

# SRS Meeting Notes for 2004

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## Jan 17

### Introduction

**Steve Kaehler** welcomed everyone and introduced the SRS for the benefit of newcomers. About 50 folks showed up by 10AM. More came later. Half a dozen new folks came. We will have a presentation next month even though F.I.R.S.T. activities will draw off some folks.

A special thanks goes to A.J. Collins for taking the notes for this meeting.

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### Events & Announcements

Many SRS regulars were absent due to concurrent F.I.R.S.T. activities happening around the Puget Sound. The pre-ship competition will take place in the Roosevelt Gym from 10:00 AM to 2:00 PM on Saturday, February 21st. Visit <http://www.usfirst.org> for more details.

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### Show-N-Tell

**Kinsey Fobes** works at RTC and helped get J314 for our use. He mentioned that there is some gear being disposed of on the bottom floor of the J building at the northeast end. Folks were invited to help themselves.

**Chris O'Dowd** showed us his another BEAM creation the will flip itself by retracting a spring and then suddenly releasing it. He hasn't worked out all the details yet., but it will be a bi-core type robot. See <http://www.beam-online.com/Robots/Circuits/bicore.html> for more info on bi-cores. He also showed us some chain tracks from old dot-matrix printers that look promising for use as robot tracks.

**Karl Lunt** showed us a new board from Technical Arts that has 1 25 MHz processor with 32K of FLASH, 2K of RAM, and a regulator on a 32-pin header all for \$25! He built a temperature sensor demo using a Dallas Semiconductor 1-wire interface chip ([http://www.maxim-ic.com/products/sensors/1\\_wire.cfm](http://www.maxim-ic.com/products/sensors/1_wire.cfm)) connected to an I/O pin. He got the sensors as samples and built the board that holds all the components.

**Kyle** from Digipen Institute of Technology (<http://www.digipen.edu/>) in Redmond, WA has associate, bachelors, and masters degrees in computer science available covering various computer-graphic related professions. They even offer a class on robotics (<http://workshops.digipen.edu/robot.html#level1>). Tyler Folsom teaches it. (<http://www.digipen.edu/~tfolsom>)

**Steve Kaehler** demo'd a hovering saucer vehicle (Vectron Ultralite) successfully this time by turning off the fluorescent lights. It hovered about five feet off the floor for a short time until the

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batteries faded. The vehicle looks like a concave fan blade sitting on its launchpad, but spins as a flying saucer when it's on. It has a motor, propeller, batteries, and an IR remote speed controller that allows one to control the motor's speed to make it rise or hover in a room. There's no way to steer it however. They can be had on the Internet for \$30-\$60. Search for "vectron ultralite" on the web (<http://www.google.com/search?hl=en&ie=ISO-88591&q=vectron+ultralite>). He also offered some equipment for give away.

**Dave Hylands** found two interesting books to review, "Build Your Own Circuit Board" and Robot Programming--Behavior Based Robotics.

Finally he showed a cool little (2" long) RC tank toy that he found. He bought a bunch so he could get a good price but they are available for around \$10 individually. Search the web for "mini RC tank" to find them. Someone thought FRY'S had these for around \$10. See [http://www.minirctoy.com/main/DetailsList.cfm/item\\_id/1719/item\\_key/609/301-1101033-1994896](http://www.minirctoy.com/main/DetailsList.cfm/item_id/1719/item_key/609/301-1101033-1994896) for a typical example.

**Greg Verge** demo'd a cool speech synthesizer chipset (8650) from RC Systems (<http://www.rcsys.com>) that sells for \$49. He built his own board and connected it to his laptop. One only needs to send a serial datastream to get pretty decent sounding speech. The chips can also be tweaked to generate many different voice types as desired by the user. The main chip FLASH can hold up to 2 minutes of audio.

Greg is also looking for robots to show at Lake Forest Park Elementary School for their Science Day presentation. Contact him if you have something he could use.

A special contest will be announced at the May 2004 meeting. Some clues are:

- A GPS would be handy but not necessary.
- An all-terrain chassis will be needed.
- No new clues this meeting, but more clues to come later.

**Michael Laine**, president of LIFTPORT Inc. (<http://www.liftport.com>), showed us a cool LEGO ribbon climbing machine he's been working on to try to figure out some of the technical problems associated with a much larger device. Michael is looking for help and ideas on his Space Elevator project. Next month's presentation is tentatively scheduled to be on this project.

**Terry Laraway** had some magazine to give away.

If you have something interesting you'd like to talk about at an SRS meeting, please contact Jim Wright ([SRSMeetOrg@jimwright.org](mailto:SRSMeetOrg@jimwright.org)) or Steve Kaehler ([sdk6772@yahoo.com](mailto:sdk6772@yahoo.com)) and we'll coordinate with you, give you suggestions and information, and try to answer your questions.

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**Regular Meetings (RM), Events, Contests, Presentations, etc.**

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- Oct 18 - RM Sat 10AM at RTC - Pres: Larry Barello: Batteries, Jim Wright Cadsoft Eagle PCB layout S/W
- Nov 15 - RM Sat 10AM at RTC - Pres: Greg Verge: PSoc, Jim Wright: Cadsoft Eagle PCB layout S/W cont.
- Dec 20 - RM Sat 10AM at RTC - Sumo soccer contest, Pres: Lloyd Spencer's Excellent Robot Adventure
- Jan 17 - RM Sat 10AM at RTC - Pres: Dave Schilling/Gus Jansson: LEGO Mindstorms, COTS Robotics
- Feb 21 - RM Sat 10AM at RTC - *Tentative* Pres: Michael Lang: Space Elevator Project
- Mar 1 - [Encoder](#) published (article submission deadline Feb 16)
- Mar 20 - RM Sat 10AM at RTC - New contest announcement, *Tentative* Pres:
- Apr 17 - RM Sat 10AM at RTC - *Tentative* Pres: Kristy Morgenson: Robot Fish Project
- May 15 - RM Sat 10AM at RTC - Pres:
- Jun 1 - [Encoder](#) published (article submission deadline May 18)
- Jun 19 - RM Sat 10AM at RTC
- Jul 17 - RM Sat 10AM at RTC
- Aug 21 - RM Sat 10AM at RTC
- Sep 1 - [Encoder](#) published (article submission deadline Aug 18)
- Sep 18 - RM Sat 10AM at RTC

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**Feature Presentation** - "LEGO Mindstorms Robots, COTS Robotics" - by Dave Schilling & Gus Jansson, co-founders of S.M.A.R.T.

### Seattle Mindstorms And Robotic Techies

Mindstorms can be programmed in several languages including RCX2.0 which comes with them and NQC (Not Quite C) which is quite popular among Mindstorms users. The RCX bricks have limited I/O which can be a problem but different sensors can be multiplexed into the same input if necessary. For example, a digital sensors like a switch and an analog light or temperature sensor producer distinguishably different data patterns. Software can therefore separate the incoming datastreams by value range or excursion.

- LEGO Mindstorms website: <http://mindstorms.lego.com/eng/default.asp>
- S.M.A.R.T. Website: [www.news.lugnet.com/org/us/smart](http://www.news.lugnet.com/org/us/smart)

Larry Barello gave an overview and introduction to the sensors used on LEGO Mindstorms at last month's meeting. They interface very easily to LEGO Mindstorms but can be used on other systems fairly easily. See his website at <http://www.barello.net/ARC/projects/LEGO/index.htm> for more information.

### Presentation Outline

A) Lego robotics (What is robotics with Lego?)

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- *Building*
  - an RCX, limitations as well as freedoms
  - consistent Lego geometry makes things easy to figure out
  - rich variety of options of what's possible; easy to experiment
  - easy to buy new parts
- *Programming*
  - NQC most common used, though higher power tools are available
  - there are some peculiar limitations, but surprisingly they don't interfere as often as you would think with what you want to do (slow, 32 globals, only "int" datatype, functions are weird, etc.)
  - sensors and motors can be handled in a high level manner
  - multiple tasks, event monitoring
  - debugging is built in

### B) Why we do it

- it's real easy to prototype something simple in a few minutes or a whole robot in a day or two
- the restrictions the RCX impose on you make for a useful mental exercise; we additionally often restrict ourselves to 'only Lego pieces' (purity, it 'feels wrong' not to, it's a challenge, and you can share your ideas with others, and pretty much know that they'll be able to build the same thing)
- still learning new ideas for building with Lego in general, as well as with robotics
- can work on many different robots over a period of time, many more than if you were building circuits and using random pieces to build with
- can work on multiple robots at once because pieces are swappable
- same pieces as everyone else means you can get inspiration around the world for what you can do

### C) What we do at SMART

- meetings every second month (see link above for time & location)
- mini challenges are focus of meeting
- many people participate by bringing robots for each mini challenge
- public shows we put on
- Crate Contraption (video)

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## Regular Meeting Conclusion

The structured part of the meeting ended around 12:15 leaving folks to talk, do demos, ask questions, seek answers, buy T-shirts, buy & sell things, etc., etc., etc.

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## Feb 21

### Introduction

**Steve Kaehler** welcomed everyone and introduced the SRS for the benefit of newcomers. About 50 folks showed up by 10AM. More came later. Half a dozen new folks came. We hope to have a presentation next month. A special thanks to Doug Kelley for taking the notes for this meeting.

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### Events & Announcements

Many SRS regulars were absent due to concurrent F.I.R.S.T. activities happening around the Puget Sound. The pre-ship competition was taking place in the Roosevelt Gym from 10:00 AM to 2:00 PM on February 21st. Visit <http://www.usfirst.org> for more details.

### Robothon - Line up of planned events

- Line maze
  - Mini (500g) & 3kg Sumo
  - Judges Award
  - Combat robots
  - *Sumo soccer?*
  - Robot building seminar
  - Call for papers
  - Hack Session (Friday evening)
  - Raffle prize/ticket sales
  - T-shirts for sale
  - Vendor booths
  - Static displays
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### Show-N-Tell

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**Steve Kaehler** - The Boeing Dominator autonomous flying attack vehicle - [http://www.aviationnow.com/awin/awin\\_awst/awin\\_awst\\_story.jsp?issueDate=2003-08-25&story=xml/awst\\_xml/2003/08/25/AW\\_08\\_25\\_2003\\_p50-53-01.xml](http://www.aviationnow.com/awin/awin_awst/awin_awst_story.jsp?issueDate=2003-08-25&story=xml/awst_xml/2003/08/25/AW_08_25_2003_p50-53-01.xml)

**Chris O'Dowd** showed us his latest BEAM robot creation. An 8-legged BEAM walker that can turn. No sensors yet, but they're coming soon. Very cool. See <http://www.beam-online.com/Robots/Circuits/bicore.html> for more info on bi-cores.

Red Scorpion - Boeing's entry into the DARPA Challenge. See <http://www.redteamracing.org/> for more info.

**Pete Miles** demo'd an RF data transmitter/receiver system for mini sumos and other small robots. See <http://www.rfdigital.com/> for more info.

**Karl Lunt** showed us a new portable soldering iron, \$25, runs on 4 AA batteries, 700 joints. See <http://www.coldheat.com> for more info. Offered some free stuff to good homes. See the March "Nuts-n-Volts" (<http://www.nutsvolts.com>) for a Robothon 2003 article.

Viper sumo robot kit - [http://www.lynxmotion.com/Product.aspx?productID=44&CategoryID=5](http://www lynxmotion.com/Product.aspx?productID=44&CategoryID=5)

**Pete Burroughs** showed us a magnet wheel mini sumo, hacked mini screwdriver with new motors, climbs walls, will compete in 3kg sumo contest. He also brought a box of free linear pot servos for give away. Needless to say, they didn't last long.

**Randy Carter** showed us his firefighter which uses a PC on-a-board from JKMicro - <http://www.jkmicro.com/>

A youngster and his father demo'd a motorized LEGO robot hand gripper. Very cool.

**Doug Kelley** announced details about a special new contest, **The SRS Mini Challenge - Advanced Navigation**.

This contest is designed to provide an interesting challenge for robot builders similar to the DARPA grand challenge but manageable on a more modest budget and schedule. The following information should help in defining the contest. The listserver will have much more discussion on the subject.

- Based roughly on the DARPA Grand Challenge - <http://www.darpa.mil/grandchallenge/>
- Autonomously navigate from one orange traffic cone to another (200-300 yards).
- Variety of terrain (grass, gravel, pavement, etc.).
- Contest location will probably be at the Seattle Center.
- 4WD vehicle chassis recommended.
- Winner is fastest robot by time.
- Robots must touch finish cone to complete race.
- Bonus points awarded for reaching alternate weighpoints along the way.
- Detailed course coordinates will be provided about an hour before the contest.

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- Can be programmed with general route to follow (straight line path not possible).
- Include deadman switch in design (restart Ok if stopped for safety only).
- 50lb max weight, no unreasonable limits on size.
- Aviation Formulary V1.41 - <http://williams.best.vwh.net/avform.htm>
- Fast, differential RTK GPS application - <http://www.gpsworld.com/gpsworld/article/articleDetail.jsp?id=85162>

**Greg Schumacher** - Robotic Reference Platform v3 (R2Pv3), Passive backplane to connect independent sub-systems to their wiring harnesses and a master processor--looking for suggestions & comments ([macmen@drizzle.com](mailto:macmen@drizzle.com)) or 206-442-1992

**Terry Laraway** had some magazines to give away.

If you have something interesting you'd like to talk about at an SRS meeting, please contact Jim Wright ([SRSMeetOrg@jimwright.org](mailto:SRSMeetOrg@jimwright.org)) or Steve Kaehler ([sdk6772@yahoo.com](mailto:sdk6772@yahoo.com)) and we'll coordinate with you, give you suggestions and information, and try to answer your questions.

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### Regular Meeting Conclusion

The structured part of the meeting ended around 11:00 since our presenter didn't show leaving folks to talk, do demos, ask questions, seek answers, buy T-shirts, buy & sell things, etc., etc., etc.

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## Mar 20

### Introduction

**Jim Wright** welcomed everyone and introduced the SRS for the benefit of newcomers. About 65+ folks showed up by 10AM on this semi-sunny Saturday morning. Jim Wright who is back after several months of absence helping his F.I.R.S.T. team. He told what has been happening over the last several months. To those at the meeting, he encouraged questions and boldness and we'll try to point you in the right direction. In fact, get anyone in this club talking about robots and it's hard to get to get them to stop.

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### Events & Announcements

Pete Miles briefed us on the International Robot Sumo Tournament (<http://www.nwrst.com/IRST/>) that took place this last week. Top sumo robots from Japan came

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to the US compete at several contests on the west coast. Both autonomous and remote control versions of robots competed. One magnetic sumo robot took three people to pry it from the steel ring. Pete beat this robot by ramming it hard enough to apparently damage one side of the robot's drive system. The matches were extremely fast and short because of the speed and acceleration of the robots. There was an article in the March 19 Seattle Times on the event. The Japanese are really interested in planning for next year and coming back to the PNW.

Jim and a number of other SRS members have been absent due to concurrent F.I.R.S.T. activities happening around the Puget Sound. He talked about what has been going on and how his team did. Visit <http://www.usfirst.org> for more details.

No club business was discussed at this time.

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### Show-N-Tell

**Chris O'Dowd** showed us "Michael", his newest robot built from Pete Burrow's servo slide pots that he brought last month. The name of the robot was inspired by the robot's "moonwalk" gait when he first turned it on. This reminded him of Michael J. See <http://www.beam-online.com/Robots/Circuits/bicore.html> for more info on bi-cores.

**Ron Provine** was on recent a business trip to LA where he had the opportunity to see preliminary qualification runs of some of the DARPA Grand Challenge competitors. He told us about each of the vehicles and how well they did. None made it very far at this time. He passed out some cool keyrings provided by the Carnegie Mellon "Red Team". Also see the February 2004 issue of Scientific American magazine for more information. The DARPA website for the contest is at <http://www.darpa.mil/grandchallenge>. See <http://www.redteamracing.org/> for more info on the Red Team. Ron also visited West Seattle High School where they have a stereolithography machine and glass etcher. They were able to make the SRS logo engraving on an ordinary drinking glass. Some interest was expressed by members in purchasing these glasses. The SRS BOD will discuss the technical and financial details and commitments involved in getting these made.

A young fellow demonstrated a LEGO robot he built with "laser cannons" and "numchucks". A very cool device.

**Karl Lunt** brought a bunch of what he called "junk". We of course recognize this man's "junk" as our "treasure". He cleaned out of his old "workshop" to move into a smaller one and had to de-clutter a bit to make room. He wanted everything to go to good homes. You could hear the salivating and bit- chomping from folks waiting to dive in. He also showed us a new robot he recently built that uses a cheap Fry's optical mouse for the front skid to provide position feedback for line following. He's been experimenting with this concept for several months since optical mice are getting inexpensive, have no moving parts, and are relatively easy to interface to a microcontroller. He gets 400 DPI resolution at up to 12 inches/second out of the mouse. It uses an Agilent HA2000 chip. He uses TC4427 MOSFET motor drivers on the robot. Karl asked



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about motor noise/interference on robots. This is a notorious problem when putting delicate electronics (sensors, micros, etc.) in the same environment as power electronics (motors, solenoids, etc.). Solving it has perplexed many, but possible solutions are also abundant. This was also a recent discussion on our YG listserv. Among the suggestions offered were:

- Put 0.1uF cap across motor terminals and from each terminal to a common spot on the motor case.
- Use multiple capacitors in parallel will cover a wider noise frequency range. Lower value capacitors cover higher frequencies.
- Power motors separately from processor (different batteries or power supplies).
- Put a diode and capacitor on the power supply to the processor so that as the cap charges through the diode, it keeps the processor going through power transients and dips.
- Shield the delicate electronics with "mu-metal" for magnetic or any conductive metal for electrostatic noise.
- Use shielded, twisted-pair wire for both system to minimize radiation and reception of noise.

See [http://www.teamdelta.com/pdf/tde\\_an1.pdf](http://www.teamdelta.com/pdf/tde_an1.pdf) for some great tips.

A fellow offered four little light seeking/avoiding robots for \$10. They sold immediately. No waiting until the end for this bunch.

**Doug Kelley** talked a little about the SRS Mini Challenge which will be officially announced in May. This contest has been revealed gradually to give people ideas and get them thinking about possibilities. Clues from last month:

- Based roughly on the D.A.R.P.A. Grand Challenge - <http://www.darpa.mil/grandchallenge/>
- Autonomously navigate from one orange traffic cone to another (200-300 yards max.).
- Variety of terrain (grass, gravel, pavement, etc.).
- GPS can be employed but isn't absolutely necessary.
- Contest location will probably be at the Seattle Center.
- 4WD vehicle chassis recommended (think bigger RC model cars).
- Winner is the fastest robot by time.
- Robots must touch finish cone to complete race.
- Bonus points will be awarded for reaching alternate waypoints along the way.
- Detailed course coordinates will be provided about an hour before the contest.
- Robot should be field programmable with coordinates & waypoints.
- Robot can be programmed with general route to follow, but straight-line path won't be possible.
- Include a "deadman" switch in design (restart Ok if stopped only for safety).
- 50lb max weight, no unreasonable limits on size.
- Aviation Formulary V1.41 - <http://williams.best.vwh.net/avform.htm> - navigation calculations & formulae
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More details and information will be forthcoming with the full package available at the May meeting.

A fellow talked about his latest robot. It has been a learning experience.

Another fellow is building a 4WD chassis to use for SRS Mini Challenge. He showed us how the drive system works. It looked very cool. Hobby shops that sell RC cars have tons of parts and accessories for these vehicles. He plans to use an ISO-POD (<http://www.newmicros.com>) and a salvaged computer from some medical equipment and encased it in a plastic picture frame box that looks very cool. He can plug in a keyboard and terminal directly. He programs it in BASIC. He found some sonar sensors for \$15 that he plans to use. They provide a discrete indication of certain distance thresholds. He doesn't know how to adjust these. They are made by HSC Electronics. See <http://www.halted.com>. He also plans to use a CMU-Cam (<http://www-2.cs.cmu.edu/~cmucam/>).

**Steve Kaehler** mentioned that Eclipse Aviation is looking for some engineers to help develop and certify a new aircraft in New Mexico. Talk to him after the meeting if you want more information. Here's links to text files with job descriptions and contact information if you are interested.

- [Avionics Engineer](#)
- [Senior Instrumentation Engineer](#)
- [Director/Manager of Software Development](#)
- [Vehicle Power Systems Engineer](#)

GPSWorld is a great magazine for GPS applications and products. The last link above regarding the SRS Mini Challenge goes to an article that uses a mobile differential reference transmitter mounted on a kayak that achieves centimeter-level resolution at ten updates per second. Real-Time Kinematic (RTK) GPS. Back issues can be accessed online at <http://www.gpsworld.com>.

Fuel Cell 2004 technology conference and exhibit in Denver, CO. June 9-10. More info is available at [http://www.fuelcelltoday.com/FuelCellToday/EventListings/EventListingsExternal/calendar\\_showdetail/0,1719,786,00.html](http://www.fuelcelltoday.com/FuelCellToday/EventListings/EventListingsExternal/calendar_showdetail/0,1719,786,00.html). He brought an article on mini flying machines (DARPA sponsored research). This has been a hot topic with the goal being to develop small, autonomous surveillance platforms and other interesting applications. See <http://www.stargeek.com/grok.php?p=smallest+flying> for more info on this technology.

See the Robothon 2003 article by Karl Lunt in SERVO Magazine. (<http://www.servomagazine.com/>)

Antweight competitions are coming - see <http://westernalliedrobotics.com> for details.

Fellow built a cool demo board using two of the motorized linear servo pots Pete Burrow's gave away at last month's meeting.

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**Gene Elliot** mentioned a new book on casting metal parts. See him after the meeting for details.

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### **Presentation - NOT**

Didn't have time for a formal presentation (didn't have one planned anyway). Jim showed video from the F.I.R.S.T. competitions during the post-meeting free-for-all time. Next month, Kristi Morgenson, associate professor in the Aeronautics & Astronautics department at the U of W, will come present on her robot fish project. Some of you may remember that she had a table at Robothon with models and videos of the project progress at that time. More progress has been made since then and she will bring us up to date and maybe tell us what's next.

If you have something interesting you'd like to talk about at an SRS meeting, please contact Jim Wright ([SRSMeetOrg@jimwright.org](mailto:SRSMeetOrg@jimwright.org)) or Steve Kaehler ([sdk6772@yahoo.com](mailto:sdk6772@yahoo.com)) and we'll coordinate with you, give you suggestions and information, and try to answer your questions and line you up in the schedule.

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### **Meeting Conclusion**

The structured part of the meeting ended around 12:00 with folks literally diving into Karl Lunt's boxes. Flying cables, wires, and circuit boards was all you could see. When the dust settled, less than one out of five boxes of stuff left after the feeding frenzy. Folks talked, shared information, showed their stuff, etc.

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## **Apr 17**

### **Introduction**

**Jim Wright** welcomed everyone and introduced the SRS for the benefit of newcomers. About 65+ folks showed up by 10AM. He encouraged questions and boldness from those with questions. We'll try to point you in the right direction.

He talked about FIRST activities in Atlanta, GA. Check <http://www.usfirst.org> for details.

The SRS Mini Grand Challenge will be held in September at the Seattle Center. **First prize is \$1000** for touching the target cone.

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# SRS Meeting Notes for 2004

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## Events & Announcements

Robothon will be September 24-26 at the Seattle Center. See <http://www.robothon.org> for details.

Next month we'll have sumo and line maze competitions after the meeting.

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## Show-N-Tell

Karl Lunt brought some documentation for the stuff he brought last month in case people were missing any documentation. He brought one of his current projects. He's been working on a "housebot" that uses X10 modules to control lights around the house. The module he brought connects a serial port (PC or microcontroller) directly to the powerlines. It uses a binary interface that requires some code to generate the control codes. His mobile robot will be able to wander the house and control lights. See <http://www.x10.com> for more details about these products. Check Karl's website at <http://www.seanet.com/~karllunt/> for a look at what he's working on.

No club business was discussed at this time.

**John** has some free stuff to give away.

**General question:** Is the mini sumo ring at Robothon going to be steel? Not sure but feed the question to the listserver. The mini sumo rules may not currently allow this but this could change.

**Tom Dickens**, Encoder (<http://www.seattlerobotics.org/encoder>) editor, FIRST team advisor, and hard-working Boeing guy, came to solicit articles for the Encoder, especially beginner's experiences and observations. He is currently planning quarterly publications of the Encoder unless more material shows up in which case he'll publish more often. Robothon will continue to have technical paper sessions. Please think about preparing and presenting something. Let's have lots more papers presented this year.

**Tom** has been investigating the "brain-power" (microcontroller) issues for robots. He is looking into bigger, more powerful controllers than what seems to be out there now. He is looking at highly compact controllers where everything is compressed into a really small footprint. PCs are getting smaller all the time, but he hasn't seen anything quite small enough for a mini sumo but there's probably something out there or coming out. He wants to write an Encoder article about what's out there. Karl suggested <http://www.mini-box.com> (EPIA) for a board that connects to the IDE port on a PC. Costco and Frye's both have really cheap FLASH memory. Mini ITX board is currently available at Frye's. Nano ITX board is coming. A Nano ITX board showed up on eBay recently but they don't seem to be readily available.

**Tom** wants to know how to get at the image data inside the cheap digital cameras. Is there a way to access the individual pixels? Most of these cameras now have controllers that generate

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composite output so low level access is not so easy anymore. Someone suggested that Logitech has a system developer's kit available for downloading. <http://www.Sourceforge.com>. Also, there is a USB port monitor called "snoopy" that might be useful.

**Ron Provine** mentioned that the last 2003 [Encoder](#) issue has the papers from Robothon 2003 for those interested in seeing what is accepted.

Combat robots Sunday 4/18 at Factoria Mall in Bellevue (1 lb. and 3 lb.).

**Doug Bell** - The LEGO RCX Challenge happens this afternoon (4/17) at the Pacific Science Center from 1:00-4:00PM. A new contest requires the robots to cross a two-inch gap between two tables and retrieve the most LEGO cubes in the prescribed time. Doug brought a line follower that the North Seattle Robotics Club built. See <http://www.workshop3D.com/rcx> for details about the RCX Challenge.

A fellow brought in his SRS Mini Challenge robot in work to show. It looked pretty cool.

There is a GPS group buy in the works.

A fellow brought in an old but functioning logic analyzer for give away.

SRS Mini Challenge info revealed so far:

- Based roughly on the D.A.R.P.A. Grand Challenge - <http://www.darpa.mil/grandchallenge/>
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## Presentation -

Our presenter is Professor Kristi Morgansen, an Assistant Professor of Aeronautics & Astronautics department from the U of W. She runs the Nonlinear Dynamics Control Lab. Unfortunately, the current prototype fried some power stuff and so it is being serviced. She talked about the mechanical, electrical, and navigation systems of the "fish". People asked many, many questions and were highly engaged in the presentation. She uses ProEngineer to do the CAD. MPC555 microcontroller. Visit <http://www.vger.aa.washington.edu> for more information. Her Powerpoint presentation to us is available at <http://vger.aa.washington.edu/publications.html>.

Be sure to come to the Engineering open house at the U of W is on April 30, 10:00-5:00PM and April 31, 10:00-2:00PM. See <http://www.engr.washington.edu/openhouse.html> for details.

If you have something interesting you'd like to talk about at an SRS meeting please contact Jim Wright ([SRSMeetOrg@jimwright.org](mailto:SRSMeetOrg@jimwright.org)) or Steve Kaehler ([sdk6772@yahoo.com](mailto:sdk6772@yahoo.com)) and we'll coordinate with you, give you suggestions and information, and try to answer your questions and line you up in the schedule. We're also interested in suggestions for people to contact or topics to present. The SRS has become quite well known around the world and this often opens doors of opportunity for presentations.

Next month we are planning on Michael Laine talking about the Space Elevator project. See <http://www.liftport.com/> for more information.

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## Meeting Conclusion

The structured part of the meeting ended around 11:45 with folks breaking into small groups. Folks talked, shared information, showed their stuff, etc.

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## May 15

### Introduction

**Jim Wright** welcomed everyone and introduced the SRS for the benefit of newcomers. About 72+ folks showed up by 10AM. I estimated close to 90 by the end of Michael's presentation.

Jim encouraged questions and boldness from those with questions. Don't be afraid to ask for help or guidance.

Because of the stack up of things planned for today, we started with Michael Laine's Space Elevator presentation. See [details below](#).

## SRS Meeting Notes for 2004

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**Doug Kelley** officially announced the SRS's newest contest modeled after the DARPA Grand Challenge. Informally called the "SRS Mini Challenge" the official contest title is **SRS/SERVO Magazine Robo-Magellan**. SERVO Magazine will provide food & drinks on Friday night at Robothon hack session which happens upstairs at the Centerhouse, a 1-year subscription to SERVO Magazine for those who enter contest, and free advertising of the event for next three months.

The object is to find an 18" plain orange traffic at most 300 ft (straight line distance) from starting point. Reach and touch cone within three tries. There will be three bonus waypoints (also 18" plain orange traffic cones) that can earn you additional points. It will happen at the Seattle Center so think outside, grass, trees, pavement, gravel, etc., but no intentional water obstacles. Prepare for inclement weather, with Sept 25 as the prime date and Sept. 26 as the alternate regardless of the weather. Thirty minutes prior to starting contest, course coordinates will be provided and you are allowed to walk the course with whatever instruments you choose *except the robot itself*. Scoring is based on time in seconds from the starting cone to destination cone. Bonus cones located off to the sides will have decimal multipliers (i.e. 0.2, 0.5, 0.7 depending on difficulty) that effectively decrease your time. Safety is very important. There is a 50 lb. weight limit. You must have a failsafe "kill" switch that immediately stops the robot. There are several options for doing this. Don't hurt anyone or anything with your robot. Robot intelligence must be self-contained on the robot, no wireless networking to a big mainframe workstation. The contest will be held in September at the Seattle Center. **First prize is \$1000** for touching the target cone. See <http://www.robothon.org> for details.

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### Show-N-Tell

**Chris O'Dowd** built a two-motor walker at a workshop he attended last month. He uses BEAM (non-microcontroller-based) techniques. This vendor (<http://www.solarbotics.com/>) has lots of B.E.A.M. products and information.

**Pat O'Dowd** "Robosapien", a robot for those who don't have time to actually make their own. \$99 at Best Buy with a multi-function remote. Bump sensors on the feet, IR sensors allow gross object avoidance. See <http://www.robosapienonline.com/> for more information or search the web for "robosapien".

**David** brought some flyers on the electronics programs at RTC. This college offers some great opportunities for those seeking professional training in many industries. It also provides us a great meeting place month to month. See [http://www.renton-tc.ctc.edu/prospective\\_students.htm](http://www.renton-tc.ctc.edu/prospective_students.htm) for more information.

**General Info:** VETCO has moved to 12718 Northup Way in Bellevue, next to Ironworks Gym.

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# SRS Meeting Notes for 2004

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## Feature Presentation - The Space Elevator Project

Our presenter was **Michael J. Laine**, president of LiftPort, a company that is developing the technology to build the Space Elevator. The website which has more information is at <http://www.liftport.com>.

If you have something interesting you'd like to talk about at an SRS meeting please contact Jim Wright ([SRSMeetOrg@jimwright.org](mailto:SRSMeetOrg@jimwright.org)) or Steve Kaehler ([sdk6772@yahoo.com](mailto:sdk6772@yahoo.com)) and we'll coordinate with you, give you suggestions and information, and try to answer your questions and line you up in the schedule. We're also interested in suggestions for people to contact or topics to present. The SRS has become quite well known around the world and this often opens doors of opportunity for presentations.

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## Events & Announcements

**Pete Miles** - Robothon will be September 24-26 at the Seattle Center. See <http://www.robothon.org> for details.

Line Maze and 3Kg robot sumo (12th NWRST) happened here today.

### Vancouver Robotics Club Games 2004

On Sunday, June 13th 2004 at the British Columbia Institute of Technology in Burnaby for a fun-filled day of robotic competitions.

Sunday, June 13th, 2004

Registration starts at 9:30 AM, competitions begin at 11:00 AM, awards and prizes at 3:30 PM

Location: BCIT Campus, Building SE2, Townsquare D 3700 Willingdon Avenue, Burnaby, BC

Get a map of the BCIT campus at: <http://www.bcit.ca/download/maps/bcitmap.pdf>

Rules and more information can be found at: <http://www.vancouverroboticsclub.org/>

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## Meeting Conclusion

The structured part of the meeting ended around 12:00 with folks mingling in small groups and crowding over by the contest areas. The line maze and sumo contests started immediately. Folks talked, shared information, showed their stuff, etc.

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# SRS Meeting Notes for 2004

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## Jun 19

### Introduction

**Jim Wright** welcomed everyone and introduced the SRS for the benefit of newcomers. About 45+ folks showed up by 10AM. The typical meeting format follows the following agenda: General announcements, Show-n-tell, Feature Presentation, robotics mingle-n-mix.

ROBOTHON is coming on September 25-26 (hack session on the evening of the 24th). Build robots for the events. See <http://www.robathon.org>.

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### Show-N-Tell

**Jim Wright** is working on a VIA-Board-based computer that is 7.25"x7.25". It is a 1G PC-on-a-board. <http://www.mini-box.com> provides an ATX power supply that connects to a 12V battery. IDE FLASHcard drive running W98. Working to run W2K with a small hard drive. Jim mentioned this setup a couple months ago. See also <http://www.mini-itx.com>.

**Doug Bell** bought a "super electronics surprise box" from Electronic Goldmine. See <http://sales.goldmine-elec.com>. He got a European style wallwart, an unlabeled car power socket adapter, some 7-segment displays, circuits from some little gadgets, speakers, and other miscellaneous things. They apparently just grab handfuls of stuff and dump them in a box. Doug Bell went to an ATMEL (<http://www.atmel.com/>) seminar recently. Multiplexed displays can be driven with fewer lines than you expect. When using discrete electronics, you need a driver for each row and column (rows+columns). It is possible to wire your LED matrix so that you only need (rows+1) I/O lines. However, it is more complicated because you do tricky things in your S/W code to compensate for simplification in your hardware. Doug explained the process.

**Cathy Saxton** will be presenting in July about using CAD tools to design her acrylic robot chassis. The process was very inexpensive, quick, and easy. See <http://www.pololu.com> for more information. They will laser cut a variety of materials.

**Larry** - Lindberg High School. Contest modeled after MIT competition where a box a raw materials is provided. The teams members must build a working robot from these parts.

**Dave** - Mini sumo Transceiver for \$10, 200 meter range, <http://www.laipac.com>. He also brought a TRW24G unit Ottawa Robotics Club. Solarbotics (<http://www.solarbotics.com>) sells mini pager motors with planetary integral gearboxes.

"Intermediate Robot Building" by David Cook.

**John McGuire** - Robotic vacuum at Walmart for \$88. Robosweeper (mentioned by a member of Dallas Robotics Club) is a simple vacuum sweeper and motor. 3kg sumo drive system. Japanese robots are fast and powerful. RC racing motors are powerful and strong for their size.

## SRS Meeting Notes for 2004

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Rollerblade wheels are durable, strong, and cheap (\$6). Attached drivegear directly to the wheel using mounting holes in the gear. 1/4" steel axle. Tough mechanical interface. Low-cost, no machine approach to construction. Glue paper pattern onto metal parts, drill and file as required, wash paper off. The motor can be adjusted for speed or torque.

**Chris O'Dowd** - Photovore mini challenge. "Slimies", robots that crawl around. This vendor (<http://www.solarbotics.com/>) has lots of B.E.A.M. products and information.

like lizards and slimy little creatures.

**Karl Lunt** - Cockroach legs (Discover Magazine) are very efficient, better than wheels.

Linksys Wireless-G Broadband Router w/4-port switch, model WRRT54G, version 2, \$60. 200 MIPS processor running Linux. See <http://www.linksys.com/Products/product.asp?grid=33&scid=35&prid=601> for more information.

**Monty Reed** found little "GI Joe" size mannequins at IKEA.

**IMPORTANT ANNOUNCEMENT AND CALL FOR ACTION:** The Administration of North Seattle Community College (NSCC) has decided to turn the school's robot lab into a "storage closet". If you agree that a student run electronics lab has more educational value than a closet, please send two emails and ask two friends to do the same. Send emails requesting explanation to: Alan Ward (President of Administrative Services) at [AWard@sccd.ctc.edu](mailto:AWard@sccd.ctc.edu) and Dr. Ronald LaFayette (NSCC President) at [RLaFayette@sccd.ctc.edu](mailto:RLaFayette@sccd.ctc.edu).

Subject line: STUDENT ROBOTICS LAB. The message the students of NSCC ask you to send should express that you, as a concerned citizen, believe North Seattle Community College should reconsider the decision to turn the student Robotics / Techtrons Lab room into a plumbing workroom or storage closet. Please ask Alan Ward to explain the educational value of a plumbing room replacing a student run electronics lab. Contact: Monty Reed at [lictonsprings@yahoo.com](mailto:lictonsprings@yahoo.com) or via <http://www.nsrsg.4t.com>

**Steve Kaehler** - We will be meeting in this room regularly from now on **except for next month (July 17)**. We need to return it to the way we found it. Please help make this happen so we can continue to use this facility. The wall dividers were in place subdividing the room into four sections. Tables were grouped in each area. Chairs inverted on the tables. **July's meeting will be in J314**. August through December will be here in K201-204.

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### Feature Presentation - Some Photosensor "Secrets" by Bill Beaty

Our presenter was **Bill Beaty**, the Weird Science Guy. The website which has more information is at <http://amasci.com/>

# SRS Meeting Notes for 2004

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- Robotics: <http://amasci.com/amateur/elehob.html#robs>
- Optical suppliers: <http://amasci.com/amateur/optosup.txt>

If you have something interesting you'd like to talk about at an SRS meeting please contact Jim Wright ([SRSMeetOrg@jimwright.org](mailto:SRSMeetOrg@jimwright.org)) or Steve Kaehler ([sdk6772@yahoo.com](mailto:sdk6772@yahoo.com)) and we'll coordinate with you, give you suggestions and information, and try to answer your questions and line you up in the schedule. We're also interested in suggestions for people to contact or topics to present. The SRS has become quite well known around the world and this often opens doors of opportunity for presentations.

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## Events & Announcements

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### Meeting Conclusion

The structured part of the meeting ended around 12:15 with folks mingling in small groups and crowding over by the contest areas. The line maze and sumo contests started immediately. Folks talked, shared information, showed their stuff, etc. People stayed to talk to Bill Beaty and others. Doug Bell brought his logic analyzer and demonstrated it after the meeting.

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## Jul 17

### Introduction

Jim welcomed everyone. 65 folks showed up on this gorgeous Saturday morning. Sorry about the glitch on the room location. We forgot to send out a meeting reminder saying that the meeting would be in J314 for this month only. We are scheduled into Room K201-204 for the rest of the year. We will try to get the big room next year as soon as they can be scheduled.

### Announcements

Robothon will be September 24-25. See <http://www.robothon.org> for more details.

Robo-Magellen contest will be at Robothon.

### Show-N-Tell

Jim Wright - Open CV vision software library. See listserver for link. There is an "OPENCV" Yahoo Group. Get link. "FindOrange" is code for Jim's orange cone seeker program. He

## SRS Meeting Notes for 2004

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demonstrated it using a USB camera. It should work with any "Video for Windows" compatible camera should work. It probably won't work with a really old camera.

CMU Camera can be purchased at <http://www.seattlerobotics.com> (not connected with the SRS).

Cal (7 years old) & Scott showed a robot kit they built that "walks" along a string. It senses noise and can be stopped with a clap. Cal liked building the gearbox. It was purchased at Frye's Electronics in Renton. See their website at <http://www.frys.com>.

Jim McGiver is working on a Robo-Magellen robot he hopes to have running around by next month. He has a fiberglass rod bent around the front of the robot with the goal of detecting where it impacts an obstacle (like the orange cone). He has some ideas using nichrome wire that he's playing around with. He's using two computers to control it. One is a 386-based board from a medical electronics machine he got from surplus. The other is an ISO-POD.

Doug Bell has a board with a GPS connected to a controller with an LCD display but no code yet.

Karl Lunt WRT54G wireless router with a Linux system. See his website at <http://www.seanet.com/~karllunt> for more details.

Check out <http://www.slashdot.org> for lots of interesting stuff.

Getting parts built: <http://www.emachineshop.com> & <http://www.pad2pad.com>

Steve Kaehler showed a robot base that he started building a long time ago. It uses wheelchair motors to drive around though it cannot yet move itself. He's looking for a dual-drive motor controller to interface a processor to them.

Michael Laine visited NASA to discuss Centennial Challenges. They are looking to invest \$20M in private sector projects to develop technology. The criteria for these contests may not be extremely difficult meet so that amateur builders can compete. Also, see <http://www.elevator2010.com> for info on a tether-climbing robot contest.

Monty Reed with North Seattle Robotics Group showed a leg-assisting machine that he wore in the St. Patrick's Day race. He also demonstrated a walking-leg pair with servos & rotary pots for encoders. He is working on a system using linear pots because linear actuators are the only ones that are strong enough for his applications. Allied Technologies. He plans to build a full-scale exoskeleton suit. NSRG is still at risk of losing their lab. <http://www.nsrg.4t.com>

Dave Highlands showed a book by David Cook called "Intermediate Robot Building". "Batteries in a Portable World" is available online or in printed form. He found a cool 36x24 pixel display that must be driven. He has been helping Karl Lunt with the Linksys controller that he has been working on. He will put his patches and instructions up on his website.

## SRS Meeting Notes for 2004

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Tom Dickens put out a call for technical paper presentations at Robothon. He encouraged SRS members to simply present what they have been working on. The Robothon website (<http://www.robothon.org>) has been modified with more information.

Ted & Matthew from Canaga TI MSP430 low-power microcontroller that runs c code. GCC has a cross-compiler for it. The chips are in a less-than-convenient package, but they are available as samples. They passed it around.

### **Feature Presentation**

TurboCAD - Building Robot Bodies Inexpensively Cathy Saxton, teacher at Issaquah High School, FIRST team participant.

Cathy showed us how to create models of parts in TurboCAD that can be sent to places on the Internet that will make parts for you. The following are places that do low-cost laser cutting jobs for small quantity orders:

- <http://www.pololu.com>
- <http://www.lynxmotion.com>
- <http://www.filener.com>

They will cut a variety of materials but check with them first. They do a great job with acrylic plastic.

### **Conclusion**

When the presentation was completed, everyone broke into small groups to talk to individuals about their robots, projects, and stuff.

## **Aug 21**

Excellent meeting. For those who did not attend (and we only had about fifty people show up)...

Cathy Saxton, Tom Saxton, Jim Wright, and Larry Barelllo (I hope I included everyone and got all the names right) discussed the prototype robot they are designing for a planned robot-building course to be offered by the SRS. Plans are still tentative, but it looks like it will be offered on the 2nd Saturday of each month, starting perhaps in January. Class fee will cover cost of parts, including a spiffy chassis that Cathy is finishing up, one of Larry's Atmel boards, and a good complement of sensors. Class syllabus is still under construction, and will be available for review soonish. [Current info on this kit can be found at <http://idleloop.com/SRSrobot>. This information will eventually move to the SRS website.--SDK]

The course will be geared for the novice builder, and the finished robot will

## SRS Meeting Notes for 2004

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be similar to an updated version of the Rug Warrior robot, as described in Jones and Flynn's book "Mobile Robots." Current plans call for emphasis on software and programming; builders will start in Basic, then move to C/C++. Knowing the caliber of the people involved, I think this will be an excellent part of the class. Previous such efforts that I am aware of did a good job with the electronics and mechanics, then kind of tailed off; I'm sure this class will hit these elements very strongly.

Response from the group was very positive, and I am already looking forward to taking the classes and building a 'bot. As I said, most details are still not solid, so watch the listserver for updates.

(I apologize for not knowing your name, but I'm lousy at names and I wasn't intending to take meeting minutes, so I didn't ask.) [This sounds like Chris O'Dowd.--SDK] One of the group's regular members showed off his latest BEAM-based walking robot, patterned after a lizard. This is a 1.5' servo-based machine that show fairly complex behavior using analog-only circuitry (no MCUs). I was particularly interested in the feeler mechanism that it used for checking its near environment; the feeler design is similar to that used by Mark Tilden in his BEAM machines. For details, do a Google for Tilden's page.

Several people brought in half-finished projects, vying for Jim Wrights' much heralded robo-junk prize. Mark Castelucchio (sp?) showed off a half-finished robo-stork built of four servo motors and about two yards of brass tubing. Rich Chandler showed his half-demolished combat robot, StrikeTerror; major geek-points for the 9 HP drive system, 3' spinning-blade kinetic weapon, and overall heavy metal. Monty Reed demoed the current state of his exoskeleton project and gave details on his plans for working with paralysis patients to help them regain some (robot-assisted) mobility; great project, Monty!

Speaking of robo-junk, Jim Schultz brought in lots of cool stuff to give away, and several people showed a net gain of non-working hack-toys when they left.

We had a visitor from Colorado (Fort Collins, I think) in attendance. He commented favorably on the size and quality of the meeting, so I think he had a good time.

Jim Wright, Doug Kelley, Cathy Saxton, and others went through the schedule for the upcoming Robothon event, September 24-26. Cathy passed a sign-up sheet for volunteers, and you can also sign up via the Robothon webpage (<http://www.robothon.org/>). T-shirts are now available for \$20 each; we WILL sell out, so get your order in early! Doug was taking orders for SERVO magazine subscriptions (see previous emails to this list) and SERVO magazine will be sponsoring the Robothon Friday night hack-session. This will be a special event for the SRS, as there will be free food!

I'm sure I left out some important bits, but it isn't intentional; just failing memory, advancing years, blahblahblah.

Following the meeting, I headed to Fry's to see if they had the Linksys NSLU2 device in stock. This is a Linux-based network storage device that has been getting a lot of attention in hacking circles recently, and could prove to be an excellent base for high-end robotics; see previous posts for details on listsevers and webpages. Yes, Fry's does carry the device, but they want \$100 each, and the going price on the web is \$75 to \$80. I will get mine mail-

# SRS Meeting Notes for 2004

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order, thank you. [google search on this guy:

[http://www.google.com/search?hl=en&ie=UTF-8&q=%22linksys+NSLU2%22--SDK\]](http://www.google.com/search?hl=en&ie=UTF-8&q=%22linksys+NSLU2%22--SDK)

See everyone at the next meeting.

Karl

## Sep 18

### Introduction

**Jim Wright** started the meeting a few minutes early. He welcomed everyone new and not-new folks. About 50 folks showed up. He explained the meeting format. Club business, show-n-tell, presentation, free-for-all.

### Club Business

Robothon is coming up next week. See <http://www.robothon.org> for details. Jim and Cathy Saxton briefed everyone on the schedule of events. Cathy brought Robothon T-shirts for those who pre-ordered and general sale.

**Tom Dickens** shared some of the topics of papers that will be presented on Saturday afternoon at Robothon. Come on down for some great presentations starting at 1:00PM.

**Jim Wight & Cathy Saxton** introduced the club to what will be the Seattle Robotics Robot kit. This robot is an <\$100 starter kit that will be built through three levels of workshop sessions that help the builder construct the basic chassis, add sensors, electronics, a protoboard, and other gear, and eventually get rolling with the robot's programming. See <http://www.seattlerobotics.org/WorkshopRobot/> for information about the robot itself.

Also see <http://www.atmel.com> and <http://www.winever.com> for more h/w & s/w and software information.

Level 1 classes begin October 9 (2nd Saturdays), and will continue on November 13 and December 11. The regular meetings will still take place on the 3<sup>rd</sup> Saturday of the month. Watch the Yahoo Group list server for details and information.

### Show-N-Tell

**Barry** brought a pair TrackerCAM hooked up to a PC. Two cameras connected to provide a parallax view for the robot to compute distance to a target. See <http://www.eagletron.com> for details.

## SRS Meeting Notes for 2004

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**Karl Lunt** brought in a new version of Tacklebot. He is having trouble with his ultrasonic sensor ([SRF04](#)). He can run it using a pendant or a wireless linked laptop. He wants to replace the X10 wireless camera with something better. Someone suggested that a better camera attached to the existing transmitter might help.

**Chris O'Dowd** brought in his latest creation, a robot lizard. He showed it off last month but improved it. He has switches that allow changing the gait on the fly. He made the legs using a CNC machine. It needs 6.3-6.5 volts to walk properly. He passed it around for us to look at.

Atmel Butterfly (\$20) from Amtel (<http://www.atmel.com/butterfly>) uses the ATMega160 processor. It has a speaker, temperature & light sensors, joystick, serial communications with a PC. He ordered it from DigiKey at (<http://www.digikey.com>). It can be programmed in 'C' or BASCOM. See <http://www.atmel.com/products/AVR/butterfly> for info.

**Gene Elliot** showed off a cool marquee badge he bought at the Puyallup Fair. It cost \$49 and can be programmed using a PC via an infrared link. This vendor sells a ton of these LED products.

**Bob Iannini**, the author of a cool new book, "Electronic Circuit for Evil Genius, 28 Build-it Yourself Projects" talked about it. ISBN 0-07-142609-4. It will be available November 16.

**Dave Showmaker** came to update us on the Space Elevator project. They are working on a blimp to hoist the ribbon to about 900 feet above the ground. After losing a couple weather balloons, they needed to try a different approach.

*Doug Bell left his yellow notepad at the meeting last month. It has SRS on the first page. If anyone has found this, please contact him via the mail list.*

**Charles Oliver** brought a linemaze robot called "SPAZ" which isn't quite working because it only executes the "lefthand rule" for solving a maze. The Robothon contest is much too complex for this approach to work within a reasonable amount of time.

**Monty Reed** found an 18" articulated robot toys at "Big Lots" for \$10. He also came in with his exoskeleton "lifesuit". He's added some additional equipment to make control by the operator. He plans to add embedded sensors to "booties" the user wears to give the controller feedback on the terrain. He will likely use electric linear actuators for making it move. He is looking for people interested in renting a shared workshop space along with him.

### Presentation

Professor of Computer Science **Bruce Hemingway** - University of Washington  
<http://www.cs.washington.edu/homes/bruceh/>

An article about this gear appears in the August 2004 "COMPUTER" magazine. He teaches about this stuff in CSE466.

Interesting websites:



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- <http://www.cs.washington.edu/education/courses/466/03au/>
- <http://www.intel-research.net/berkeley>
- <http://www.tinyOS.com>
- <http://www.xbow.com>

hunter-predator sensor network system

## **Conclusion**

Starwars is coming out Tuesday, but you still need to get those robots ready for Robothon next weekend.

## **Oct 16**

### **Introduction**

Jim welcomed everyone on a rainy Saturday. About 40 folks showed up by 10:00, but another 25 came by 10:15 bringing the total to 65. We are glad everyone came.

### **Club Business**

The SRS robot build session last Saturday went very well, but they ran out of kits. They are working on putting more together. Watch for information on the web. The next session will be on Saturday, November 13. See <http://www.seattlerobotics.org/WorkshopRobot/> for information about the robot itself. Also see <http://www.atmel.com> for more h/w & s/w and software information.

Level 1 (2nd Saturdays), and will continue on November 13 and December 11. The regular meetings will still take place on the 3<sup>rd</sup> Saturday of the month. Watch the Yahoo Group list server for details and information.

### **Show-N-Tell**

A fellow brought a Parallax KH1 is a miniature humanoid robot that uses 17 servos, is statically balanced, yet can walk and even stand up from laying down flat on its back. See <http://www.parallax.com> or [http://www.parallax.com/html\\_pages/robotics/boebot/boebot.asp](http://www.parallax.com/html_pages/robotics/boebot/boebot.asp) for more information.

**Larry Barello** posted a link to the YG for a Korean manufacturer of various servos including some very powerful units.

**Kevin Ross** talked about the upcoming FIRST Lego League contest. "No Limits" what could you do to help people with disabilities to overcome hindrances. He needs another eight judges. It

## SRS Meeting Notes for 2004

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runs from 7:30 to 4:00 PM Email: [kevinro\(at\)kevinro.com](mailto:kevinro(at)kevinro.com). Also see <http://www.firstwa.org> for more information about F.I.R.S.T. events. One is coming Dec 11.

Several folks have purchased SRS robot kits for other family members in the hope that they will catch the "robotics bug". The jury is still out on the success of these endeavors.

**Larry Barello** brought a bunch of single axis automotive gyros left over from F.I.R.S.T. He bought the whole lot and offered them for sale to those at the meeting. There is a MEMS piezoelectric device inside that is somewhat coarse, but can be used with appropriate filtering. It has an analog output that is proportional to the supply voltage. It can be used for heading control in a robot by measuring how fast the robot is turning. This data is then integrated to compute how many degrees the robot turned.

**Tom Dickens** talked about the SRS Encoder magazine (<http://www.seattlerobotics.org/encoder>). There hasn't been an issue recently due to a lack of enough articles. He needs about half a dozen to put one out. Please, please, please write articles! We want and need the kind of information that members have. Help people by sharing what you've learned. Everyone wins and the Encoder will be the information source of choice for robot builders everywhere. He will put out at least quarterly issues if he gets enough material.

He started working on a Robo-Magellan (<http://www.robothon.org/robothon/challenge.html>) machine that hopes will be able to explore his property (outside) and of course compete in the contest next year. It will carry a PC running Linux, cameras, and be wirelessly linked to his house. He gutted a couple \$10 electric drills for drive motors. He is writing an article on his efforts.

**Dave Shoemaker** (<http://www.Liftport.com>) brought a box a parts to get rid of from a cleanup exercise.

**Tom and Cathy Saxton** brought their Robo-Magellan robot, "Scout", which was a team effort. It was built from a RC monster truck. It uses a CMUCam (<http://www.seattlerobotics.com/>) riding on a 4WD chassis. There are wheel encoders inside the balloon tires. It uses an Analog Devices rate gyro to track orientation. She also showed the Level 1 version of the SRS robot kit.

**John McGiver** built an electronic compass using Neodymium spherical magnets and analog Hall Effect sensors. Because these magnets are so powerful (15-17,000 gauss), when suspended in a frictionless gimble-type arrangement, the mechanism snaps into alignment with the earth's magnetic field. He's floating the apparatus in a water-Clorox-soap solution. This choice of fluid achieves his goal of a low viscosity suspension system. He used linear Hall Effect sensors to sense the position of the magnet. It is positioned about one diameter away from the magnet. One sensor is positioned on each side with additional sensors orthogonal on the sides and a fifth on the top for pitch and roll. House of Science in Ballard has the magnets, the plastic spheres come from craft stores.

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**Chris O'Dowd** tested his robots at school by just turning them on and leaving them. Kids seem to want to do really stupid things to them, but the BEAM devices are very hearty and robust. The material he uses is Sentra from TAP Plastics. There is a store near Lake Union downtown.

**Kris Miles** showed her "quad-pod" four-legged walking robot kit made by Parallax and uses a BOEBoard. The kit runs about \$500. She just got it together. See the Parallax website at <http://www.parallax.com> for more information.

**Pete Miles** brought some extra Robothon stuff including T-shirts left over for sale for \$20. Pete brought his Lynxmotion walking robot, but it has some problems so it's not walking right now. It has nineteen servo. See their website at <http://www.lynxmotion.com> for more information.

**Larry** from Lindberg High School brought a bunch of gear to show. The students work in teams of three. This year, they had to build machines that could push balls into a goal. The robots are built on shoestring budgets using very creative and innovative skills and materials. Stuff is tweaked continuously, even on the day of the contests. The next contest will happen around the end of May.

**Dave** talked about Google Desktop, a new interesting application that organizes information on your PC, but it is a free utility that send usage data back to Google. Use with the obvious caveats. See <http://desktop.google.com> if you are interested.

Lynxmotion has some pricey but powerful new servos. See <http://www.lynxmotion.com> for details.

### Presentation #1

**Kinsey Fobes** (*kfobes(at)rtc.ctc.edu*), **Jim Milstid** (*jmilstid(at)rtc.ctc.edu*), **Dave Marshall** (*dmarshall(at)rtc.ctc.edu*), RTC instructors, talked about some of the programs Renton Technical College has to offer those interested in electronics and other technical programs. The college graciously provides meeting facilities free of charge to the SRS.

Renton Technical College

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**Jim Milstid** teaches full-time day classes on basic electronics up through basic microcontrollers and even power control. They also use PLCs. They brought in a large treaded machine built in the early nineties by a former instructor (Jim Paroso) that he plans to get working with a new

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controller built by his students. Anyone can come. Talk to Jim, Dave, or Kinsey if you or if you know someone who may be interested.

**Dave Marshall** teaches night classes. He talked about some of the programs available. If there are special class interests, email these guys and tell them what you are looking for. They are willing to pull special classes together if there is enough interest. The winter quarter begins in January.

### **Presentation #2**

**Arvindakshan Ravichandran** presented his project, an intelligent cane for blind persons. The "stick" uses a couple motors, one for driving and one for steering. It senses low and head height obstacles and dropoffs ahead the user as the person walks along. The unit steers away from things so that the person doesn't walk into things. He demonstrated the basic operating mode of the device. He wanted a system that "thinks" for the user so they don't have to concentrate so much on where they are going. A white paper on this project will be published with the others presented at Robothon.

### **Conclusion**

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

## **Nov 20**

### **Introduction**

Jim welcomed everyone on a rainy Saturday. About 75 folks showed up. We are glad everyone came.

### **Club Business**

The SRS robot build sessions are going well. Last Saturday continued the buildup process. See <http://www.seattlerobotics.org/WorkshopRobot/> for information about the robot itself. Also see <http://www.atmel.com> for more h/w & s/w and software information.

Level 1 (2nd Saturdays), and will continue on December 11. The regular meetings will still take place on the 3<sup>rd</sup> Saturday of the month. Watch the Yahoo Group list server for details and information.

### **Show-N-Tell**

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**Larry Barello** talked about the upcoming FIRST Lego League contest. The theme is "No Limits". The goal is to challenge kids to figure out what they could you do to help people overcome hindrances. It runs from ~8:00 to 4:00 PM. Also see <http://www.firstwa.org> for more information about F.I.R.S.T. events. This event will happen at Highland Middle School on Saturday, Dec 11.

**Steve Kaehler** talked about a bunch of articles pulled from magazines and the web on various "interesting" topics. They were passed around the room.

Links to articles passed around:

- Self-navigating vehicle :<http://www.gpsworld.com>
- Self-repairing software:  
[http://www.nasa.gov/home/hqnews/2004/oct/HQ\\_04339\\_self\\_service.html](http://www.nasa.gov/home/hqnews/2004/oct/HQ_04339_self_service.html)
- Autonomous fleets: <http://www.today.uidaho.edu/DetailsPrint.aspx?id=2817>
- Voice commanded UAV: <http://web.mit.edu/newsoffice/2004/aircraft.html>
- Micro Helicopter: [http://www.epson.co.jp/e/newsroom/news\\_2003\\_11\\_18\\_2.htm](http://www.epson.co.jp/e/newsroom/news_2003_11_18_2.htm) (tethered flight)
- Micro Helicopter: [http://www.epson.co.jp/e/newsroom/news\\_2004\\_08\\_18.htm](http://www.epson.co.jp/e/newsroom/news_2004_08_18.htm) (free flight)
- Glider: <http://ucsdnews.ucsd.edu/newsrel/science/UnderWaterRobot.asp>
- Shape-shifting robots: <http://www.newscientist.com/news/news.jsp?id=ns99996418>
- Micro jet engines: <http://www.newscientist.com/news/news.jsp?id=ns99996559>

**Karl Lunt** hacked lithium-ion battery pack (\$7) and charging system (\$7). LI batteries are much smaller and lighter than other types but take longer to charge and must be charged with special safety circuitry to avoid explosions. They were made for Qualcomm. See <http://www.allelectronics.com>.

**Terry Harmer** of BAIRS (Bellingham Artificial Intelligence Robotics Society) invited members of the SRS to attend and participate in a cool event coming next year. In late April BAIRS will host a mostly non-competitive festival of robotics. He will send information to the list with more information. Their website is coming soon. They are interested in demonstrations of artificial intelligence.

**Cathy Saxton** brought a couple SRS robot kits for people who pre-ordered them.

**Tom Saxton** bought some stuff from "Cheaper Than Dirt" (<http://www.cheaperthandirt.com>.)

New Book on ATMEL microprocessor

"Embedded C Programming and the ATMEL AVR"

ISBN: 1401812066, Barnett, Cox, & O'Cull, Thomson - Delmar Learning.

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Websites: <http://www.electronictech.com>, <http://www.delmar.com>,  
<http://www.thomsonlearning.com>

**John McGiver** last month built an electronic compass using Neodymium spherical magnets and analog Hall Effect sensors. Because these magnets are so powerful (15-17,000 gauss), when suspended in a frictionless gimble-type arrangement, the mechanism snaps into alignment with the earth's magnetic field. He changed the floating solution from a water-Clorox-soap solution to the stuff used in speaker magnets. This new choice of fluid achieves his goal of a low viscosity suspension system that recovers quickly from external motion of the compass. He used linear Hall Effect sensors to sense the position of the magnet. It is positioned about one diameter away from the magnet. One sensor is positioned on each side with additional sensors orthogonal on the sides and a fifth on the top for pitch and roll. House of Science in Ballard has the magnets, the plastic spheres come from craft stores.

John also brought in a "Mechamo" kits he recently purchased for his son. Very cool. Japanese site: <http://www.gakken.co.jp/otonanokagaku/> US source: <http://www.e-clec-tech.com>.

**Michael Laine, of LiftPort**, (<http://www.Liftport.com>) talked about his visit to MIT and his space elevator robot's climbing nearly three-hundred feet in very nasty weather. It received a lot of attention because of this event.

**Lloyd Spencer** (<http://www.coroware.com>) was at Robonex (<http://www.robonex.com>) recently. He and a college demonstrated a motorized platform that could be put together easily and quickly and show what they do. It is an "XP PC" on wheels. It uses WI-FI to link it to a joystick connected to a laptop PC and send pictures from an onboard camera. They want to collaborate with .NET robot developers. It can boot to three environments: XP Pro, XP Embedded-Large, XP Embedded-Small.

**Monty Reed** (North Seattle Robotics Group) is always looking for hackable toys to turn into robots. He suggested looking for wired remote control since this is cheaper than paying for RF stuff you probably don't need. He found a cool \$20 robot ("Roger Robot") at BigLots but couldn't find more when he went back.

Fellow brought a bunch of stuff for give away.

**Chris O'Dowd** brought a Solarbotics (<http://www.solarbotics.com>) pendulum kit. It uses solar cells for power. Just put it in the sunshine and it will swing as long as the sun shines.

**Pat O'Dowd** brought some small motors for sale.

A fellow brought a 4WD/4W steering chassis (\$300 from Tamiya Hobbies (<http://www.rocousa.com/tamiya.htm>)). It uses common components. He is working on a PC-based stereo vision system to be carried on the robot.

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A fellow showed an ARM-based computer the size of pack of cigarettes that runs Linux and uses a solid-state card. Intel PXA265 processor. He plans to use this for the brain of his Robo-Magellen robot at next year's competition. See <http://www.gumstix.com> for more info.

**Allen** ? is looking to buy a CNC and wants to make it available for use by other club members in New Castle. Contact him at [allenc\(at\)expedia.com](mailto:allenc(at)expedia.com) for more information or to make arrangements.

**Pete Burrows** a prototype of an automaton "fortune teller". He found this cool battery holder at <http://www.mouser.com> that slides out with all the batteries inside. It is much more expensive than the typical Radio Shack variety, but is much easier to swap batteries quickly.

Stewart Tansley is Program Manager in the [University Relations Group \(US/Latin America/India\)](#) at [Microsoft Research, Redmond WA, USA](#) He is involved in .NET robotics applications and other interesting uses of technology. See <http://www.research.microsoft.com/~stansley> for more information.

### Presentation

**Kinsey Fobes** introduced **Francisco Martinez**, one of two RTC machine shop instructors. He explained the basics of what a machine shop does and what RTC's shop does. RTC offers a Tuesday & Thursday class next quarter to learn how to use CNC machinery. The college graciously provides our meeting facilities free of charge to the SRS.

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### Conclusion

Jim concluded the meeting and everyone quickly jumped on the offers that were made during the 'round the room time and a bunch of folks took off to see the machine shop.

## Dec 18

### Introduction

## SRS Meeting Notes for 2004

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Jim Wright welcomed everyone to the meeting. No presenter this month so more time for show-n-tell and other activities. About 60 folks showed up.

### Show-N-Tell

**Dan Strother**, who attends WSU, built and demonstrated a solid-state Tesla coil that shot out streams at 50KV to 100KV. He used IGBTs driven by a PLL. He wound the coil himself. The unit can run for the primary/secondary turns ratio is 4:800. More info can be found at <http://www.dtchron.com>.

The CNC machining class at RTC will run \$200 if enough people are interested. Contact **Kinsey Fobes** for more information.

**Karl Lunt** brought an Intermec 6540 to show. It is a 486DX88. It's a mini PC but is not very straight forward to wake up. He is still trying to figure it out. He is still researching trying to find information on its many proprietary components. He bought it at Vetco for \$25. They have some 384MB FLASH drives for \$13.

**Barry Schrag** showed us "ROVER", a AWD ATV-like chassis that carries a laptop connected to a 3D compass and two FireWire cameras. The plan is to give it the capability to compete in Robo-Magellan and similar competitions. It presently weighs about 15 lbs but will get heavier.

**Dave** brought his Gumstick processor that he brought last month.

**Gene Elliot** and several other folks brought a bunch of cool stuff to give away.

**Monty Reed** brought a cool motorized robot toy (Roger Robot) available at Big Lots to hack. His goal is to hack the controls without opening the robot. He is having trouble with noisy motors and is attempting to program an Atmel controller in C. It did pretty well for a demo. Go to <http://www.biglots.com> to locate a store near you.

**Randy Carter** brought his in-work projects, a fire fighting robot and ViCtoR. He is using a set of advanced motor controllers that can be electronically slaved to each other. They can also be programmed with startup and stop profiles. See <http://www.PMDcorp.com> for info about these chips.

**Tyler Folsom** (tfolsom(at)scn.org) talked about a visual navigation robot project he and others are working on that they are attempting to give the capability of moving about just by seeing with stereo cameras. It takes a stereo image, separately processes these to match some target, fuses the images, feeds them to a path planner that processes them to a movement plan. DigiPen Institute of Technology Team SLEEIPNIR 206-522-6441. Also see <http://www.scn.org/~tfolsom>

**Cathy Saxton** brought an AVRCam that she is playing with. This device is like the CMUCam but may communicate via a different interface protocol. She hopes get this camera working with her controller. It will track eight different colors. They cost about \$100 "assembled" but they



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may not be neatly assembled. Someone said that it can be bought as a kit without the camera for \$50. Info can be had at <http://www.jrobot.com> .

Cathy talked about and demonstrated a new linemaze solving simulator she wrote that correctly handles loops and find the most efficient path in three attempts.

**Michael Laine** talked about Space Elevator Project. They now have two robots. One climbed the "Green Building" at MIT last month in horrible weather, yet did extremely well. Some great publicity was obtained.

Bellevue Highschool Robotics Club is raising money to pay for their entrance fees in next years FIRST competition.

The location of the monthly club meetings is now in Building K rooms 201-204. The entrance is off of Monroe at NE 6<sup>th</sup> . Here is a map (<http://www.renton-tc.ctc.edu/visitors/builds.htm>) of the campus and here's directions (<http://www.renton-tc.ctc.edu/visitors/location.htm>).

### **Presentation**

None this month. We're working on something for next month.

### **Conclusion**

Jim concluded the meeting so everyone could get down to Frys for that all important last-minute Christmas shopping.