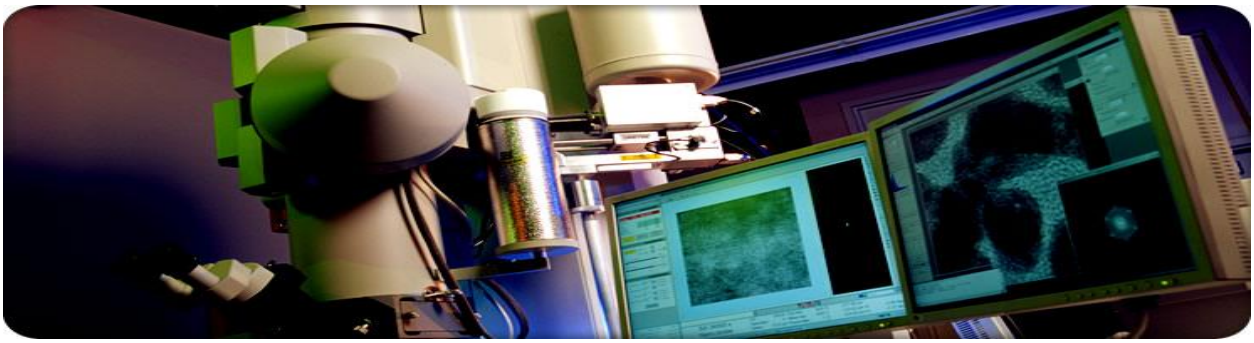

UNT

COLLEGE OF ENGINEERING

DESIGN DAY

Friday, April 27, 2012

University of North Texas

Discovery Park

Program

Discovery Park Auditorium, B155

1. Welcome Address 9:00 am
2. Poster presentation and project presentation in Discovery Park Foyer 9:30 am – 11 am

3. Project Presentations: 11:30 am – 5 pm

A) Computer Engineering (11:30am) B155
B) Information Technology (1:30am) F223
C) Electrical Engineering (1pm) B242
D) Mechanical and Energy Engineering D201
E) Electronics Engineering Technology (11:30am) B190
F) Mechanical Engineering Technology (1pm) B185
G) Construction Engineering Technology (1:30pm) B192

Engineering Technology

Team #1: Team Bad Trip

Team Members:

Kyle Fincher
Ryan Morris
Assem Mahmoud
Mustafa Mustafa

Executive Summary:

As a senior design project, team Bad Trip designed all components necessary to retrofit a CBS MAGVAC Breaker to fill the need the now obsolete Westinghouse VCP150 previously filled. The new breaker needed to act and perform just like the previous VCP150; meaning that mechanical and electrical systems had to be designed in order interface with the older equipment properly.
The original breaker was modeled in Solidworks in order to visualize critical interfacing components in relation to one another. The breaker to be retrofitted was also modeled to help the team design a new housing and design mechanical interfaces to perform like the old breaker. Once concepts were modeled, calculations were performed to verify the rigidity of the newly designed structure. After the design was complete, a prototype was fabricated.
Sheetmetal was cut, bent and welded to form the housing for the new breaker. All mechanical interfaces were fabricated using sheetmetal and round steel tubing. Therefore, the amount of current running through these breakers can put electrical fields around all the components, rapidly accelerating corrosion if proper corrosion resistance methods are not used. All metal surfaces had to be yellow zinc plated or painted to eliminate corrosion.

Team #2: Truffle Machine

Team Members:

Robert McAshan
Nonso Agolue
Chris Reed

Executive Summary

A small independent chocolate company, Quintessential Chocolates, owned by Lecia Duke asked our team, Efficient Solutions, to design and construct a machine to assist in the manufacture of truffles. The machine extruded the inner material, ganache, of a truffle. The previous manufacturing operation had a single person hand piping every truffle, an expensive and time consuming situation that was no longer acceptable. Efficient Solutions designed a machine to do this in a simi-automated method. It was simi-automated to permit advertising the product as being hand made..

The machine was temperature controlled to prevent melting or hardening of the ganache. It was set to only extrude the desired amount of ganache per truffle. Being placed in a kitchen, special care was taken to ensure that the machine was small and easily cleaned. To make cleaning even easier a bag with the ganache was inserted into the machine instead of putting the materiel in directly. In addition to mechanical and size considerations, ease of use was taken into account. The machine is hand held with a lever built into the handle, each squeeze of the lever extrudes the desired amount. This method of operation also enabled the Efficient Solution's design to be used effectively with minimal training. Weight was also considered so that the operator would not get to tired while operating the machine for extended periods of time.

Team #3: Ellison Workholding Solutions

Team Members:

Ryan Steffee
Marcia Eligwe
Curtis McConnell

Executive Summary

Ellison Workholding Solutions (EWS) was consulted to design a clamping device for a CNC horizontal milling center. The piece that was machined used thin forged aluminum for stock. This presented unique challenges that were eventually overcome for a quality product. Due to the forged nature of the stock, a perfectly flat surface could not be assumed. In order to get optimal holding force, multiple pins were used to adjust for imperfections; the thin aluminum also had a tendency to chatter, especially when machining on the side. Vibration and chatter were unacceptable due to their negative effects on finish, therefore, a hydraulic system was designed that dampened and absorbed these unwanted vibrations. The last aspect of this fixture had to do with the automation process. Since repeatability is mandatory in any manufacturing process to ensure each product created is the same as the last, the centerline and height were maintained even when loading new stock in the fixture.
Ellison Workholding Solutions designed a hydraulic circuit to actuate 8 pins at the base of the part. This hydraulic system was integrated with the controls of the CNC to limit operator interaction. The operator loaded the stock and the CNC clamped the material. At this point, the CNC ran the program and machined the part. After completion, the finished product was released and the cycle started again.
The build of this project was set to begin in January of 2012 and completed by mid-April 2012, to allow for testing and troubleshooting.

Team #4: Project Cool Out

Team Members:

Adam Avis
Dalton Hausler
Jason Smith
Travis Mayberry

Executive Summary

PepsiCo is interested in providing consumer beverages in developing economies. To help serve this need the Project Cool Out senior design team built and demonstrated an innovative mobile beverage cooling/distribution prototype. The team consists of four senior level students in the Mechanical Engineering Technology program at University of North Texas with faculty consultation. Delivery was May of 2012. The prototype attaches and travels behind an existing common bicycle. The unit has two wheels with automatic braking system, cooling unit with container, and canopy. The wheels are attached to a common axle and brake automatically when the bicycle slows. The braking system requires no additional connections by the user. Container capacity is minimum of 48 single-serve, 350-mililiter beverages. Cooling is provided by high efficiency compressor unit maintaining 7-degrees Celsius or below for minimum of eight hours between full charges. Power is supplied by a deep cycle battery. In addition to charging the battery from a power outlet, when attached to a bicycle, the user recharges the battery while moving. Cooling and container unit are of simple design and easily replaced by off-the-shelf parts if required. The canopy provides space for communication and advertisement. PepsiCo management identified India as the target market. The project required research into regional conditions of weather, population, and transportation as well as energy access. The prototype demonstrates PepsiCo and University of North Texas values of environmental sustainability, human safety, and innovation.

Team #5: Rocket Racer

Team Members:

Andrew Valenzuela
Bibek Maharjan
Jared King
Arturo Alarcon
Alex Contreras
Isaac Olowogbade
Ndy Onyebuchi

Executive Summary

The Pulse jet engine is the simplest form of a jet engine in which the combustion occurs in pulses. The explosion which occurs in pulses expands the air inside the combustion chamber. This hot and compressed air, when trying to exit the pulse jet engine through the tailpipe, produces the thrust. The first pulsejet engine was patented in 1906 by Russian engineer V.V. Karavodin. These engines were extensively used by the German army during the World War II to power their V-1 flying bomb. There are basically two types of pulsejet engines, a valved one and a valve-less one. The valve-less one has no

moving parts. For this project, Rocket Racers built a valved pulse jet engine and retrofitted it to a RC car platform. The engine was made of stainless steel sheet. The electronic control was taken off of an off-the-shelf RC unit.
Heat generation was the most significant challenge because the engine was producing a large amount of heat and was sure to melt the components of the typical RC car. The challenge was to place the electronic components so that operations were safe while it maintained 100% operability. The whole platform of the RC car that was used was initially made of plastic. The team redesigned and replaced the platform using metal. The pulse jet engine is basically a rocket, best suited for motion in a straight line. In this project, the team designed mechanisms and explored different ways to control the engine. The main challenge was throttle control. The team designed the engine to control the throttle and allowed the pulse jet engine to be throttled just like any other engine.

Team #6: Green Electric Conversion Operations

Team Members:

Brent Elliott
Matt Kidd
Jeff Smith

Executive Summary

The University of North Texas Student Service Department approached Green Electric Conversion Operations (G.E.C.O) to convert a 1931 Ford Model A from an internal combustion engine to an electric drive system. After analyzing the needs and concerns of Student Services G.E.C.O. decided on a range and speed the car should be capable of after the conversion. These requirements dictated the minimum size of the electric motor and battery pack. Based on these needs, G.E.C.O selected a NetGain Warp9 motor for its well-known balance of power and affordability. A lithium ion battery pack was paired with the motor for maximum range while reducing weight and increasing product lifetime. A battery management system was implanted in order to balance battery loads during system operation and charging, further increasing the endurance of the product. Additional controls and system monitoring equipment was integrated into the vehicle's dashboard. These controls provided feedback on current system status, speed, and estimate range remaining. The conversion included complete technical documentation on the safe operation and maintenance of the system components.

Team #7

Team members:

Javier Altamirano
Marcus Sanchez
Phillip Wong
Alex Farquhar
Mike Yeager

Executive Summary:

We have taken the plans for a condominium building that was planned to be built in New York City and reengineered it to be built in San Francisco. The original building was a concrete structure and we have reengineered it to be a steel structure so that it can stand up to the earthquake loads in San Francisco. We have also increased the height of the building from 8 floors to 20 floors and have designed two identical towers instead of one single building. All of this required reengineering of the structure. There are a total of 396 residential units with 4 penthouses. The approximate square footage is 350,000. Our approximate project cost is $130,885,645.

9th & Mission will offer residents a luxury living experience in the heart of downtown San Francisco. Amenities will abound in this urban high-rise but the number one amenity will be its prime location. 9th and Mission will be located within walking distance of several San Francisco staple locales.

In addition to its location, 9th and Mission will provide homeowners with brilliantly designed spaces and unparalleled luxury throughout every phase of its construction. Our goal will be to provide customers with a unique living experience in one of America's finest cities.

Team #8: Intuitive Green Consultants

Team Members:

Greg Severn
Mike Newby
Nikhil Mannan
Diego Jimenez

Executive Summary:

Our project is to suggest modifications to meet LEED Silver qualifications for the First Woodway Baptist Church school addition, located at 101 Ritchie Road, Woodway, Texas 76712. We are working in corporation with The Wallace Group (Architects), and Pearson Construction (General Contractors). Our goal is to recover all expenses utilized to achieve LEED Silver Certification within a time frame of 15 years beyond its completion date. In addition, the intent of this project is to show that building by LEED standards is both beneficial to the environment while being cost efficient.

Team #9

Team Members:

Hayden Lindley
Chris Shakesby
Erick Garbina
Kyle Durham

Executive Summary:

The Lofts at North Lakes is an upscale modern student living community located on the corner of US 77 and Riney Road in Denton, TX. The Lofts at North Lakes is a 12 acre property located across the street from The University of North Texas' Discovery Park. We offer two different floor plans for potential residents to lease. Each floor plan offers a garage, full kitchen, washer and dryer hookups (washer and dryer can be leased for an additional charge). In both floor plans each bedroom has its own closet, connected bathroom, and built-in desk. The first floor plan is the townhome. This model includes a 2-car tandem garage, 2 bedrooms, 2.5 bathrooms, and a back elevated wooden deck. The second floor plan is the duplex. This model includes a 1-car garage, 3 bedrooms, 3.5 bathrooms, and a covered back porch. In the Club House/Leasing Center of The Lofts at North Lakes we offer many amenities for our residents. There is media lounge, kitchen, and pool room that a resident can use or reserve at any time during their lease for parties such as watching the Superbowl or the World Series. We also provide a gym and a hot tub which can be used by our residents 24 hours a day 7 days a week. There is also a gated swimming pool with lounge areas, pool volleyball, and a fire pit for keeping warm when the weather gets chilly. We also provide a study room, regulation sized basketball court, sand volley court, dog-park, picnic/grilling areas, and over a mile of crushed granite running trails.

Team #10

Team Members:

Fahad Bin-Rashid
Garrett Morgan
Peter Khaya

Executive Summary:

The Project goal is to build a warehouse store for Locke plumbing and electrical supply co. The function of this ware house is to store supplies for future delivery to its main stores in Plano and Denton. This building will be 25,200 sq. ft., with 8220 sq. ft. of retail space and 16,380 sq. ft. of warehouse. Due to the extent of the earthwork, the project is expected to take ten months. In addition to building the warehouse, proper accommodations will be provided to rain water. The pond will be built on the north east corner of the construction. The main objective of the pond will be to slow down the water flowing through the drainage ditch. Total Project cost: $2,000,000. Our team's main objective considering the

LEED is to construct a warehouse that requires the least amount of energy consumption possible. The following are the considerations to increase the energy efficient building:

1. Light Pollution
2. Acoustic performance
3. Day light

Team #11: DO Engineering

Team Members:

Ayman Al Odaily
Donald Oglesby

Executive Summary:

Open Source Hardware PCB Router
This project designs and constructs an inexpensive (<$200) Printed Circuit Board (PCB) router for processing of single/double layer copper plated PCBs. Comparable commercial products cost at least 10x more. The router is controlled by a laptop and accepts a variety of input specification formats. All plans, schematics, source code etc. will be placed in the public domain on the project's web site. Engineers, technologists, students and hobbyists will be able to easily construct the router using cheap and easy to procure parts based on the published design.

Team #12: MPK Engineering

Team Members:

Matthew Griswold
Phi Ngyuen
Kazi Saquib

Executive Summary:

The eDash Electronic Dashboard. The project builds and enhances the capabilities of a previously published electronic dashboard system. The eDash monitors vehicle functions via the OBD II interface, retrieves error codes, logs data, and provides statistics with customizable display menus. The original designer has graciously provided permission for his design to be used by MPK engineering. Planned enhancements include tire pressure monitoring and wireless safety notifications.

Mechanical and Energy Engineering

Team #1

Team Members:

Anna Barren
Chance Carlton
Cory Dodson
Taylor McRae
Micah Mosley
Greg Muzljakovich
EJ Newell
Jeff Tsiatsos

Executive Summary:

High Survivability of Helicopter Drive Systems. The team is to develop a method to increase the survivability in helicopter drive systems in the event of failures within the primary lubrication systems.

Team #1

Team Members:

Archie Wright
Andrea Clark
Todd Weir
Taylor Fisher
David Sanders

Executive Summary:

Pollution Monitoring Shelter. This team is to develop a portable, self-powered pollution monitoring shelter that is able to withstand category 1 hurricane force winds and resist corrosion.

Team #3

Team Members:

Bob Applegate
Jared Barton
Maggie Deatrick
Ben Derryberry
Lauren Graham
Emil Leutwyler
Ted Pinto

Davis Thanh
Lisa Thidavanh

Executive Summary:

Human Powered Vehicle. This team is to design and build a Human Powered Vehicle that will be entered in ASME's national Human Powered Vehicle Challenge. The team must meet all constraints required by the competition. This will be the MEE's department first national competition.

Team #4

Team Members:

Alexis Narvaez
Ashesh Dangol
Cakra Wicaksono
Cecil Aguh
Gabriel Elaiho
Charlie Michalka

Executive Summary:

Pulse Jet Propelled Hang Glider. This team will design a pulse jet engine that has the capability to propel a hang glider. This design will allow hang gliders to launch from flat surfaces without the need for tow cables.

Team #5

Team Members:

Derek Dunlap
Zach Fair
Ryan Gray
Mauricio Londono
Casandra Manning
Byron Rose

Executive Summary:

Sandwich Vending Machine. This team will design a vending-type machine that will produce hot or cold sandwiches based on user input.

Team #6

Team Members:

Cody Beck
Kyle Pinion
Francis Maxwell Jr.
Joe Powell
Barrato Collins
Schaeffer Harris

Executive Summary:

Portable Hydro Generator. This team will design a light-weight, environmentally-friendly, portable device that is capable of generating power using the energy found in moving water. The purpose of this design is to give outdoor enthusiasts a convenient way to generate power using nearby water sources.

Electrical Engineering

Team #1

Team Members:

Innarith Sihara Son
Kuan Chen
Saed Qaraqi

Executive Summary:

Home Security / Safety System. Security and safety in homes have a tremendous impact on peoples' lives every day. This paper proposes the integration of both areas to achieve a convenient and efficient system for providing the required security and safety simultaneously. The system is designed using the low cost MSP430 microcontroller, which consists of programmable flexibilities and built in features with future upgrade potential.

Team #2

Team Members:

Deepak Sharma
Faraj Ahmed
Hesham Alsehaim

Executive Summary:

Phone Controlled Lock. : The idea of the project "Phone Controlled Lock" is as simple as it states: - unlock a door by phone call. There are instances when people lock their keys inside the house, or sometimes have somebody else get in the house. This is when our project comes into play, convenience being the key without any doubt. This kind of locks that are available in the market right now are either too expensive or require an exclusive internet service. The lock we are about to design will definitely be a lot cheaper and hence within the reach of layman. The design will consist of one major telephone detector circuit, which in turn will have DTMF decoder and a wireless component. When any key is pressed, the DTMF will pick up the tone and decode the tone of the pass-code to a digital output to control the lock. The wireless component will communicate and enhance the wireless connection between detector and the door lock. Once the lock successfully receives the code, the door is unlocked. We will find out if we face any difficulties while doing the project once we start building it. Hence, our project "Phone Controlled Lock", as the title suggests, is unlocking a door by means of a phone call for the ease and efficiency of people.

Team #3

Team Members:

Ryan Loudermilk
Josh Smith
Lorin Swan
Raymond Welch

Executive Summary:

S.A.F.E system, Site Alert Flood Emergency System. Flash flooding is considered by the United States Geological Survey (U.S.G.S.) to be the number one weather related killer in the United States. The U.S.G.S. has reported that an average of 127 people per year die due to flood related accidents. With the majority of these caused when people attempt to drive across moving water. There is a need for ways to monitor low level water crossings and alert the public to the danger. We feel a low cost solution would allow for more crossings to be monitored. Our design combines a low cost water level detection sensor with a wirelessly connected station. This station will then display a warning and if needed activate any flood safety measures. Our design accurately reads water levels as small as inch increments and broadcasts them to a display that actively changes as the water level does. Initial prototype costs reflect the viability of a full scale version becoming the low cost alternative to current design on the market.

Team #4

Team Members**:**

Jeremy Kessler
Syed Zeeshan
John Jenkins

Executive Summary:

Wireless Monitoring System. This project is about developing a new method for monitoring different changes in the environment. More specifically, we seek to monitor signals using different sensors that will then send the inputs into a wireless transmitter that will then send all the signals that are being received to a common receiver that will then send the signals into a computer that uses the different information to compare data and let the user know the situation that is outside. This system will allow different hotspots to be marked with sensors to make sure there is no irregular activity going on which will cause disturbances to the locals or the community and if there is such activity the system will notify the monitors to sound an alarm that will allow everyone to take the necessary precautionary measures.

Team #5

Team Member:

Noah Maze

Executive Summary:

A Lego Mindstorms NXT-Based Test Bench for Cohesive Distributed Multi-agent Exploratory Systems: Mobility and Coordination. The projects objective was to design and implement a cost-effective and time-saving test bench for the implementation and study of advanced communications theories and decentralized control systems. Our computer-based test bench controls multiple low-cost Lego Mindstorms NXT programmable robotics kits via Bluetooth and can be used to simulate a variety of situations and control schemes. We envision that this test bench will serve as a conduit to foster the real-world application of distributed multi-agent exploratory system concepts.

Team #6

Team Members:

Cordero Benitez
Jose Herrada

Executive Summary:

Portable Three Band Equalizer Amplifier. Audio amplifiers have been part of our culture for as long as vacuum tubes have, giving musicians a voice and bringing diverse cultures together through sound. This paper proposes combing two great amplifier designs and incorporating them into one to make a more efficient portable amplifier. This system is designed using three banks of filters along with and audio amplifier and a solar panel.

Computer Science and Engineering

Team #1: Van Buren Boys

Team Members:

Charles Goodrum
Michael Holloway
Adrian Salazar
Michael Koch
Alex Humphries
Ajay Joshi

Executive Summary:

Parking Lot System. Automatically identify and report parking space availability using a computer vision system on the lot and a mobile app for the customers.

Team #2: Swarm-Copter

Team Members:

Andy Hagar
Patrick Ungu
Mark Moudy
Tikitai James
Rasheed Wright
Joseph Williams

Executive Summary:

Cooperative Quad Copter Project. Develop cooperative capability to allow two or more quad-copters to coordinate mission activities and to communicate with a ground base station.

Team #3: Vrooms

Team Members:

Juan Meza
Ricky Patel
William Kesterson
John Wing
Nathanael Mathis

Executive Summary:

Automated Golf Cart. Modify a standard golf cart to provide “driver-less” taxi service within the Discovery Park facility for visitors.

Team #4: Big Brown

Team Members:

Craig Carlson
Drew Allen
Farica Mascarenhas
Brian Curtis
Curt Smith

Executive Summary:

UPS Scanner. Develop a scanner for the UPS facility that will reduce the number of mis-loaded packages at the distribution site.

Information Technology

Team #1: Mean Green IT Machine

Team Members:

Ian Walton
Anibal DeLeon
Elyssa Morgan
Michelle Berggren
Cjivona Hicks

Executive Summary:

CSE Library System. Develop a library management system for the CSE departmental textbook library.

Team #2: PEBKAC

Team Members:

Thomas Charuvila
Jose Lazalde
Ruben Rico
Alfredo Villagomez
Marcos Zepeda
Curtis Myers

Executive Summary:

Physician Website. Develop an informational, scheduling and retail sales website for a local professional speaker and chiropractor.

Team #3: The IT Crowd

Team Members:

Jared Hislop
Richard Travis Campbell
Ryan Crouch
Shannon West
Matt Moses
Gerardo Picazo

Executive Summary:

Blackbeard's Treasure Chest. Develop a retail sales site for a company that sells pirate and renaissance apparel and accessories.

Team #4: Go Team Venture

Team Members:

Blake Carson DeBarry
Pa Sanna Ceesay
Scott Powers
Christian Lopez
Chris Brown
Elizabeth Bennett

Executive Summary:

Senior Design Parts Inventory. Develop a parts inventory and check out system for the Computer Science and Engineering Labs.

Team #5: Redeye Consulting

Team Members:

Anousone Bouasanouvong
Carlos Camarillo
Henri Hernandez
Jonathan Mesa
Kevin Craig
Matthew Murray

Executive Summary:

CTC Success Stories Web Project. Develop a multimedia web component for the Convergence Technology Center at Collin College that will permit them to post and share success story videos and testimonials.

Team #6: GET-IT

Team Members:

JR Freeman
Wesley Nyamangwanda
Zachary Banes
Tim Page

Executive Summary:

Clear View Auto Glass web Project. Develop a commercial sales and informational site for an auto glass repair company.

Team #7: RoboTechTX

Team Members:

Martinique Jackson
CJ Edwards
Javier Avela
Rashad Robinson
Drew Turner
Tom Boyd

Executive Summary:

Automated Graduate Student Records. Create an online repository of graduate records information such as degree audits that is accessible by students and faculty. This will help automate the checklist for progress towards graduation.

Team #8: Apptastic! Labs

Team Members:

Brett McCormick
Kyle Taylor
Katerine Villafuerte
Eric Vannucchi
Eric Boyd

Executive Summary:

DCTA Transit Tracking. Develop a pair of mobile apps that will track the current location of trains and busses in the DCTA network and provide riders with real-time updates as to arrivals and departures from a particular stop.

Team #8: Prestige Worldwide

Team Members:

Lee Crane
Michael Nelson
Amelia Chase
Miles Collins

Executive Summary:

Forward Tutoring. Develop the tutoring and volunteerism website that was designed by TAMS students and was the Winner of the UNT Innovation Challenge and Murphy Center Entrepreneurship awards for 2011.

Team #9: Umbrella Tech II

Team Members:

Christopher Beene
Eduardo Diosdado
Michael Hebron
Deidre DeNeal
Huy Ngo

Executive Summary:

Robocamp Registration and Management. Redesign and improve the online registration and camp information site for the UNT Robocamp program.