Jan 15

Introduction

Jim welcomed everyone. He talked about the CNC class info (Kinsey Fobes *kfobes(a)rtc.ctc.edu*). Attendance: 55

Brainstormed for ideas for presentations:

- Expert presentations by college professors & grad students
- "How to" classes and tutorials on basic stuff
- "Mini" or pre-Robothon contests or events between Robothons
- F.I.R.S.T. contest information and activities
- Product presentations (sales demos) no sales pressure
- Microprocessor technologies and applications
- Sensor technologies
- Control methods for robots

Some FIRST info on the east side: http://www.issaquahrobotics.org

Club Business

A member's car was broken into during a recent robot build session out in the RTC parking lot. Please be sure to keep your vehicle locked and keep items of value locked up and out of sight in your vehicle.

Show-N-Tell

Larry Barello needs to get rid of a bunch of stuff.

John McGiver brought a balancing robot he's working on. He hacked a Gyration "Gyromouse" that he bought off eBay for less than $20 to get two-axis position rate gyro. The output is about 1 mv/deg/second. The TINY26 has a couple internal ADCs that he uses to read the high and low side of the signals. He demonstrated it and it worked pretty well, but the natural drift of the gyros causes it to accelerate into a runaway condition. It was suggested that an independent tilt reference is needed to give the robot feedback on what it's actually doing. The rate gyros are relative devices that need to be referenced to something much more solid. See http://www.gyration.com/gyromouse.htm for more information.

Larry Barello gave us a basic tutorial on OP amps and applying them the circuitry needed to condition the rate gyro. The discussion also branched into the differences between accelerometers and rate gyros. Accelerometers measure static acceleration (i.e. gravity, tilt) or dynamic acceleration (change in acceleration). For our purposes, static acceleration measurement is the most useful. Larry and John plan to publish a white paper on the basics of what they discussed. Here's an online tutorial http://www.uoguelph.ca/~antoon/gadgets/741/741.html for those interested. Search the web for "op amp tutorial" to find others.

Josh (in kindergarten) received a mini sumo robot kit for Christmas that isn't working yet.

Gene Elliot & Terry Laraway brought a bunch of stuff for give-away.

Chris O'Dowd brought some cool robots that he's been working on lately. They will be on display at an exhibit next week across from the Best Western downtown. Check (http://www.dorkbot.org) for information. See http://www.solarbotics.com for info on B.E.A.M. kits.

Monty Reed (North Seatle Robotics Group) brought his "Roger Robot" hacking experiment. He wants to build a machine that can be purchased off-the-shelf at BigLots for $20 and hacked without opening the case. See http://www.bsless.com/rogrobot.html for a picture.

Monty also brought his "lifesuit" robotic exoskeleton that he's working on. He's working on several different types of actuator systems (pneumatic, hydraulic, and electric). He designed this suit in 1986 after suffering a broken back in a parachuting accident. He initially built the suit for himself, but since he doesn't need it, he decided to build it to help the +750,000 folks out there who need physical therapy. The suit will help patients who need physical therapy but can't get it because enough therapists aren't available. The suit will permit "self-service" physical therapy.

Tom & Cathy Saxton brought a video demo of the next F.I.R.S.T. competition that basically involves stacking tetrahedrons and lots of other things. Jim Wright gave us a commentary on the contest video. A bunch of SRS folks are involved in F.I.R.S.T. See http://www.usfirst.org/robotics for more information.

Presentation

None scheduled for this month but not for lack of trying. Larry Barello's OP Amp tutorial (above) filled the time.

Conclusion

Jim concluded the meeting and everyone quickly jumped on the offers that were made during the 'round the room time.

Feb 19

Introduction

Lots of folks were at the F.I.R.S.T. regional event this weekend. Steve Kaehler stood in for Jim Wright and welcomed everyone. Attendance: ~70

Club Business

Robothon is coming in October. See http://www.robothon.org for more information.

Reminder: A member's car was broken into a couple months ago out in the RTC parking lot. Please be sure to keep your vehicle locked and keep items of value (or apparent value) locked up and out of sight in your vehicle.

Show-N-Tell

Puyallup Hamfest, March 12, starts around 9:00 AM at Washington State Fair Grounds. See http://www.mikeandkey.com/flea.htm for more info.

F.I.R.S.T. See http://www.usfirst.org. Regional info available Some FIRST info on the east side: http://www.issaquahrobotics.org. See http://www.usfirst.org/robotics for more information on national and other regional events.

Terry Harmer - BAIRS - Bellingham, March 5th, 1st annual festival at Fairhaven Public Library, 1st floor. See http://www.westernfrontonline.com/vnews/display.v/ART/2005/03/01/422506e2e29c9 for details. Club website: http://bairs.cs.wwu.edu/

http://www.gumstix.com - new connex board, ethernet, compact FLASH, http://www.colinux.org

Tyler - young fellow interested walking robots. Would like to talk to people about them.

People doing strange things with electricity - COCA - 410 Dexter Ave N. near the Seattle Center (east). Lots of electronics/interactive art until March 3. Open Wed to Sun noon to 5PM. See http://www.cocaseattle.org/season.htm for information.

Gene Elliot brought his baby Robosapien. (http://www.google.com/search?hl=en&lr=&q=robosapien&btnG=Search) Costco is selling "cold heat" soldering irons for $15.99 (http://www.asseenontv.com/prod-pages/heat_cold_soldering_set.html). **Terry Laraway** brought a bunch of catalogs for give-away.

Tyler Folsom talked about his teams involvement in the 2005 DARPA Grand Challenge (http://www.darpa.mil/grandchallenge/). There are 195 teams are entered this year.

http://www.rotomotion.com; yaw, pitch, & roll sensor, Kalman filter, $299.

Someone is looking for OS2/Warp. http://www-306.ibm.com/software/os/warp/

Lowes Hardware in Bellevue is closing out ultrasonic "tape measure" devices for $10. Other places may have them as well.

Ten-bit programmable rotary encoder chip uses a rotating magnet, produces 1000 counts/revolution, has an SPI interface. Available form Austria Microsystems. PN AS5040. See http://www.austriamicrosystems.com/04segments/industry/AS5040.htm for more info.

Western Allied Robotics will be at the Seattle Center Centerhouse on Saturday, April 2 around noon. See http://www.westernalliedrobotics.com for details.

Tiny JAVA microcontroller, w/Ethernet, 1MB static RAM, $65 ea, can also be programmed in C.

Robothon is the 2nd weekend in October (Sat 10/8 & Sun 10/9). Hack session on Friday evening (10/7) from about 6 to10 PM upstairs conference room in Centerhouse. See http://www.robothon.org for details.

University of Washington Tacoma Campus (1900 Pacific Ave) is having a science fair on March 12 from 9 AM to 4 PM. They will have robotics & biomedical displays. Campus website: http://www.tacoma.washington.edu/

Took a short break while setting up for the presentation.

Presentation

GYRE Project - David Bliss, Matthew Dockrey, Lee Zeman, Team members not present: Amy Lacenski, Anna Tonkonogui, Erin Karper.

http://depts.washington.edu/gyre/pictures.html

Presentation Outline

- Project background
- Control system basics
- Vision-based orientation control
- The robot
- Videos
- Demonstration

Reduced Gravity Student Flight Opportunities Program:

http://microgravityuniversity.jsc.nasa.gov/students/activeteams.cfm?PageNum_selectees=5

Special thanks to David, Matthew, and Lee for coming to share about their project and demonstrate the robot for the SRS.

Conclusion

Steve concluded the meeting and everyone quickly jumped on the offers that were made during the 'round the room time and to take a closer look at the GYRE robot..

Mar 19

Introduction

Jim Wright welcomed everyone. Attendance: ~60

Club Business

Robothon is coming in October. See http://www.robothon.org for more information.

CNC Set-Up & Operation for Robotics:

- Class MTECS 219-8872 - Starts 4/16/05 and ends 6/25/05 on Saturdays from 8:00-4:30 PM. Fee $269.00
- Renton Technical College 3000 NE Fourth St. Renton, WA 98056 (425) 235-2352 http://www.renton-tc.ctc.edu

Monthly "practice" contests are planned after the regular meeting: No prizes or fancy preparations, just an opportunity to run robots and practice competing.

- May - Line Following
- June - Mini Sumo
- July - Line Maze
- August - Walking Robots
- Fall - To be announced

SRS Robot Workshops - More are in the works. These will probably occur on the second Saturday of each month like last year. More information is forthcoming

F.I.R.S.T. See http://www.usfirst.org. Regional info available Some FIRST info on the east side: http://www.issaquahrobotics.org. See http://www.usfirst.org/robotics for more information on national and other regional events.

Planning is in the works to conduct a FIRST Mini Challenge at the Issaquah Saturday Market. More information will come as details are worked out.

University of Washington School of Engineering Annual Open House is coming! This is a great experience for kids of all ages with emphasis on students in grades 4-12. Enjoy departmental exhibits, hands-on activities, student & faculty presentations, demos of all types both inside and outside. See http://www.engr.washington.edu/openhouse

- Friday, April 22 from 9:00 to 3:00 PM
- Saturday, April 23 from 10:00 to 2:00 PM

If you have any questions, please do not hesitate contacting *openhouse(at)engr.washington.edu* or 206-685-1785.

ON-LINE REGISTRATION IS NOW AVAILABLE AT:
http://www.engr.washington.edu/openhouse/regform-formmail.html

UW College of Engineering

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http://www.engr.washington.edu/score

Show-N-Tell

Steve Kaehler passed around some Internet articles on cool technological developments.

- John Hopkins University - **Artificial Antenna Helps 'Cockroach Robot' Scurry along Walls** - http://www.jhu.edu/news_info/news/home05/mar05/antenna.html
- University of Pittsburgh Medical Center - **Brain Controls Prosthetic Arm in Monkey** - http://newsbureau.upmc.com/TX/SchwartzArmResearch2005.htm
- Georgia Institute of Technology - **Test Successfully Flies Smarter Rotary Wing UAV** - http://www.gatech.edu/news-room/release.php?id=515
- JPL - **Armwrestling match between an EAP actuated robotic arm & a human** - http://ndeaa.jpl.nasa.gov/nasa-nde/lommas/eap/EAP-armwrestling.htm
- GPS World Magazine - March 2005 - http://www.gpsworld.com (online archives available going back several years)

  The Robot's Great Race - DARPA Grand Challenge 2005 - http://www.gpsworld.com/gpsworld/article/articleList.jsp?categoryId=277

  Micro Aerial Vehicles (MAVs) Provide Bird's Eye View - http://www.gpsworld.com/gpsworld/article/articleDetail.jsp?id=128403

- Design News Magazine - March 7, 2005 - http://www.designnews.com

Robots Enable Non-Invasive Surgery - http://www.designnews.com/article/CA514050.html

Jim Tighe, Driving force behind SpaceshipONE, voted engineer of the year

- MIT - **Alarm Clock that Runs Away** - http://www.theregister.co.uk/2005/03/28/mit_clocky/
- Electronic Design Magazine - March 3, 2005 - http://www.planetEE.com

Liquid Lenses Focus Without Moving Parts - http://www.varioptic.com

Cool military gadgets & technology

Tyler Folsom talked about his teams involvement in the 2005 DARPA Grand Challenge (http://www.darpa.mil/grandchallenge/). There are 195 teams are entered this year. He showed us a video of the vehicle Team Sleipnir is working on. They are very confident in their design. See http://www.teamsleipnir.com for more information.

Doug Bell talked about MAKE: Magazine, a publication about making things. See http://make.oreilly.com for details.

Michael Laine updated us in the latest space elevator adventures. (http://www.liftport.com) There is a party planned at the Space Needle for April 12. Contact him at info(a)liftport.com for details.

Gene Elliot brought some stuff to give away.

Terry Laraway brought a bunch of catalogs for give-away.

Monty Reed demonstrated his latest prototype "lifesuit". The LIFESUIT is a robotic exoskeleton brace designed to help paralyzed people walk again. It has been developed by Monty Reed with assistance from North Seattle Community College and the UW Medical Center and Business School. There will be a fund-raising benefit at the Seattle Museum of the Mysteries (623 Broadway, Capitol Hill, Seattle) on April 16th from 7-9 PM. See http://www.theyshallwalk.com for more information.

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John McGiver and his son showed a six-legged mechanical walker "Mechamo" kit they brought in last December as a kit. It's now built and operates. Very cool.

- Japanese site: http://www.gakken.co.jp/otonanokagaku
- US source: http://www.e-clec-tech.com.

Fellow and his grandson are looking for assistance with a BOE-Bot kit. It uses a BASIC Stamp II and has an IR remote control. See http://www.hobbyengineering.com for specific kit details.

Presentation

ARC Labs at the University of Washington - **Sam McKennoch**

Sam is a doctoral candidate in the Autonomous Robotics and Control Systems Lab at the UW.

Presentation Outline - "ARCS Research Overview: Fuzzy Sensors and Synched Velocities"

- ARCS Lab Overview and Undergrad Activity
- Graph Grammars
- Khepera Testbed (http://www.k-team.com/robots/khepera)
- Fuzzy Inference System for Sensor Calibration
- Velocity Profile Synchronization for Arbitrarily Connected Graphs of Situated Agents
- Dynamics of Convergence to a Symbol Anchoring Consensus in Distributed Agents
- Conclusion
- Q&A

Conclusion

Jim concluded the meeting and everyone quickly jumped on the offers that were made during the 'round the room time.

Apr 16

Introduction

Jim Wright welcomed everyone. Attendance: About 55 people braved the rain to come talk about robots. He introduced any new folks to SRS and the typical meeting flow.

Club Business

There will be a practice **Line Following** competition here next month after the regular meeting. If you can, go to PDXBot (http://www.pdxbot.org) on May 1 in Portland, OR to see what this is like. They will also be running a Robo-Magellan competition on Saturday, April 30.

Monthly **"practice" contests** are planned after the regular meeting: No prizes or fancy preparations, just an opportunity to run robots and practice competing.

- May - Line Following
- June - Mini Sumo

- July - Line Maze
- August - Walking Robots
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- Renton Technical College 3000 NE Fourth St. Renton, WA 98056 (425) 235-2352 http://www.renton-tc.ctc.edu

SRS Robot Workshops - There will be another SRS Robot build session. Details are being worked out and the kits are nearly ready. Stay tuned for more information via the Yahoo Group listserver. Check the SRS website at http://www.seattlerobotics.org for more information>

See Jim after the meeting if you are interested in details of some recent corporate business.

The Encoder - From Editor Tom Dickens (not discussed at the meeting, but this topic hasn't been mentioned for a while)

"The last ***Encoder*** (http://www.seattlerobotics.org/encoder/) was about 3 (well, maybe 4) months ago. I plan to have new Encoders out quarterly, but it really depends on you. Yes, you. I write some of the information, but without great articles from the ***Encoder*** readers there is not much to publish. If I get a flood of articles I will publish Encoders every 2 months, or even every month. Writing an article for the Encoder is quite easy. I'll format it into a web-page for you, so you can e-mail me text, an MS-Word file, or just about anything. Of course, pictures make a good article even better."

"What to write about? Anything robot related. If you're interested in it, others will be too. I'm sure there are readers that know more than you do, and readers that know less. If you share what you know, it will help many others. Besides learning and sharing information, ***Encoder*** articles can be very inspirational. If you share a few pictures of a robot you're working on, others will see it and be inspired to build their own. I know this is true since I am constantly getting inspired reading about robots and projects people have done. I also know that others get this inspiration too; I receive a few e-mails a day from people who have read one of my articles and make comments, have questions, or want to share their work with me."

University of Washington School of Engineering Annual Open House is coming!

This is a great experience for kids of all ages with emphasis on students in grades 4-12. Enjoy departmental exhibits, hands-on activities, student & faculty presentations, demos of all types both inside and outside. See http://www.engr.washington.edu/openhouse

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F.I.R.S.T. - **F**or **I**nspiration and **R**ecognition in **S**cience and **T**echnology

See **http://www.usfirst.org/robotics** for more information on national and other regional events.

Some local (Seattle area) FIRST info on the east side: **http://www.issaquahrobotics.org.**

Planning is in the works to conduct a FIRST Mini Challenge at the Issaquah Saturday Market. More information will come as details are worked out.

Show-N-Tell

Steve Kaehler passed around some magazine and Internet articles on cool technological developments.

- Bear-Cam - http://www.gpsworld.com/gpsworld/article/articleDetail.jsp?id=146689
- Autonomous Lawnmower Competition - http://www.gpsworld.com/gpsworld/article/articleDetail.jsp?id=118308
- Tilt Sensors - http://www.sensorsmag.com/articles/0904/41/
- Lithium Batteries deliver 2WHrs - http://www.tadiranbat.com
- Tiny Methanol Powered Fuel Cell - http://www.toshiba.com
- Wave Power - http://www.oceanpowertechnologies.com and http://www.oceanpd.com
- Unmanned Aerial Vehicles (UAV)

- US AFRL - Test Flies Smarter Rotary Wing UAV - http://www.gatech.edu/news-room/release.php?id=515
- Boeing ScanEagle - http://www.boeing.com/defense-space/military/unmanned/um_news.html
- Boeing X-45 - http://www.boeing.com/defense-space/military/x-45/x45news.html
- Boeing X-50 - http://www.boeing.com/defense-space/military/unmanned/um_news.html

Some online technology & design resources available by free subscription:

- Best of EDN Designs - http://www.edn.com/index.asp?layout=siteInfo&doc_id=127541
- SENSORS Magazine - Great resource for instrumentation & controls technology - http://www.sensorsmag.com
- GPS World Magazine - All about GPS - http://www.gpsworld.com
- Design News Magazine - Engineering design resources - http://www.designnews.com
- Electronic Design Magazine - Electronic design resources - http://www.planetEE.com

Kinsey Fobes brought in a cool little machine made by Fluke (http://www.fluke.com) to load screws into an automatic screw machine. It consisted of a helical shaped bowl that looked kind of like a coal strip mine. The screws are dumped into the bottom of the bowl in the middle and the machine is plugged in. It buzzes and the screws slowly crawl around the bowl climbing higher as they follow the helix. He also has a bunch of equipment that he needs to get rid of. See him after the meeting.

Dave brought some new Gunstix (http://www.gumstix.com) boards Ethernet add-on, compactFLASH add-on, protoype RoboStick has an ATMega128 onboard.

Terry Laraway brought in a remote controlled mechanical **panther** hr bought for $4.00. It be steered by pivoting its body. He found it at a local GoodWill. It was made by "Wowee"? This link (http://www.otherlandtoys.co.uk/panther.htm) looks like it.

A fellow mentioned that there is a new Lithium-Ion battery that can be recharged very rapidly. I found this link that seems to confirm this:

Toshiba has introduced a new battery that can receive 80% charge in a minute. The article doesn't specify how long the other 20% takes, but the battery is supposed to accept up to 1000 cycles of this. See http://www.dpreview.com/news/0503/05032903tosh1minbatt.asp for more details.

Doug Bell brought in a catalog of fancy Agilent oscilloscopes. He has other catalogs of stuff. IMEX is a way for businesses to trade or give away stuff. The North Seattle Robots Club acquired a bunch of stuff (mainly ICs) when the House of Science closed down. The club meets

at NSCC on Mondays from 3-9PM and Thursdays from 5-9PM. The club's website is http://www.NSRG.4T.com

Cathy Saxton showed off a sensor board (for her newest line follower robot) that she designed with Eagle PCB software and had fabricated by http://www.sparkfun.com. There is a book that walks you through the process using the Eagle PCB design software (http://www.cadsoftusa.com/).

Tom Saxton brought a MAKE: journal. See http://make.oreilly.com for details.

ATMEL is having a sales pitch/engineering seminar (free "Butterfly") on June 1 in Bellevue, WA at the Double Tree Hotel. These seminars offer good free food and stuff and are a great way to explore Atmel chips. http://www.atmel.com. DigiKey (http://www.digikey.com) sponsors the events. See http://www.atmel.com/seminar/mcu/default.asp for the schedule of events around the country.

Doug Kelley mentioned that Microsoft (http://www.microsoft.com) has released "beta 2" of many of their tools.

Michael Laine told us about their latest robot's adventures (http://www.liftport.com). It broke in Utah last month. The users placed a radio at the top of a balloon-suspended tether and wanted to have the space elevator robot retrieve it. The wind was a problem again, and the robot got stuck right where the ribbon twisted and burned out the motors. Some minor design changes will preclude this in the future, but it was a painful lesson learned. Also see http://www.MarSociety.org/mdrs or http://www.GTMars.com for more information on these scaled-down applications of the space elevator technology.

Jim Carroll mentioned that Servo magazine is interested in pictures of our creations with a brief description. Send them to Ryan at Servo Magazine See http://www.servomagazine.com/contact.php for contact info.

Feature Presentation - "A Barbaric Approach to Robot Building" - by Jim Wright

Introduction

Jim Wright talked about "F.I.R.S.T. robotics technology" focusing on the basic hardware construction involved with a typical FIRST robot. The acronym, FIRST, stands for "**F**or **I**nspiration and **R**ecognition in **S**cience and **T**echnology" and seeks to immerse young people into a mentored science and technology project so they become excited about the possibilities and maybe choose a related field as a career. He has been involved with team for a while and has learned a lot about the challenges of building a large machine capable of completing the contest objectives while getting the high school aged kids involved to do most of the work. It is a fast-paced activity that is both rewarding and at time frustrating but overall satisfying.

He sees bits and pieces of these robots showing up in many other places besides FIRST contests and decided to share with the SRS how to use this stuff on other robots. Jim Culbertson and Jim

Wright have shared frustrations, experiences, and notes on this topic. A number of other SRS members are directly involved with FIRST. They include Larry Barello, Kevin Ross, Ted Griebling, and Tom & Cathy Saxton to name a few. See http://www.usfirst.org for more information.

The Motor

The "Cim-Motor", designed specifically for FIRST is Jim's favorite motor. It runs on 12VDC and is ideal for building large robots. It can be purchased from http://www.InnovationFirst.com. Sometimes robot builders use a particular item as the core of their design. If the motor is this piece, the current-torque curve for the motor provides the performance envelope that is theoretically possible. Here's some additional info on the subject: http://www.gizmology.net/motors.htm and a great DM motor tutorial (http://lancet.mit.edu/motors/).

The Wheels

The wheels typically used are 6" in diameter and are intended primarily for wheelchairs. Decide on a nominal or maximum speed and compute the RPM of the wheels to accommodate this. 6" wheels have a circumference of about $2\pi*3$" or ~18.84". 60 RPM then corresponds to a linear speed of ~19"/sec or ~1.5 ft/sec. Other speeds can easily be computed this way. These wheels can be obtained from Skyway wheels (http://www.SkywayWheels.com) directly if you are on a FIRST team or through a distributor if you aren't . The bearings are built into the wheels which is a good thing. Jim is using these wheels on his Robo-Magellan robot.

The Wheels and Motors

The best place to operate the motors is near one-half the free-speed (RPMs with no load) along the diagonal line from max torque corner to max RPM corner on the RPM-vs-torque plot. Somewhere in the middle affords the best use of your available battery power. Once this output RPM is selected, the gearbox can then be designed. Websites that sell gears often have tools to help you design your gearbox.

The Gearbox

The design of the gearbox is really a geometry problem where you select and position meshing gears such that the input-to-output ratio converts the optimal or desired motor RPM to the desired output shaft RPM and thus linear speed. A number of years ago, SRS member Lance Kaiser gave Jim a simple technique for laying out the gearbox. Draw the layout of gear axle holes onto a piece of paper, copy this four times, and glue one directly onto each piece of gearbox frame material (steel, aluminum, etc.). Drill the plates through the pattern and then build the gearbox frame. It was suggested by someone in the audience to make sure the teeth are "prime" to one another so that you get more uniform wear.

Wheel Spacers/Hubs

Jim needed a bunch of $12 spacer/hubs for the Skyway wheels and decided to build rather than buy them. He made a silicon mold of an original part and then bought a batch of liquid plastic from TAP Plastics (http://www.tapplastics.com/) to make his parts. This is a great place to get raw plastic materials to build your own pieces often at much lower cost than buying pre-made parts.

The Speed Controls

The currents involved when moving 120-150 lb. robots at the discussed speeds are substantial. Currents between 100 and 200 amps is not unusual. This requires very efficient, high-powered controllers capable of protecting themselves if something bad happens. This self-preservation feature doesn't always work, however. The controllers are run by standard radio control electronic speed controllers (ESC) (e.g. http://www2.towerhobbies.com/) plugged into the either the FIRST controller (http://www.InnovationFirst.com) or an ordinary RC receiver.

Protection Systems

Blowing motor controllers can be protected with fuses and circuit breakers. They can be placed around the system to keep the smoke in. Jim uses resettable circuit breakers. He also uses marine electrical parts for this purpose.

Main Power Control

There is a single 120A circuit breaker in series with the batteries that serves as the main on/off switch for the robot and provides general short-circuit overload protection. This is important unless you like "burning up" lots of money.

Battery Connectors

It is very important that power cannot be plugged in incorrectly. Apparently, there are young people out there who seem bent on letting that all-important smoke out of anything and everything electrical. This helps prevent that. There are battery power terminals available that make sure the wrong things cannot be connected together.

Jim brought in one-half of the drive system from the "Terrified Chameleon" to show what all this hard work and discussion actually boils down to.
http://www.tedlarson.com/robots/robothon2004/Stills/Small/04-Terrified-Chameleon.htm

Conclusion

Jim concluded the meeting and everyone quickly jumped on the offers that were made during the 'round the room time.

May 21

Introduction

Jim Wright welcomed everyone. Attendance: About 50 came to talk about robots. He introduced any new folks to SRS and the typical meeting flow.

Club Business

Kathy and Tom Saxton may have line following competition at end of presentation.

Monthly **"practice" contests** are planned after the regular meeting. No prizes or fancy preparations, just an opportunity to run robots and practice competing.

- June - Mini Sumo
- July - Line Maze
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- Fall - To be announced

Robothon is the 2nd weekend in October (Sat 10/8 & Sun 10/9). Hack session on Friday evening (10/7) from about 6 to10 PM upstairs conference room in Centerhouse. See http://www.robothon.org for details.

Larry Barello presented a synopsis of FIRST competitions. Barrello's school won regional Larry did not go down to Atlanta, however next Saturday a FIRST Competition pick up competition and it will be at the Pickering Barn at Issaquah, Farmers' Market. Larry Big will be sending out notices, so tentatively May 28, 2005 9-3pm.

F.I.R.S.T. - **F**or **I**nspiration and **R**ecognition in **S**cience and **T**echnology

See **http://www.usfirst.org/robotics** for more information on national and other regional events.

Some local (Seattle area) FIRST info on the east side: **http://www.issaquahrobotics.org.**

SRS Robot Workshops - There will be another SRS Robot build session. Details are being worked out and the kits are nearly ready. Stay tuned for more information via the Yahoo Group listserver. Check the SRS website at http://www.seattlerobotics.org for more information>

Some guy brought in free dead hard drives to give away and use as parts. Someone else chimed in and said Home Depot has Torque screw drivers that can be used to take these apart. Also Vetco has a 28 piece security screw driver kit for screws of the size found in hard drives.

Karl Lunt talked about a Toshiba 350 laptop that he bought from Vetco. A 233 PIII 96 meg RAM machine 384 meg flash drive CD ROM and mounted it on Centra (sic) plastic. THIS IS his solution to having dealt with interoperability problems with other Linux set ups he has had. Total investment around $70. He is planning to go back for a 305 which should sell for around $20.

The Encoder - We are looking for an editor. "What to write about? Anything robot related. If you're interested in it, others will be too. I'm sure there are readers that know more than you do, and readers that know less. If you share what you know, it will help many others. Besides learning and sharing information, ***Encoder*** articles can be very inspirational. If you share a few pictures of a robot you're working on, others will see it and be inspired to build their own. I know this is true since I am constantly getting inspired reading about robots and projects people have done. I also know that others get this inspiration too; I receive a few e-mails a day from people who have read one of my articles and make comments, have questions, or want to share their work with me."

Show-N-Tell

John McGiver(?) talked about PCB foundries http://www.Sparkfun.com $5/sq in no other fees will take Eagle input files. http://www.barebonespcb.com $35 set up and 55 cents a sq in. will not take Eagle input files Advanced Circuits is at http://www.4pcb.com. Up to three circuit boards for a total of 60 in sq. cost $100 will not take Eagle input files. There was a brief discussion of the club about the peoples experiences with these companies. The gist of all of it was make sure the company will produce what you expect. Some have specific parameters that need to be met in input files. Some CAD programs do not meet all of these expectations as well may produce reverse dimensions that is not acceptable. Some talk about LPI (what ever that is) and silk screening and how these companies assist in theses matters

The guy who wrote the Evil Genius book(s) was back and was interested in finding a distribution point in the United States. He received several responses. http://www.elxevilgenius.com clutch@elxevilgenius.com book is available via http://www.Amazon.com and other outlets

Chris O'Dowd talked about his rail gun experiences with his school

An unidentified individual (**Lloyd Spencer?**) talked about the Robo Business symposium. sponsored by Robotic Trends magazine. 600 people attended, numerous vendors and distributors as well. improvements in robotic arms vendors, now it is common to produce an arm that can lift 8ox for a cost of 1-2 thousand. Comparing this to a few years ago where the same capacity would cost around $40 thousand. Web site for next years events can be find via: http://www.coroaware.com and http://www.roboevent.com.

An individual brought in a couple of copies of Make: magazine available a Borders Books and UW bookstore. Also, see http://make.oreilly.com.

One member requested that another Eagle (cad program) workshop be presented. Kathy or Jim Write offered to do this and a demonstration will be given in the June or July meetings.

A club member talked a bit about http://www.DigiKeys.com surface mount paste and wanted to go in with someone else for a purchase.

A club member discussed the ICRA 2005 symposium discussion was on events there including vision control systems. Also mentioned was the ICAR2005 event in Seattle this June.

Microsoft has new software available for hobbyist programmers Languages available are VB and C#. http://MSDN.microsoft.com/coding4fun.

Andrew Michalicek from Arazon stopped by for our meeting, a Honeywell employee that is an active roboticist in his home state.

Kathy Saxton talked about a number of items: There will be three new level 1 classes opening up in June so sign up now. She also talked about Phase II of the kit, which will sell for about $65. It has more detectors and a breadboarding area is included in this part of the project. She discussed quad-encoders (not part of Phase II however), will be available through SRS for $35. They are made by http://www.Acroname.com/ and sold on their web site for about $40. Kathy will have the Robothon volunteers sign up sheet next month for Robothon to be held in September.

Tom talked about the UW Engineering Open house and said to watch for it next year.

Feature Presentation - "The Development of Nano and Microelectromechanic System" - by Kerwin Wang

http://www.ee.washington.edu/research/mems/projects.htm.

http://faculty.washington.edu/kww/Web/kwre.htm

Conclusion

Jim concluded the meeting and everyone quickly jumped on the offers that were made during the 'round the room time.

Jun 18

Introduction

Steven Kaehler lead the meeting for Jim Wright, greeting a group of 50-60 who came out to talk robotics.

Club Business

Robothon is the 2nd weekend in October (Sat 10/8 & Sun 10/9). Hack session on Friday evening (10/7) from about 6 to10 PM upstairs conference room in Centerhouse. See http://www.robothon.org for details.

July 16 We will be taking pre-orders for T-shirts ($20 for a shirt; $50 for a shirt + 50 raffle tickets). Buy your shirt now to ensure that you get the size you want! Cash or Check please.

Make Checks out to Seattle Robotics. Other payment methods are being considered. Distribution for pre-sale will be in August and September.

We need help for Robothon in the fall. Every imaginable position is available (including help in the Paper submissions which is not mentioned on the web page). Please sign up at http://www.robothon.org/robothon/volunteer.php

Monthly **"practice" contests** are planned after the regular meeting: No prizes or fancy preparations, just an opportunity to run robots and practice competing.

- June - Mini Sumo
- July - Line Maze
- August - Walking Robots
- Fall - To be announced

SRS Workshop Robot

Level I kits are available now ($105).
Order information is available on the website at www.seattlerobotics.org/WorkshopRobot/
Level II kits (when available) will run $65.

There will be another set SRS Robot build sessions. Level I build classes will be held for the next three Saturdays at Renton Technical college.

- June 25, 2005
- July 2, 2005
- July 9th, 2005

See Cathy Saxton for details.
Information is also available via the Yahoo Group listserver.
Check the SRS website at http://www.seattlerobotics.org for more information>

The Encoder - We need someone to help out in this area as Tom has other commitments, contact Cathy Saxton after the meeting.

- Accept and new submissions
- Format articles to conform to SRS style
- Post articles to the web site.

From Editor Tom Dickens (not discussed at the meeting).

"The last ***Encoder*** (http://www.seattlerobotics.org/encoder/) was about 3 (well, maybe 4) months ago. I plan to have new Encoders out quarterly, but it really depends on you. Yes, you. I write some of the information, but without great articles from the ***Encoder*** readers there is not much to publish. If I get a flood of articles I will publish Encoders every 2 months, or even every month. Writing an article for the Encoder is quite easy. I'll format it into a web-page for you, so

you can e-mail me text, an MS-Word file, or just about anything. Of course, pictures make a good article even better."

"What to write about? Anything robot related. If you're interested in it, others will be too. I'm sure there are readers that know more than you do, and readers that know less. If you share what you know, it will help many others. Besides learning and sharing information, ***Encoder*** articles can be very inspirational. If you share a few pictures of a robot you're working on, others will see it and be inspired to build their own. I know this is true since I am constantly getting inspired reading about robots and projects people have done. I also know that others get this inspiration too; I receive a few e-mails a day from people who have read one of my articles and make comments, have questions, or want to share their work with me."

Show-N-Tell

Doug brought in his 3 Kg sumo; the latest improvements are the ABS end caps machined down. Looking good!

Karl Lunt brought in his Diabian Linux development platform hacked from a 233 (cpu) Toshiba Laptop. With VGA out an old laptop can be rejuvenated into a system as what Karl is using. Original hard drive, floppy complement the system as well as a 384 Mb flash drive. See Karl for details

Someone brought in a few copies of Ubuntu and handed them out. Ubuntu is one of the more user friendly distributions, well worth the installation if you have not tried it out.
If you did not receive one, you can order one for free off of their web site at:
http://www.ubuntulinux.org/

Chris brought in his rail gun for a demo to be performed after the meeting.
He also talked a bit about make magazine. http://www.makezine.com

John brought in a book to give away. "The Tragedy of the Moon" is a compilation of essays. With the topic of space ladders being a hot topic in recent months, he thought someone would enjoy reading it. Free for the taking after the meeting.

Someone brought in a EPROM burner to give away after the meeting.

Lee is working on a very cool sensor emulator done with software. Dynamic modeling so far has been very basic. He is planning on making it expandable as it is being developed. The application is being written using Microsoft Foundation Classes.

Ryan brought in the robot which is the centerpiece of his new company, Rybots. This five legged robot is targeted to middle tier of robots builders. At this time it appears that it will be a platform only sold as a kit assembled or disassembled. If you are looking for a bot platform and do not want to be encumbered building the platform or locomotion aspects then this bot is for you. Estimated price is in the $500 range. You can contact Ryan at www.rybots.com

Feature Presentation
"Carangiform Locomotion" by Professor Kristi A. Morgansen http://vger.aa.washington.edu/ Professor Morgansen has talked to our group before so many of us are generally familiar with her team projects. The presentation was open-ended so that dialogue with the audience would be more spontaneous and on topics that the group wanted to hear. Materials, construction, and controls were of the most interest to our group.

Current projects:

Carangiform Locomotion
http://vger.aa.washington.edu/fish_project.html

Bios-inspired Schooling
http://vger.aa.washington.edu/schooling_project.html

Modeling & Control of Coupled Mechanical-Fluid Systems
http://vger.aa.washington.edu/fluid_project.html

Conclusion

Steve concluded the meeting and the mini sumo practice session commenced as well as everyone quickly jumped on the offers that were made during the 'round the room time.

Jul 15

Introduction

Jim started the meeting a little late due to a communication glitch as far as getting the room unlocked. We'll try to get this smoothed out for future meetings. About 55 folks showed up.

Club Business

Robothon is coming October 8-9. See http://www.robothon.org for more information. T-shirt pre-orders were accepted at the meeting to guarantee your size.

Cathy Saxton, SRS VP talked about club business. **Jim Kindsvater** is our new Encoder editor. He is willing to put the Encoder out but needs your articles. Write stuff up. You'd be surprised what people find interesting. See http://www.seattlerobotics.org/encoder.

The SRS Workshop will happen the next three Room K204 from 1:00-5:00 PM on Saturdays.

Bring wire cutters & strippers. There are a couple new boards in the works but nearly done. They should be available really soon. See http://www.seattlerobotics.org/WorkShopRobot/ for more information.

Show-n-Tell

Steve Kaehler passed around some magazines with various articles of possible interest to the club members.

- "Night & Day – The Quest for Perpetual Flight", Aviation Week & Space Technology (http://www.aviationnow.com/avnow/news/channel_awst.jsp) , June 27, 2005, pg48ff. Glider flies non-stop for 48 hours.

- "Strain Sensor Basics & Signal Conditioning Tips", SENSORS Magazine (http://www.sensorsmag.com/), June 2005, pg18ff.

- "Wireless Nodes Dynamically Link to Build Intelligent Sensing Networks", RTC Magazine (http://www.rtcmagazine.com), June 2005, pg25ff.

- "Porous Silicon Creates Beta-Decay Battery", Electronic Products, July 2005, pg21. See http://www.betabatt.com

- "Portable Radar System Sees Through Walls", Electronic Products, July 2005, pg21. See http://www.engadget.com/entry/1234000180047496/

- "Sci-Fi Robots Edge Closer to Reality", http://www.elecdesign.com

Boeing Surplus Sales has a bunch of 0.030 and some 0.100 double-sided PC board material (12"x18"). See http://www.boeing.com/assocproducts/surplus/ for directions to the store.

Cathy Saxton wants to modify a solar battery charger to charge a 6V instead of a 12V battery and is looking for design suggestions to accomplish this.

One fellow brought in some PC power supplies, wire harnesses, and other miscellaneous stuff for free.

Tom Carroll is trying to start a robots club. He is trying to raise some money for this and has some printers for sale. He is working a an article on underwater ROVs. He is interested in old robots to write about. See http://www.huv.com for some examples. You can contact Tom at Twcarroll@aol.com.

Karl Lunt found a website that detailed a technique for making X10 wireless cameras non-directional. Google "RC-CAM4". He also talked about a little jig that could light off fused rockets attached to a robot. It uses nichrome wire energized by a PWM controller connected to a battery to generate heat to light a fuse. http://www.yb2normal.com/antenna2.html.

Jim Kindsvater (Encoder editor) will be videotaping folks and stuff at the monthly meetings. He will put these on the SRS website (http://www.seattlerobotics.org).

Barry talked about some cool encoders he installed on his robot. He had some problems with misaligned wheels. When he fixed this ir worked much better.

Dave brought in his "robostick" which uses an ATMega processor. See http://www.gumstik.com.

Terry Laraway brought some literature give away.

Gene Elliot has a small video screen that he hopes to get working with the 2.4 GHz wireless cameras.

Fellow talked about a miniature 1" color video camera that can be purchased at Radio Shack for about $80. It has both sound and video. On the web non-sound versions can be purchased for even less. See http://www.helltek.com/h06b.html for some examples.

John McGiver brought his line maze robot for the practice contest after today's meeting.

Ron Provine has some stuff for give away. He talked about MITs work to be able to drop wireless sensors from helicopters. The devices would form an adhoc network.

Nate is a first time meeting attendee, brought a cool robot he's working on.

Larry Barello showed a RoboMagellan (http://www.robothon.org) robot that he started building a couple years ago. It is a balancing robot. He figured he could use dead reckoning rather than GPS for navigation. He demonstrated it but the balancing algorithms need some improvement. See his website at http://www.barello.net for more information on many of his projects. Honeywell HMR3300 (http://www.magneticsensors.com/prod_syst.html) is a high precision magnetic compass that doesn't require a perfectly level platform.

Presentations

Lee Leahy – Software Simulation of the SRS Workshop Robot

Lee showed us his 'c' program that allows him to "run" a virtual robot on the line maze in order to test algorithms and sensor processing techniques to determine how well it interprets the sensor data. It is an MFC application. He can introduce simulated "noise" onto his sensors inputs to see how well it handles them. It actually follows the edge of the line primarily using the center sensor. At intersections the other sensors come into play. He color-codes the traces on the display so he knows which ones have been explored. He can simulate slight differences in the motors.

Paul Verhage – Robot Rovers

Near Space Balloon Launches - From Boise, ID. Started the BORG (BOise Robotics Group) Near space applications. Shoot photos from up to 100,000 feet altitude. FAR101 permits this. Balloon grows to 100 times original volume. Balloon bursts carrying payloads (weather stations, cameras, insects, bacteria, etc. up to 1 ft^3 and 6 lbs.) that go from 10 to 166 miles. Takes about an hour to go up and 1.5 hours back down. One got caught in the jet stream (prevalent in January) and flew 700 miles from Kansas to Indiana before it came down in a farmer's field. Temperatures are about -60° F at 100,000 feet. The air pressure is only 1% of sea level. NWS launches about a hundred balloons a day and has done so for the last 50 years without an incident of an airplane meeting one. 144.39 MHz for tracking the balloons. See http://www.findu.com/cgi-bin/find.cgi?kd4sth-11 to spot Paul's balloons.

Robot Rovers – Brought a bunch of cool rover robots that might be sent to an asteroid to explore and sample it. Uses lots of X10 cameras and BASIC Stamp processors. Peanut butter jar lids for wheels, cardboard boxes for camera housings, pie tins for radio antennas. See July SERVO Magazine (http://www.servomagazine.com) for Part 1 of 3 articles about this technology. Two rovers have to work cooperatively using only video screens fed by rover and lander cameras to figure out what's going on. A satellite in a halo orbit around the asteroid provides continuous control and video interconnections.

Look for some additional articles by Paul in Nuts-n-Volts (http://www.nutsvolts.com) for more information about these machines.

The X10 cameras are low quality but it is possible to separate the camera in a X10 camera from the transmitter and replace it with a better one.

Conclusion

Mingling, T-Shirts, junk exchange, line maze practice, looking, chatting, etc.

Aug 20

Introduction

Jim started the meeting with the usual introduction and general explanation of how our meetings run.

Club Business

Robothon is coming October 8-9. See http://www.robothon.org for more information. The Robothon 2005 T-shirts are in and those with pre-orders were encouraged to pick theirs up. Shirts were also available for sale. The volunteer schedule for workers at Robothon will soon be up on the website. Check back there later.

Cathy Saxton - The SRS Workshop class are done for now but check http://www.seattlerobotics.org/WorkShopRobot/ for more information. Kits are still available for sale but some parts are on back-order and may not ship until the middle of next month.

Cathy talked about pricing for the SRS Robot add-on accessories. She also talked about the revamping of the SRS website that is currently in progress. Encoder article information is being loaded into a database to permit easier searching and browsing of their contents.

Tyler Folsom is the whitepaper chairman for Robothon this year, but only one abstract was submitted for consideration. Unless lots more come in the near future, we may not have presentations this year.

Jim Kindsvater, **E**ncoder editor, took pictures and encouraged members to write articles. He is willing to put the Encoder out but needs your articles. Write up what you are working on. Contact him is you have an idea or need help. You don't need extraordinary writing skill to do this. You'd be surprised what people find interesting. See http://www.seattlerobotics.org/encoder. He also will be videotaping folks and stuff at the monthly meetings for inclusion on the SRS website.

The **Swapmeet** will happen outside in the parking lot after today's meeting.

Show-n-Tell

Spycam in CyberGuys catalog. See http://www.cyberguys.com for more information.

Chris O'Dowd showed off a walking robot that he modeled after one he saw. It doesn't have a controller yet.

One fellow brought in some PC power supplies, wire harnesses, and other miscellaneous stuff for free.

A fellow talked about Dean Kamen's IBOT walking wheelchair (see http://www.cnn.com/TECH/computing/9911/26/ibot.idg for some information). He had an opportunity to see one demonstrated in person. They are pretty amazing to watch as they literally stand up to climb or descend stairs. They are totally cool but also quite expensive.

Michael Laine (http://www.liftport.com/**)** talked about some of the latest adventures of the Space Elevator project including the loss of a couple large weather balloons. Calling the FAA when this happens isn't much fun. They are getting ready for a mile high climb in eastern Washington. The equipment, balloons, and helium are pretty expensive. See http://www.spaceelevator.com for more information.

Barry showed us the latest on his robo-magellan robot. He has fabricated a Fiberglas body with a cool clear dome at the front where the stereo vision system sits. The body is somewhat rough at this time, but with some more work, it should look pretty good and protect the robot's internal components from the elements.

George showed a cool robot based on a MAC-mini computer (http://www.apple.com/macmini). The robot was built from scratch except for the MM controller. The power controller uses frequency-to-voltage converter (FVC) connected to wheel encoders to provide speed feedback data to the controller.

Monty Reed talked about the latest with his Lifesuit Project. The August issue of SERVO Magazine had a great article on Monty and his suit. See http://www.servomagazine.com/preview.php?issue=26. Thanks

to recent exposure of him in his suit, he has been asked to appear on NW Afternoon on KOMOTV to talk about where this project is going and what he hopes to accomplish with it. He was also in the final stages of initiating a group-buy of 1G thumbdrives for $29 off the Internet.

Monty mentioned that BALBOT.COM (http://www.balbot.com) has a kit that uses two Sharp distance sensors mounted fore and aft on the robot each looking down on the ground at an angle to tell the controller the robot's attitude. This scheme only works on level ground.

Jerry Lamb showed us a cool drag race timing and light control system he built that provide millisecond resolution of run times for the racers.

Dave brought in his "robostick" which uses an ATMega processor. See http://www.gumstix.com.

Presentations

Tyler Folsom showed us the latest developments on Team Schleipner's DARPA Grand Challenge (http://www.darpa.mil/grandchallenge/) robot. Unfortunately, due to some technical difficulties, their robot is out of the contest for this year. He also gave a presentation of their stereo vision processing system.

Jim Wright showed us his Robo-magellan software for cone detection based on OpenCV code libraries.

Pete Miles demonstrated a humanoid walking robot that uses nineteen servos run by a BASIC Stamp via a serial servo controller. The robot cannot dynamically balance itself and so uses a leaning gait as it walks, shifting its CG completely from one foot to the other before taking the next step. This makes for a rather slow gait, but permitted it to walk successfully around the arena without tipping over. At this time, the robot is "blind", having no sensors to actually "see" where it is going. This will come later.

Conclusion

Mingling, T-Shirts, swap meet junk exchange, walking robot practice, looking, chatting, etc.

Sep 17

Introduction

Jim started the meeting with the usual introduction and general explanation of how our meetings run. About 60 folks showed up.

Club Business

Cathy & Tom Saxton - Robothon is coming October 8-9. See http://www.robothon.org for more information. The Robothon 2005 T-shirts are in and those with pre-orders were encouraged to pick theirs up. The volunteer schedule for workers at Robothon is now up on the website. Please consider volunteering for the various jobs that need support. The more people who help, the better things run so please help us out.

The SRS Workshop class are done for now, kits are still available for sale, but check http://www.seattlerobotics.org/WorkShopRobot/ for more information.

Show-n-Tell

David Shoemaker (http://www.liftport.com/**)** talked about some of the latest adventures of the Space Elevator project including the loss of a large ceran-wrap balloons. They don't like balloons. They attempted a mile high climb in eastern Washington but the weather turned foul on them. See http://www.spaceelevator.com for more information.

Jim Kindsvater, SRS Encoder editor, took pictures and encouraged members to write articles. He has enough articles to release an Encoder out but needs your articles. Write up what you are working on. Contact him at editor(a)seattlerobotics.org if you have an idea or need help. You don't need extraordinary writing skill to do this. You'd be surprised what people find interesting. See http://www.seattlerobotics.org/encoder. He also will be videotaping folks and stuff at the monthly meetings for inclusion on the SRS website. Jim will collect pictures from anyone who wants to take them at Robothon. Keep the size to 100KB or so. They only need to be web quality.

Karl Lunt is looking for an adapter to connect 3.5" hard drive a laptop drive connector. Mini-box (40-pin ATA 3.5").

George Storm is looking for a group of 10-15 people who will come to a p-SOC (programmable-System On a Chip) class. See http://www.cypressmicro.com for more details about these devices. Contact him at keencoyote(a)earthlink.net if you are interested in such a class. The specific details (when, where, etc.) will be worked out once enough people agree to commit.

Cathy Saxton showed us her triple-servo, six-legged walker discussed in SERVO Magazine recently. She built it out of laser-cut acrylic plastic that she affectionately calls R. O'Bot because it is green (Irish). She successfully demonstrated its basic walking gait in spite of the anti-demo fields normally present in the room.

Steve Evans showed us a "robot in a box" that he built to teach F.I.R.S.T. (http://www.usfirst.org) kids about the basics of robot electrical and mechanical systems. This gives them a crash course in electronics, mechanics, and pneumatics so that when the competition starts, they have some idea how things work.

Jeff Schober demonstrated a cool two-legged walking robot (from Lynxmotion) that he will enter into the Robothon Walking-Robot competition. It uses digital servos that make a rather loud whining sound. Unfortunately, it doesn't run long on batteries. It looks kind like a walking chicken as it moves,.but, these cool robots are not cheap. See http://www.lynxmotion.com for more information.

Gene Elliot has access some typewriters donated by his company. See him if you are interested.

Monty Reed talked about his BALBOT (http://www.balbot.com) kit that uses two Sharp distance sensors mounted fore and aft on the robot each looking down on the ground at an angle to tell the controller the robot's attitude. This scheme only works on level ground. It uses a "socker bopper" on top to protect it from damage when it falls over (often). Monty and his son Isaac demonstrated "robo catch" showed us his cool remote control robot with awesome robot sounds.

There was a question about how a three-legged robot walks. These kind of robots tend to spin as they walk. There are BEAM type robots that are attempting to do this.

Dave brought in his "robostick" which uses an ATMega processor. See http://www.gumstix.com.

Presentation

Karl Lunt and Dave Hylands – Embedded Linux

Karl showed us how they access embedded Linux to make a robot controller. Karl used a cheap laptop from RE-PC as the platform. They use the Debian distribution which is one of the easiest for novice users. Yellow Dog, GEM2, Damn Small Linux, etc. You'll need "Advanced Unix Programming" by Marc Rochkind, 2nd Edition and "Programming Linux" (latest edition) by Matt Welsh. He uses his development system as his target to avoid cross platform translation issues. He implemented a talking voltmeter application for demonstration.

Links:

- http://www.debian.org,
- http://www.linuxcentral.org

Dave likes Gumstix because they run Linux on a really small platform (literally the size of a large pack of gum). He uses CoLinux (free) to run Linux on a Windows XP platform. Linux and Windows have character case sensitivity issues. Linux is sensitive to filename case where Windows isn't. Distributions are primarily divided into two camps: stuff that runs in the Kernel and stuff that runs in "Userland". They each have unique goals based on the target users. He plans to use the Gumstick as the brain for a Robo-Magellan robot. He uses Linux because it works well in the networking world, able to talk to lots of things via wires and wirelessly, and it's free.

Levels of Linux

- Shell (highest level)
- User (middle level)
- Kernel (lowest level, talking to hardware)

Links:

- http://www.debian.org,
- http://www.colinux.org
- http://www.gumstix.com
- http://www.robostix.com
- http://www.linuxfromscratch.org
- http://www.busybox.org
- http://www.freshmeat.net

Conclusion

Mingling, T-Shirts, swap meet junk exchange, walking robot practice, looking, chatting, etc.

Oct 15

Introduction

Jim started the meeting with the usual introduction and general explanation of how our meetings run. About 60 folks showed up.

Club Business

Pete Miles - Robothon was a great success. People seemed to enjoy all the activities. Lots of robots in the many contests, though mini sumo was a little light compared to a couple years ago. Maybe its time to move on to other contests. Thank you to all volunteers, contest participants, vendors, exhibitor, and spectators. Results for the contests are posted at http://www.robothon.org .

More people need to bring robots to the practice events after the monthly meetings. It requires a lot of effort to bring all the contest equipment even if only for practice, so it is greatly appreciated when folks take advantage of the opportunities.

Please feed back your comments regarding Robothon 2005 to the Robothon Committee at the Robothon website.

Cathy Saxton - The SRS Workshop classes are starting up next Saturday and will continue for three Saturdays in a row. This will be a Level 1 class (basic kit assembly) kits are available for sale. Check http://www.seattlerobotics.org/WorkShopRobot/ for more information.

Jim Kindsvater, SRS Encoder editor, took pictures and encouraged members to write articles. He has enough articles to release an Encoder out but needs your articles. Write up what you are working on. Contact him at editor(a)seattlerobotics.org if you have an idea or need help. You don't need extraordinary writing skill to do this. You'd be surprised what people find interesting. See http://www.seattlerobotics.org/encoder. He also will be videotaping folks and stuff at the monthly meetings for inclusion on the SRS website. Jim will collect pictures from anyone who wants to take them at Robothon. Keep the size to 100KB or so. They only need to be web quality.

Show-n-Tell

David Shoemaker (http://www.liftport.com/**)** talked about some of the latest adventures of the Space Elevator project including the loss of a large ceran-wrap balloons. They don't like balloons. They attempted a mile high climb in eastern Washington but the weather turned foul on them. See http://www.spaceelevator.com for more information.

Tom Carroll has a bunch of stuff he wants to trade away for folks to use on robots or whatever.

Doug Kelley won a level one robot kit (http://www.seattlerobotics.org/WorkShopRobot/) at Robothon.

Tom Saxton showed us BlueSmurf (a Bluetooth dongle). See http://www.sparkfun.com/shop/index.php?shop=1&cart=430973&cat=1&itemid=394& for more info.

Pete Miles has a bunch of chips free for taking. Pete bought a cool metal case for $20 at Loews Hardware that is perfect for transporting his mini sumo robots and related equipment. The group discussed robot contests in general and why the overall number of entries seems to be down compared to a couple years ago. No doubt, building a robot is not easy, but it is fun and rewarding even if you don't win a contest. Just being able to say you've done it. Perhaps getting some of the F.I.R.S.T. kids involved in doing sumo or other contest robots in between the big F.I.R.S.T. events. This could help keep them interested and help them to learn more about autonomous robotics. The two serious events in Seattle each year where sumos compete are Robothon & NW Robot Sumo. There are other events in the PNW like PDXBot in Portland, OR. San Francisco also host some large events.

Doug Kelley asked whether people are more interested in the newest contests than ones that have been around for a while. Many folks affirmed that the newer contest tend to be more exciting, especially if no one has ever done anything like them before. Robot sumo is a well established, mature contest. Unfortunately, we're not seeing mini sumos on display at our meetings anymore. *Please bring your projects-in-work to the regular meetings. This is a great opportunity to get some encouragement to progress to the next level, or seek advice on solving some technical problem that has been holding you back.* Regardless if the state of your project, we enjoy seeing them.

Ron Provine suggested some wireless remote control features to mini sumo platforms for people to play with. The BlueSmurf mentioned by Tom Saxton above would be one possibility.

Pat O'Dowd has some small motors for sale.

Chris O'Dowd showed us a B.E.A.M. robot he built two hours before Robothon.

Fellow is working on a robot that calls for a particular PIC (16F78) but has a 16E54 processor that he's trying to get working. The two processors are pin-compatible but have different resources and is looking for code examples.

Eric Nield (a high school student on the Issaquah Robotics F.I.R.S.T. Team) got a "Baby Orangutan" at Robothon and has been having fun playing with this processor. See www.pololu.com for more information about this and other similar products.

Gene Elliot wants us to do another swap meet. Perhaps something can be arranged for next month in the room.

John McIvor showed his new linemaze robot. He uses small roller blade wheels online. He likes this hardware because its tough and cheap due to the high production volumes. He has experimented with different wheel materials, shapes, and preparation techniques trying to optimize traction. He has had some success but has also learned a lot of ways that don't work.

Cathy Saxton talked about her line maze/line following robot. Her main problem was making clean turns and re-acquiring the line. Her sensor uses visible light rather than IR.

Jeff Schober showed us a cool three-legged walker he's working on. It is in the beginning stages right now.

Richard Greenway showed us a really bright single-LED three-watt lamp. It can be purchased American Bright (an importer) for about $15 as a sample. It draws 1A at 4.5 volts but can be pulsed with up to ten times that much current. See http://www.americanbrightled.com/flash_smt_led.html for more information.

Geoge Storm talked about his efforts to coordinate a PsoC (programmable-System On a Chip) Class. The current status is still in work. No news on whether the vendor will do the class yet, but he is still trying. See http://www.cypressmicro.com for more details about these devices. Contact him at keencoyote(a)earthlink.net if you are interested in such a class. The specific details (when, where, etc.) are being worked.

Barry is interested in non-magnetic heading sensors. He has used rate gyros and wheel encoders but the math is pretty intense. He's looking for some help figuring out how to put this kind of data together to get navigation information.

Doug Bell talked about his entry into the walking robot contest. He entered a LEGO Mindstorm robot that happened to have a program in it that kind of worked. He took third place in spite of himself. He

Michael Laine talked about the Space Elevator project. There were some successes and some failures, but overall, things are moving forward. See http://www.liftport.com for more information. There is an interesting newsletter list on which you can register.

Presentation

Issaquah Robotics F.I.R.S.T. Team

The Issaquah Robotics F.I.R.S.T. Team (http://www.usfirst.org) brought in their robot and showed us how it works. The contest poses a challenge that must be accomplished. The teams purchase a basic kit that includes the electrical and mechanical controllers and pneumatics, but they must design and build entire robot within six weeks. Students meet after school five days a week and Saturdays during the design/build phase. It must weigh less than 130 pounds. There is a safety system built into the system that requires continuous communication between a F.I.R.S.T.-provided "master" controller and a team-provided "slave" controller. If the master doesn't hear from the slave every few milliseconds, it shuts down all power systems. The robots cannot be reused year after year. They must be built each year even if the same design is reused. They demonstrated their robot for us. There is an autonomous part of contest that provides opportunity for additional points if the tasks can be accomplished with the allotted time period. The different teams help each other out and share technology and parts. The robot uses a basic tank scheme, three wheels on each side, with all six wheels driven. The middle wheels are

slightly lower than the other four allowing the robot to turn more easily. This also causes it to teeter on four wheels at a time. The team's website is http://www.issaquahrobotics.org.

The Team (those present)

- Christopher Nield
- Kyle Corbitt
- Eric Knise
- Advisors: Tom & Cathy Saxton

The next competition starts January 7, 2006.

Conclusion

Mingling, buying T-Shirts, junk exchange, looking, chatting, etc.

Nov 19

Introduction

Jim Wright welcomed about 45-50 folks who showed up. He announced that last month he was elected president of the SRS by the Board of Directors. He also invited anyone interested to come to the BOD meetings and get involved.

Club Business

Jim Wright talked about the FIRST LEGO League and some upcoming events. See http://www.firstwa.org for information about this great program. There are also larger machines and events happening across the country which involve a number of SRS members. See http://www.usfirst.org/robotics/ for more information.

Please bring your robots or other projects to the monthly meetings. The more people bring, the more we have to discuss during the Show-N-Tell time.

Cathy Saxton talked about the SRS Workshop classes. The last series of Level 1 classes are done. Level II classes are in planning and will be announced on the SRS website. Check here for details: (http://www.seattlerobotics.org/WorkShopRobot/).

Show-N-Tell

Tom Saxton showed us some new robots he's working on that use Orangatan microcontrollers. See http://www.robotmarketplace.com for more information.

Jim Kindsvater encouraged people to join the SRS Yahoo Group as a great way to learn lots about robots. Visit (http://groups.yahoo.com/group/SeattleRobotics). You'll need to join the list to access all the features and receive email. Visit the SRS website and click on the "Meetings" or "Contact Us" link to find out how. Also try http://www.fenchurch.org to join the Monday night chatroom. It is hosted by Richard Greenway's server.

Kinsey Fobes recently bought in an off-road (cross-country) version of the Segway Transporter. See http://www.segway.com/segway/model_xt.html. He brought it to show us and let people try it out. It uses a bunch of rate gyros and motors to self-balance. Its speed is limited to 12 mph max so you are considered a "pedestrian". He wants to replace the off-road tires with regular tires to reduce rolling resistance. See http://www.segway.com for general information on all Segway products.

Dave Hylands showed us two of his PC oscilloscopes boards. There are features of each that he likes and dislikes. See http://www.bitscope.com and http://www.oricomtech.com for more information. Tektronix has a great tutorial on oscilloscopes called "XYZ on Oscilloscopes". See http://www.tektronix.com for the article. Go the "Oscilloscopes Home".

Steven Kaehler passed around some magazine articles on various subjects.

- "POCKET REF", by Thomas J. Glover (available in all hardware stores)

  Visit http://www.sequoiapublishing.com/ to see all the different ones available.

- Cool video equipment catalog at http://www.supercircuits.com
- Ultracapacitors (350 Farads @ 2.5V in a "D" battery-sized package.

  Visit http://www.maxwell.com/ and http://www.nesscap.com/ for more information.

- "One Platform Measures Anything", Sensors Magazine, November 2005, http://www.sensorsmag.com
- "Mind Over Matter", Design News Magazine, 10-24-05, pp67,

  (Direct Link: http://www.designnews.com/article/CA6275330.html)

- "Humanoid Robots on the Rise: Get Ready to Invite One Home", Electronic Design, 10-27-05, pg17. Link: http://www.elecdesign.com/Articles/ArticleID/11297/11297.html
- Cool DARPA Grand Challenge Entry – http://www.digitalautodrive.com
- "Driverless Vehicles Take on the Desert", Design News, 9-5-05, pp66.
- "Reconfigurable Processing Design Suits UAV Apps", COTS Journal, Vol 7, No. 10, Oct 2005, http://www.cotsjournalonline.com

Ron Provine talked about the DARPA Grand Challenge (http://www.darpa.mil/grandchallenge) and a particular entry built and entered by a couple insurance agents who thought the project would be fun. They came in fourth place! He has emphasized to people he knows and works with that a lot of "solutions" that chew up R&D money are probably over-engineered (and

consequently over-priced). Often the successful solutions come from unexpected places (like tinkerer's garages) rather than multi-million-dollar research labs. He also recommended a couple books:

- "Probablistic Robotics" by Sebastian Thrun, Wolfram Burgard, & Dieter Fox, ISBN 0-262-20162-3
- "Principles of Robot Motion, Theory, Algorithms, & Implementations", ISBN 0-262-03327-5.

Michael Laine talked about the Space Elevator project. Things have been quiet lately but they are still are working on some of the "balloon" problems. He is looking for sources of high-strength materials for ribbon. See http://www.liftport.com for more information. There is an interesting newsletter list on which you can register. Google "space elevator challenge" for lots of information. Also try http://www.CentennialChallenges.nasa.gov.

Karl Lunt showed us a cool little switching regulator from DigiKey (Model LT1121) that you can easily throw onto a small robot without taking a lot of space or money.

Presentation

The Seattle Robotic Society is pleased to present Professor Rolf Rysdyk (http://www.aa.washington.edu/faculty/rysdyk/), Assistance Professor Rolf Rysdyk from the **Autonomous Flight System Lab** (AFSL) at the University of Washington.

See http://www.aa.washington.edu/research/afsl/ for more information about the research being done by the AFSL and an overview of Professor Rysdyk's presentation.

Conclusion

Mingling, looking, chatting,, riding the Segway, etc.

Monthly Meeting of the Seattle Robotics Society

Saturday, December 17, 2005 at Renton Technical College Room K201-202

Introduction
Jim Wright is off traveling in the Far East on a business trip so Cathy Saxton (SRS VP) ran the show. About 35 people showed up on a very cold Saturday morning. The February meeting ***may*** be moved to coincide with a FIRST practice event. See http://www.usfirst.org for more information about FIRST events and activities. This is in work and further details will be announced when the time gets closer.

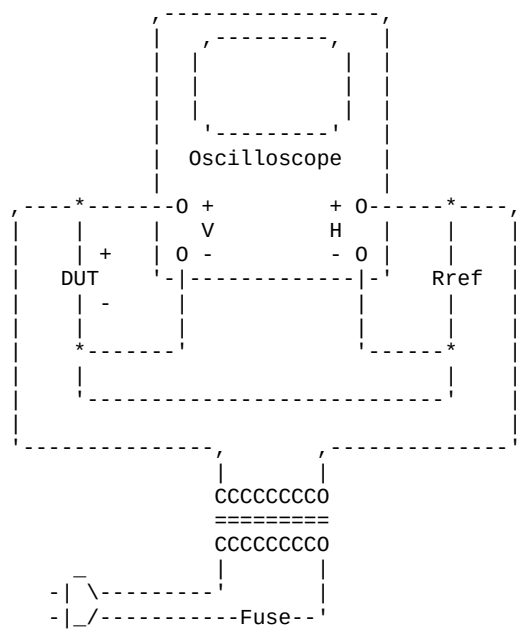
The Robothon Committee is investigating doing a practice contest (warm-up event) in Portland next year in the spring. More information will be forthcoming on the SRS website and the Yahoo Group listserver. See http://www.seattlerobotics.org/contact.php

Show-N-Tell
Cathy Saxton designed an "electronic Christmas card" that is really electronic. It is a Christmas tree with lights that blink, flash, etc. and can plug directly into a mini-light bulb socket. It is very cool. She used an AMTEL 2313 controller (http://www.atmel.com).

Ron Provine talked about using Segways as robots. He passed around some articles on this topic showing a machine he helped build using a F.I.R.S.T. robotics controller and other FIRST hardware. The newest Boeing Frontiers Magazine has a feature article on robots activities happening at Boeing including a picture of their machine. See http://www.boeing.com/frontiers (Dec05/Jan06 issue). Link directly to article: http://www.boeing.com/news/frontiers/ts_sf09.html

Jin Hayashi (jhayashi(at)seattlelutheran.org) is looking for a FIRST robotics mentor with design and machining experience to help their team. Contact him if you are interested.

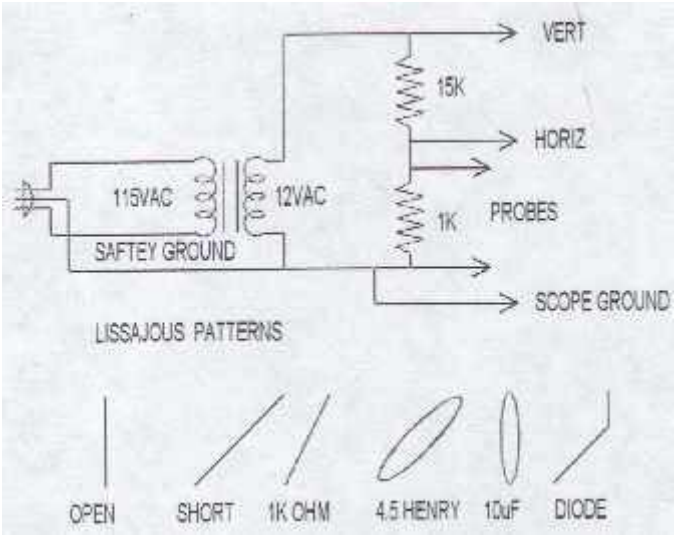
Doug Bell brought a bunch of cool stuff. See http://tamiya.com/english/e-home.htm. He found an interesting mechanical linkage that can scoop something up without dropping it yet does so with a single motor. Leonardo Davinci has been the topic of several recent TV shows. Doug showed us a cool universal linkage that can compress as well as drive at a variety of angles. He showed us a three- and a four-legged version. He built these at the NSCC Robotics Lab (North Seattle Robotics Group, http://nsrg.4t.com/) run by Monty Reed.



Schematic for Doug's Basic Tracer (uses O-Scope for display)

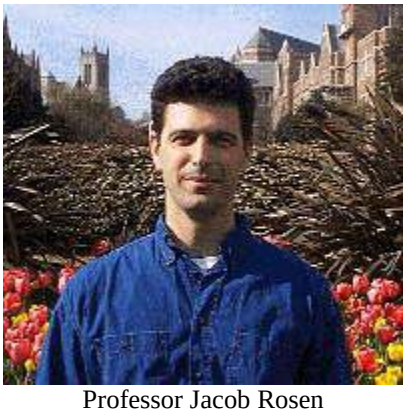
Doug also drew and explained a circuit that he learned in grade school "a few years ago" called a "Junkbox Curve Tracer" based on the circuit above. What this circuit does is plot the voltage versus current response (+ and -) for an electronic component or device connected to the test terminals. This allows a bunch of interesting experiments on different kinds of components. Resistors produce a straight diagonal line. Capacitors produce an oval. Diodes and transistors produce an "L-shaped" knee. It is possible to characterize good functional circuits and use this to troubleshoot defective circuits. He then added a current stepper to generate a family of traces for transistors. He showed us a demo of this circuit. Here's an example and tutorial of this from the Internet: http://www.seas.upenn.edu/ese/rca/instruments/Curvetracer/curvetracer.html

Here's an alternate circuit design (off the web) without the current stepper that does the same thing:



Presentation – Professor Jacob Rosen

Professor Rosen (http://brl.ee.washington.edu/People/_Rosen/Jacob_Rosen.html) talked about surgery of the future. Robots operated remotely would perform surgical procedures from a virtual workstation located anywhere in the world. This would permit skilled surgeons to perform their art anywhere a remote surgical room can be assembled. A particular surgeon could perform procedures in New York, Tokyo, and New Delhi all in the same day without leaving their Los Angeles office. You can find out more about the BRL and the work being done there, check out http://brl.ee.washington.edu



Professor Jacob Rosen

He talked about exoskeleton technologies and the state-of-the-art. Movies like Alien and Star Trek present futuristic and as-yet unachievable examples of this. The basic concept is that the exoskeleton is an extension of the operator's body that amplifies that person's strength and motion. The interface to these devices is still primitive and non-invasive to the operator's body, but advances are being made that are moving toward a thought-controlled system that works much the way our bodies do. This would permit much shorter reaction times and more fluid motion of

the exoskeleton. Another issue is how amazingly efficient and powerful our muscles are for their size. Trying to duplicate this in a machine still greatly exceeds current technology, but research and development continues.

Jacob offered to lead a tour of the BRL at the UW sometime. Perhaps we can arrange for this some Saturday afternoon.

"Robotic Surgery" on Google: http://www.google.com/search?hl=en&q=%22robotic+surgery%22
"Exoskeleton" on Google: http://www.google.com/search?hl=en&lr=&q=exoskeleton

Conclusion
Folks mingled, looked, chatted, and sought out individuals to talk in more detail.

This file is archived on Yahoo Groups at
http://groups.yahoo.com/group/SeattleRobotics/files/Monthly%20Meeting%20Minutes/ .

Notes recorded and submitted by Steven Kaehler, SRS Secretary, secretary(at)seattlerobotics.org