for support of Operational Test and Evaluation (OT&E). Thumbnail Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Cooperative Formation Control of**

**Autonomous Underwater Vehicles** control for multiple Autonomous Underwater Vehicles (AUVs) is considered keep a desired formation with respect to the leaders configuration in 3-dimensional spaces .. obstacle avoidance scheme, which uses forward look sonar to detect AUVs are designated as followers which follow the leader by **Follow the leader formation control of multiple** - Calhoun Home Multiple Autonomous Vehicles Using Forward Looking Sonar. 6. thesis presents a simulation of a follow the leader behavior for multiple Autonomous. **Follow the leader tracking by autonomous underwater vehicles** A two-dimensional forward-looking sonar model with a 1200 horizontal scan and a The overall vehicle heading error incorporates this obstacle avoidance term to Follow the leader : formation control of multiple autonomous underwater **Automated Parsing and Conversion of Vehicle-Specific Data into** One of the greatest challenges associated with the Autonomous Underwater Vehicle (AUV) is reliability, accuracy, and the high precision navigation system for its submerged operations. Data collected Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. Grabelle **Vision based leader-follower formation control for** - **Scholars Mine** An economic analysis is made of vehicles powered by compressed natural gas (CNG), alcohol, and electric vehicles (EVs) as Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Evaluation of the NPS PHOENIX Autonomous Underwater Vehicle** A dynamic model of the vehicle response is used for control between location updates. Using sonar image feature extraction is necessarily time consuming and therefore is performed in a tactical level Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. **Formation Control of Multiple Autonomous Vehicles Using Forward** Follow the leader tracking by autonomous underwater vehicles (AUVs) using their autonomy by allowing multiple operating AUVs to simultaneously coordinate their information shared between the vehicles using acoustic communications. of multiple autonomous underwater vehicles using forward looking sonar ?. **A next-generation AUV energy system based on aluminum** Non-tactical vehicle replacement for the Department of the Navys medium- and heavy-duty vehicle fleet. Thumbnail Follow the leader formation control of multiple autonomous underwater vehicles using forward looking sonar ?. Grabelle **FOLLOW THE LEADER: FORMATION CONTROL OF MULTIPLE**