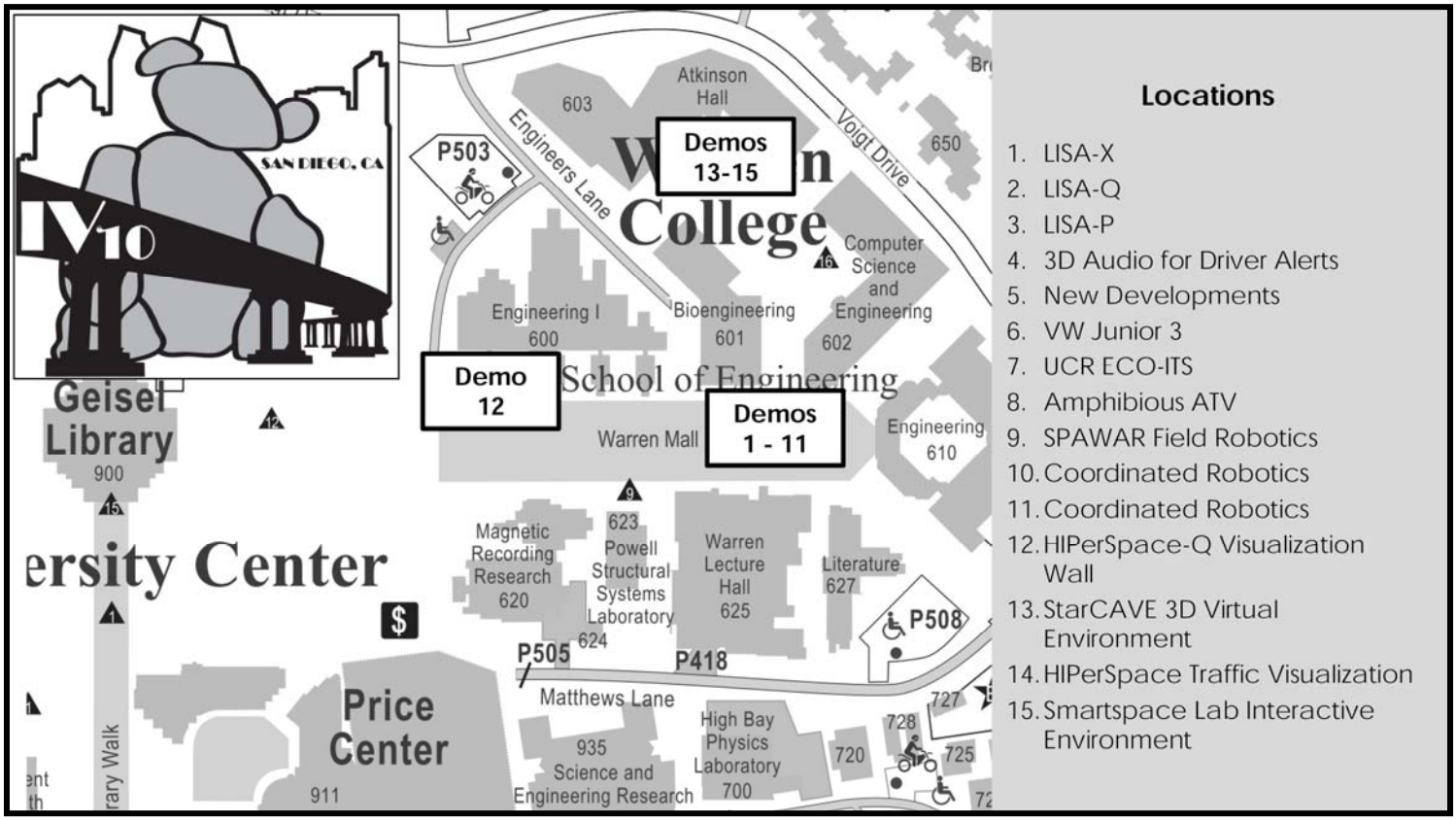
IEEE IV 2010 – Demonstrations and Exhibits Day – June 24



Descriptions

1: LISA-X Vehicle Testbed
This demo showcases a holistic approach to Driver Intent Analysis that incorporates measurements of the environment, the vehicle, and the driver, into mathematical models to estimate and predict the intentions of a driver. This includes a real implementation of a lane change intent detection system.

2: LISA-Q Vehicle Testbed
The LISA-Q testbed is a unique on-road laboratory that monitors the vehicle's dynamics, the driver, and the on-road panoramic environment using computer vision. Robust monocular frameworks for the detection and tracking of vehicles, Lane localization and tracking methodologies, and Dynamic panoramic surround analysis will be showcased.

3: LISA-P Vehicle Testbed
The Laboratory for Intelligent and Safe Automobiles (LISA) at UCSD uses this vehicle as a basis for research into various aspects of DAS, such as stereo- and omni-camera systems for looking at and analyzing the surround environment, vision-based systems for tracking driver posture dynamics, and other interesting demos:

- *In-Car Audio (InCA) Acquisition and Analysis:* Using a novel 2-mic based source separation technique between overlapped driver and passenger speech. The separated channels are further analyzed for speaker identification, keyword spotting as well as for audio emotion detection.
- *Beamforming Speaker Array System for Infotainment Audio Delivery:* This speaker array uses optimized filters that direct sound into narrow beams to direct audio to multiple listeners simultaneously with little interference.
- *Dynamic Active Display (DAD):* A novel laser-based wide-area heads-up windshield display for rich interactive visual feedback.

4: 3D Audio: Binaural Encoder and Reproduction System for Driver Alerts
This software module and playback system, developed by UCSD Calit2 researchers, provides real-time virtual-position encoding of driver alerts. These spatial audio cues can direct the driver's attention to obstacles and hazards of importance. Head models and highly efficient crosstalk cancellation provide a convincing virtual surround sound experience in a compact package that may be integrated into automobiles.

5: New Developments
This area will showcase videos of recent exciting developments of various groups related to Intelligent Interactive Vehicles and Cognitive aspects of driving, including Sequential Dependencies, Pedal Misapplications, and Stress-related EEG studies.

6: Volkswagen Junior 3
Volkswagen's DARPA Urban Challenge Winner, Junior, now has an exciting younger brother. This vehicle demonstration will showcase integration of some of the more recent autonomous vehicle sensor systems and technologies, such as a parking assistance system.

7: ECO-ITS (University of California, Riverside)
U. C. Riverside is investigating the design of Intelligent Transportation Systems (ITS) approaches that target environmental goals, under the direction of Prof. Matt Barth. This vehicle demo will include overviews of eco-friendly assistance systems, including "Eco-routing" and "Dynamic Eco-Driving".

8: Amphibious ATV (SPAWAR & UCSD)
This project involves the design and implementation of a remotely operated amphibious ATV for autonomous obstacle avoidance which requires accurate steering, shifting, and throttling. The automation unit is centralized on a single base plate installed on the chassis without hindering manual use.

9: SPAWAR Field Robotics
This demo will showcase field robotics research, as well as development in robotics, sensor fusion, communications, and human-machine interfaces for physical security and remote tactical surveillance applications.

10, 11: UCSD Coordinated Robotics Laboratory
The UCSD Coordinated Robotics Lab under the direction of Prof. Thomas Bewley develops small, simple robots that can overcome large, complex obstacles. Ultimately, we expect the development of such miniature agile robots to enable a host of new applications, including 3D Mapping.

12: Jacobs Hall HIPerSpace-Q Visualization Wall *(Location: Engineering 1 - Jacobs Hall Lobby)*
A new atrium-style lobby includes a digital gallery, serving as both a living laboratory for visualization research and a showcase for innovation throughout the Jacobs School of Engineering.

- *Triton Eyes*: Twelve cameras synchronously capture video to generate two 360-degree panoramic views as a testbed for real-time analysis of how people interact with their surroundings.
- *Highly Interactive Parallelized Display Space*: This display system is 10 times the resolution of HDTV and can enable users to interact with huge datasets in real time, and can link to an international network of similar displays for scientific collaboration.
- *Alioscopy Autostereoscopic Display*: This display uses 8 interleaved images to produce the autostereoscopic (no glasses) 3D effect.
- *Contextual Activity Notification Visualization Analysis System*: CANVAS provides a web-based user interaction interface for instantaneous feedback of contextual processing units, integrating cameras around the UCSD campus and centralize information.
- *VEhicle Classifier and Traffic flOw analyzeR*: The VECTOR system is a real-time video based highway traffic management system that accumulates traffic statistics, provides robust vehicle type classification, and detects abnormal situations from daily speed profiles.
- *DIVA, Mobile Probes*: GPS enabled devices are tracked and visualized on a map. Distributed video sensors situated around campus are automatically activated when a target of interest is in the vicinity for continuous monitoring and tracking over large areas.

13: StarCAVE 3D Virtual Environment
(Location: Calit2 Atkinson Hall, 1st Floor)
StarCAVE is a five-sided virtual reality (VR) room where scientific models and animations are projected in stereo on 360-degree screens surrounding the viewer, and onto the floor as well. StarCAVE provides an immersive environment allowing groups of scientists to venture into worlds as small as nanoparticles and as big as the cosmos – permitting new insights that could fuel discoveries in many fields.

14: California Traffic Report by UCSD: HIPerSpace Visualization *(Location: Calit2 Atkinson Hall, 2nd Floor)*
The California Traffic Report, which is available on both the website and the iPhone app, provides personalized traffic information: Commute times based on current traffic conditions, traffic speeds and congestions, and traffic maps. Users can also track specific sections of highway and have daily traffic reports and alerts via email or text messaging. It covers most highways in southern California as well as San Francisco, San Jose and other Bay Area cities.

15: Smartspace Lab Interactive Environment
(Location: Calit2 Atkinson Hall, 5th Floor)
The meeting room in the Smartspace lab at Calit2 is a state-of-the-art intelligent space equipped with 5 video streams and 32 microphones for human activity analysis. The demonstration includes audio-visual person detection and tracking in real time, as well as a location specific speaker modeling framework with online learning capabilities for speaker diarization and meeting transcription.