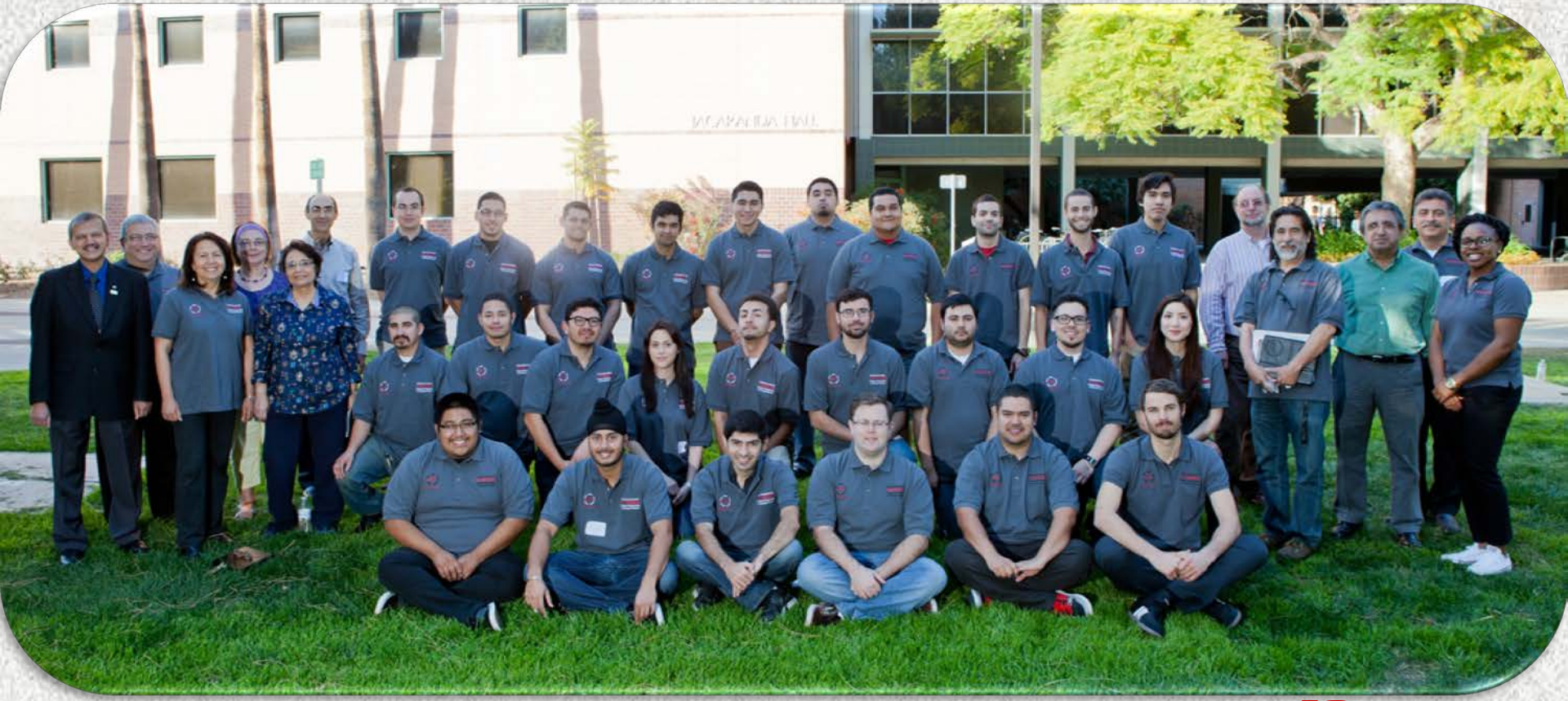
Welcome to AIMS^2(HSI-STEM Grant) Meeting # 28



JD 1568
2 PM – 4PM
Sep 18, 2014

•***AIMS^2 Cohort: Photo Courtesy Armando***

CSUN SHINE

The AIMS^2 Project Team
Attract, Inspire, Mentor, and Support Students

Faculty and Staff from the College of the Canyons, Glendale CC, & the College of Engineering and Computer Science, CSUN

AGENDA

- Welcome and introductions of new Faculty Mentors/Staff
- Overview of grant
  - Program News and Plans for Year 4– Ramesh
  - Project Evaluation and Progress to date – Nathan
- Academic Progress of Cohorts
  - Glendale Community College – Jan Swinton, Scott Rubke and Richard Cortes
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- Adjourn

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Congratulations Dr. LaTesha Hagler
Outstanding Staff Merit Award 2014
We are really proud of you

Nomination for National Award

Ramesh, S K

From: Elena Segura <esegura@edexcelencia.org>
Sent: Thursday, April 24, 2014 1:02 PM
To: Ramesh, S K
Subject: Examples of Excelencia-Program Nominated

Dear Mr. S. Ramesh:

Congratulations! Your program or department, **HSI-STEM Project/College of Engineering & Computer Science**, has been nominated for the 2014 Examples of *Excelencia* initiative. In order to be considered for this national recognition, you will need to submit a profile for your program no later than May 2nd, 2014 at 5 pm EST. You can submit your program's profile and obtain additional guidance about the process at: http://www.edexcelencia.org/create-profile.

Background:
Examples of *Excelencia* is the only national data-driven initiative focused on identifying and recognizing programs/departments with evidenced-based practices that increase Latino student success in higher education. We focus on results and on disseminating these promising practices to others interested in serving Latino students.

Benefits:
This year, a committee of national experts will recognize four programs as the 2014 Examples of *Excelencia*, identifying one from each of four categories: associate, baccalaureate, graduate, and community-based organizations. Each will receive a $5,000 financial award, a featured listing in the 2014 edition of What Works for Latino students in Higher Education, and inclusion in our online searchable Growing What Works database. A representative from each program will be flown to Washington, DC for the 2014 *Celebración de Excelencia*, held September, 30th 2014 and will be invited to be part of a plenary panel to discuss their work on October 1st, 2014 for the ALASS (Accelerating Latino Student Success) Workshop.

If you have any questions, please contact us at examples@EdExcelencia.org.

We look forward to learning more about your program or department's efforts to accelerate Latino student success at the associate, baccalaureate, graduate, or community-based organization levels.

Best,

Elena Segura
Program Manager
Excelencia in Education
www.EdExcelencia.org
1717 N St. NW, 2nd floor
Washington, DC 20036
202-785-7350 ext. 1104

1

AIMS² Program recognition: http://www.edexcelencia.org/2014

From: Elena Segura [mailto:esegura@edexcelencia.org]
Sent: Tuesday, August 26, 2014 12:10 PM

Dear Mr. Ramesh,
Congratulations! Your program has been selected as one of this year's **Honorable Mentions for Examples of *Excelencia* in the Baccalaureate category**! Please take note of the following events and materials needed to prepare the celebration of your success.

Events:
Celebración de Excelencia: Please reserve September 30th to attend Celebración de Excelencia to be held at the St. Regis Hotel in Washington, DC where the selection of your program as an Honorable Mention will be made officially public.

ALASS: On October 1st we invite you to attend the Accelerating Latino Student Success (ALASS) workshop where the four selected Examples from each category will share the success of their program with an audience of approximately 70 educational, policy, government, philanthropic, and Latino advocacy leaders.

Compendium: The program will be featured in **2014's edition of "What Works for Latino Students in Higher Education Compendium".** I will send you the final version of the profile that will be included for your review.

Attached to this email, please find the official letter recognizing CSU Northridge Engineering and Computer Science HSI-STEM Initiative as one of this year's Honorable Mentions for Examples of *Excelencia* in the Baccalaureate category.

Congratulations once again and thank you for your work to improve Latino student success!

CSUN SHINE

http://www.edexcelencia.org/our-work

Our Work | Excelencia in Ed...

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Convert Select

Our Work

- About
- Our Work
  - Our History
  - What Others Say
  - Strategic Plan
- Our People
- Our Support
- News
- Events
- Connect

SHARE

Some believe a focus on race and ethnicity divides us as a society. At *Excelencia* in Education, we believe acknowledging racial and ethnic trends describes our society in useful ways. Using data and analysis to identify factors that influence the success of specific student populations establishes the base line information from which to develop more effective policies, engage diverse stakeholders, and enhance the active and tactical responses needed to better serve Latino and all students.

9:57 AM
5/15/2014

CSUN to host White House STEM Summit

- Invited by the White House to host national event (one of four campuses)
- Date: October 7, 2014
- Focus on College Opportunity and broadening participation in STEM
- Supported by the Helmsley Trust and the White House OSTP

Goals and Objectives

- To increase the number of Hispanic and low-income students who successfully transfer from Glendale Community College (GCC), and College of the Canyons (COC) to California State University, Northridge, to pursue majors in Engineering and/or Computer Science.
- To increase the number of Hispanic and low-income students who join CSUN as upper division transfer students and graduate with degrees from one of the undergraduate programs in the College of Engineering and Computer Science.
- To develop a model, seamless and sustainable transfer program to assist Hispanic and low-income students to successfully transfer from GCC and COC to California State University, Northridge where they will complete their studies in Engineering and/or Computer Science.

California State University Northridge
Years of Life-Changing Opportunity

Project Activities

- Tutoring to improve student performance in preparatory Math and Science courses.
- Advising and tracking of students in cohort
- Work closely with faculty and staff in feeder community colleges to develop seamless articulation agreements, especially for students transferring from 2 year colleges to CSUN.
- Create a mobile digital environment with Tablet PCs , iPad's, and appropriate software, so that the project team can work with the cohorts to enhance communication, engagement, collaboration and creativity, and instant learning assessment.
- Expand Facilitated Academic Workshops (FAW) in required introductory courses and key upper division courses offered by the college's programs
- Faculty/Peer mentoring and career advising of students in the cohort
- College wide events focused on careers and jobs such as the biannual Tech Fest events held in February and September.
- Provide students with opportunities to work on hands-on projects and research activities that encourage them to stay connected with their majors

Nuts and Bolts

- All cohort students meet regularly as a group with faculty mentor and peer mentor from their respective program
- All cohort students maintain an online journal using Moodle with submissions required on a monthly basis – responses to prompts and additional information
- All faculty mentors maintain an online journal with submissions required once/semester
- Lead project faculty from GCC, COC and CSUN meet regularly to address gaps in articulation agreements and collaboratively develop curriculum to address gaps
- Monthly meetings of the entire team to review progress on key project measures and activities.
- Annual meeting with External Advisory Committee
- Bi-annual gathering of the cohorts at partner colleges to promote interaction

Students served to date

- Since January 2012 we have served a total of 161 students in three cohorts (approximately 67 % Latino/a). This includes 87 first-time transfer students at CSUN, 38 students at GCC, and 36 students at COC.

Budget Update

Year	Proposed	Awarded	Difference	% Difference
Year 1	$1,096,856	$1,096,856	$0	
Year 2	$1,140,998	$1,134,630	($6,368)	-0.56%
Year 3	$1,132,511	$1,128,888	($3,623)	-0.32%
Year 4	$1,129,743	$1,075,169	($54,574)	-4.83%
To Date	$4,500,108	$4,435,543	($64,565)	-1.43%
Year 5	$1,062,659	$1,041,659	($21,000)	-1.98%
	$5,562,767	$5,477,202	($85,565)	-1.54%

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California State University Northridge

IGV Hybrid Team

STEM Research/Application Project

for AIMS2 Program

CSUN Intelligent Ground Vehicle

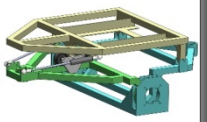
College of Engineering and Computer Science

Hardware Systems

Mechanical

RED RAVEN 2.0

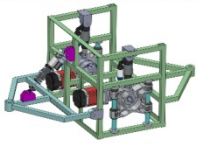
RED RAVEN 2.0 utilizes an improved linked bogie design inspired by the Mars Rover Rocker Bogie suspension system. Keeping the original design of RED RAVEN, two dual action dampers were added to minimize top platform motion and tipping as shown to the right.



Special features of RAVEN 2.0 are drive train decouplers used to enable the drive wheels to turn independently from the motors. RAVEN 2.0 maintains a CG centered above the drive axle, allowing for zero-radius turns on the spot.

LINJA

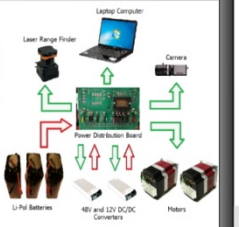
LINJA utilizes a dymanic frame inspired by the success of RED RAVEN. It features a front pivot for a flexible frame and an independent drive wheel suspension system using a unique linear bearing Spider-Slider design, shown to the left.



Specialized drive train decouplers were fabricated to enable the drive wheels to turn independently from the motors. LINJA frame was also designed to maintain a CG centered above the drive axle. A liquid cooling system was designed to keep the laptop's CPU at a functioning temperature. This cooling system is able to be transported from one platform to the other.

Power

Both RAVEN 2.0 and LINJA emphasize efficiency and reliability. The power delivery system emphasizes efficiency by concentrating all power distribution into a single board. Key components, such as the motors and battery packs, are protected by fuses on the power distribution board, DC - to - DC converters, the CLAMP module, and Protective Circuit Modules (PCMs) in the battery packs. The DC - to - DC regulates the voltages, protecting from excess current or voltage by providing a stable output. The CLAMP Module protects the motors from counter-electromotive force — a backward voltage developed during deceleration. This voltage could damage the motor's servo controllers, rendering the robot motionless. Finally, the batteries themselves are constructed from Lithium Ion Polymer (LiPo) battery cells and PCMs. Each of the forty eight battery cells are susceptible to over charging, overheating, and deep discharging, which could cause them to rupture or ignite over time. The PCM in each battery pack protects the cells inside the battery, assuring them a long life. Finally, Arduino is used to activate the autonomous light. Furthermore, it is also implemented to collect light intensity data for image calibration.



Arduino Microcontroller

Safety

Vehicle safety is a primary concern; as such an emergency stop system comprising a wireless remote and a physical push-button are incorporated into the robot design. The wireless remote system functions in excess of 100 feet away, and the push-button stop is easily accessible and clearly visible.

Outcomes

This project provides students the opportunity to work as a team, learn leadership and project management skills, and presents a yearlong challenge to design, build, program, and test a successful product. Systems such as the power system, navigation system, line recognition, motion control, and cognition algorithms work together seamlessly to successfully navigate a difficult obstacle course. Skills and methodologies learned in the process are relevant in many areas both related to and unrelated to robotics, including industrial, aeronautical, space, residential, and military applications, to name a few.

What is IGVC?

The purpose of the Intelligent Ground Vehicle(IGV) Team is to design and assemble a fully autonomous unmanned ground robotic vehicle that can negotiate a course with obstacles and perform tasks assigned to it during the **Intelligent Ground Vehicle Competition (IGVC)**. The goals of this competition are to advance the technology of intelligent ground vehicles (IGVs) by challenging a new generation of engineers to perform realistic missions on a competition course and to foster ties between young engineers and the organizations developing IGV technologies. The vehicle is to be judged in three different categories: **Auto-Nav Challenge, Vehicle Design Challenge, and J.A.U.S. Challenge.** Each year about 60 teams from countries around the world participate in this robotic event.

Vehicle Design Challenge

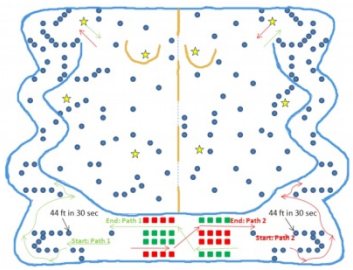
The vehicle design challenge looks into the design strategy and the critical thinking demonstrated by the students during the assembly of the vehicle.The vehicle design is judged based on a written report, an oral presentation, and vehicle examination (without taking the Autonomous/Navigation Challenge results into account). The design challenge tests the students' abilities to effectively and efficiently convey thier innovative ideas and design process.

J.A.U.S. Challenge

The JAUS Challenge is a test of the vehicle's ability to take orders from another computer. Using the on board Navigation System, the robotic vehicle is required to send information, such as its current position, yaw, and velocity, to the JAUS system. In addition, the vehicle must navigate between a set of designated waypoints that the JAUS system sends to the Navigation system.

Auto-Nav Challenge

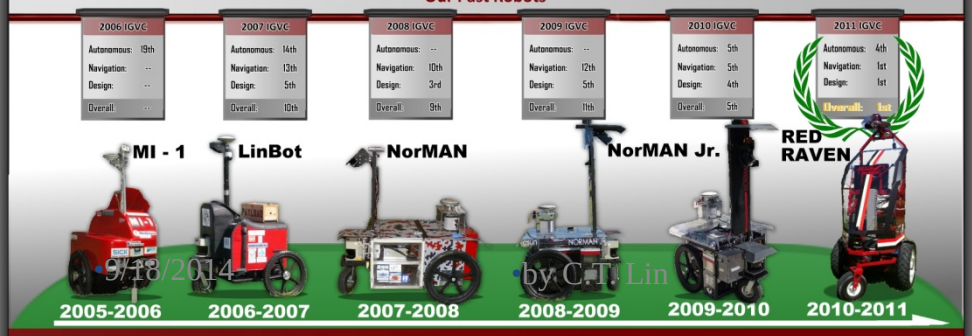
In this new challenge, the vehicle both navigate through an outdoor obstacle course on its own and follow GPS waypoints to find its way out of a large, unbounded area. The course consists of construction barrels, cones, pedestals, saw horses, ramps, and flags. The vehicle must autonomously avoid obstacles while staying within boundaries, designated by white lines, throughout the entire course. The robot must also follow a set of designated navigational waypoints which determines the path the robot is required to travel. In the center of the course, these are the only references the robot has for guidance, as there are no boundry lines to mark a clear path. Instead, the robot must decide on it's own path, avoiding obstacles and crossing a fence which runs down the middle of the field with a single opening randomly placed before the run begins. On top of the normal obstacles, flags are also placed throughout the course. Depending on the color of the flag, the robot must pass either on the left or right side of it, meaning it must be able to identify different colors and plan its route accordingly. A sample map is shown to the right, with the circles representing obstacles, squares representing flags, and stars representing GPS waypoints to which the robot must travel.



Teamwork

The project requires collaboration between people of many different backgrounds and engineering fields, including electrical, mechanical, and computer engineers. Each individual's work must integrate seamlessly with everyone elses' work to create a functioning robot. This provides the team with unique work experience similar to an industrial environment, making this a valuable experience to everyone involved.

Our Past Robots



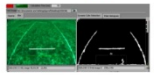
Software Systems

Vision

Vision is the eye of the vehicle. It uses cameras to see its surroundings. It then corrects the images to make the data more useful. On Red Raven, a single camera feed is used to guide the robot. Light sensors and a microcontroller assist with light balance. On Linja, there are two camcorders that acquire a wide angle of view to assist with better maneuverability of the robot. This method introduces less distortion, though the images must be combined.

FO124TC Camera

DCR-HC28 Camcorder



Navigation

Navigation features a goal priority setting algorithm which finds the fastest path through a set of GPS waypoints. This system is similar to how a traffic GPS sensor behaves.

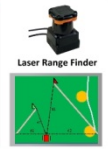
Digital Compass

GPS Sensor

Inertial Measurement Unit (IMU)

Cognition

Cognition is based on an obstacle avoidance algorithm known as Radial Polar Histogram (RPH), which constructs radial paths to avoid obstacles and reach its goal and react to the environment as perceived by the sensors. This algorithm generates a desired turing radius and velocity for motion control to execute. It can also identify some obstacles and calculate its future location.

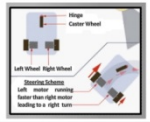


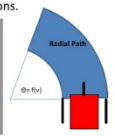
Motion Control

Vehicle motion is executed by the use of a differential drive which is similar to the operation of a wheelchair. Motion control utilizes dynamic velocity and acceleration functions to perform accurate motion executions.

QuickSilver Motor

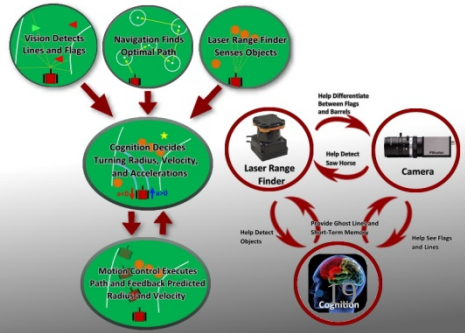
Motor Controller





System Integration

The sensors, motors, and controllers all work together to execute a task.



A Proposed Hybrid Team Model

- A hybrid team of **GCC/COC/CSUN** for 2015 IGVC
- Focus on
  - *Design Challenge*
  - *Auto-Nav Challenge: Basic Course*
    - Vision
    - Cognition
    - Navigation
  - *JAUS Challenge: Defer to next competition in 2016*
- Use an off-the-shelf platform for vehicle chassis
- Encourage non-AIMS2 program student participation in the hybrid team

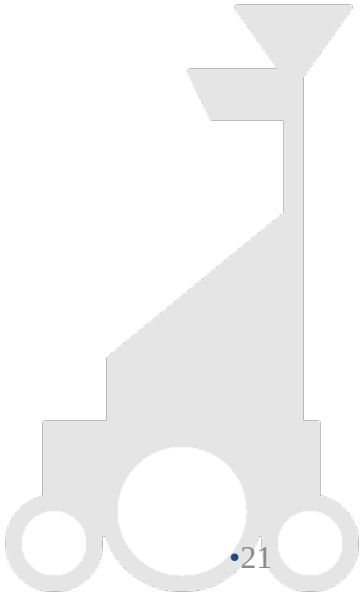
Contact Information

College Dean, S.K. Ramesh

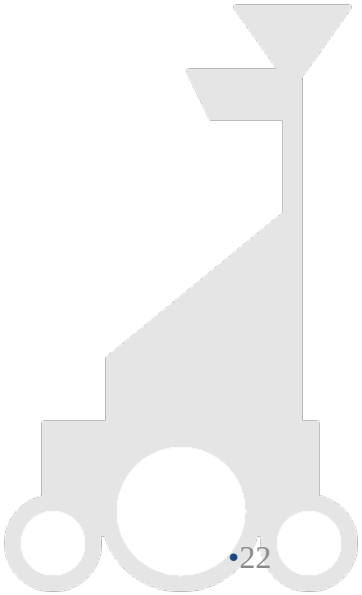
s.ramesh@csun.edu

ME Department, Professor C.T. Lin

ct.lin@csun.edu



Q & A



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Meeting Calendar for Summer-Fall 14

- *September 18th, 2014*
- *October 16th, 2014*
- *November 13th, 2014*
- *December 11th, 2014*

***All meetings above are scheduled from 2 PM – 4 PM in JD 1568**.

*Note: Fall 2014 Tech Fest – September 23rd, 2014