



Carleton
UNIVERSITY



GEARED UP

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THE OFFICIAL PUBLICATION OF THE CARLETON MECHANICAL AND AEROSPACE SOCIETY



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**THE CANADIAN
GRAND PRIX**



www.cmas.carleton.ca

SO WHO'S IN CHARGE?

YOUR 2010-2011 CMAS EXECUTIVE

Good Morning/Afternoon/
Evening (choose one)
my fellow Mechs and Aeros,
and welcome to the new semester. My name is Ian Pace and as you should know by now, I'm your Director of Publications on CMAS for the year. By holding such a prestigious title, I am responsible for all things CMAS-related that need to be published, mainly Geared Up.

My goal for Geared Up this year is to publish two issues during the school year. Now I can't do it all by myself. I may be younger and more agile than last year's editor, but I will still need your help. Geared Up is as good you want it to be, and that means I need your articles. Anything engineering-related WILL be accepted. I will even take time to edit your work so it is CCDP-worthy...ish.

I'd like to thank everyone who wrote articles for this issue, and look forward to more submissions through this year.

Contributors to this issue:

Jordan Briggs
Nigel Noble-Hearle
Ian Pace
Antoni Parshatis
Steven Sonnenberg
James Sutherland
Mat Tasson

Good luck in the new year CMAS, and keep all of your submissions coming.

Ian Pace
Publications Director

President	Marla Haring	AERO D (IV)
	- Ensure that CMAS runs smoothly and awesomely - Chair weekly meetings	
VP Internal	Mat Tasson	AERO B (CO-OP)
	- Make sure exec gets their stuff done - Send angry emails for exec to write Geared Up articles	
VP External	Jeff Teutsch	AERO B (IV)
	- Organize conferences for students to attend - Deal with the outside world	
Finance	Natalia Gornicki	AERO A (III)
	- Budget funds for events, conferences, etc. - Deal with money and stuff	
Events	Andrew Cairns	AERO A (IV)
	Nigel Noble-Hearle	AERO B (IV)
	- Organize events for CMAS members - Make CMAS fun and awesome	
Publications	Ian Pace	AERO B (III)
	- Publish Geared Up and any other documents CMAS needs - Send annoying emails bugging you to write articles	
Services	Riley Filteau	AERO D (II)
	- Make sure CMAS is stocked up with supplies - Order and print course manuals for each semester	
Technical	James Sutherland	MECH (III)
	- Organize mailing lists and update CMAS website - Responsible for keeping CMAS on the interwebs	
Year Reps	Ben Robinson (4th)	MECH (V)
	Jordan Briggs (3rd)	AERO A (IV)
	K.J. Korbin (2nd)	AERO A (II)
	Steven Sonnenberg (1st)	AERO C (I)
SMART	Antoni Parshatis	AERO B (III)

SMART is a mentoring program that has been developed by CMAS in order to help first year students adjust to life in university/engineering. The SMART program takes a 1st year student and pairs him/her up with an upper year student in order to help them adjust to their new surroundings. Whether you are having trouble adjusting to the extremely outgoing engineering community, or just having a bit of trouble doing your first integrations, an upper year student in CMAS can help.

WHAT'S GOING ON?

CMAS NEWS

**IAN PACE
AERO B (III)**

The first semester had its fair share of events and activities. One of our first events of the semester was a Top Gear night, where students watched their favourite episodes of the British auto show.

We then traveled to Vintage Wings for their annual airshow where we saw air and ground demonstrations of both vintage and modern aircraft. We witnessed the awesome power of the Avro Lancaster Bomber, the one of a kind sound from the Harvard, and the rich history of the Tiger Moth. We also saw the Canadian Forces CF-18, as well as an air demonstration of the MIG-15.



Later in the semester, we travelled to National Aviation Museum where we had a personal tour of the Canadair Northstar restoration project. Students were able to get behind the scenes into their parts shop, and close-up of the engine restoration, and a tour inside the former airliner.

There are also several new initiatives being put into place within the society. CMAS has implemented a google documents website that can be accessed by

any member. Within this new website, members are able to see the responsibilities and current activities of each of the executive. Members can also find records of minutes from past meetings, any important shared files, the most updated CMAS constitution, as well as links to any other CMAS-related web related documents.

T-shirts have also been ordered and we are expecting them to arrive within the first few weeks of this semester.

We hope to have several new events this semester for our beloved members. We plan on introducing a potato cannon competition, and possibly a remote controlled aircraft competition. Stay tuned for more details around the office.

Finally, we hope to publish another issue of Geared Up before the end of the semester. This means you have to write articles. Anything engineering related will be accepted, so go ahead and send your articles to gearedup@cmas.carleton.ca.



RED BULL AIR RACING

THE FASTEST SPORT ABOVE GROUND

IAN PACE
AERO B (III)

This summer I had the opportunity to go down and see the Red Bull Air Race in Windsor, Ontario. The race is one of the fastest sports in the world, and involves pilots flying upwards of 350 km/h mere meters above water as they pull high-G turns to get around pylons.

The race features pilots representing numerous countries at venues across the world. Pilots range from 26 year old Canadian Pete McLeod to 54 year old Hungarian pilot Péter Besenyi (pictured). The pilots come from a huge variety of backgrounds, ranging from aerobatic display pilots to military fighter pilots. The two planes that are currently used by the pilots are the Edge 540 and the MXS-R, aerobatic planes that have been tweaked to give maximum speeds of up to 425 km/h.

Only one plane flies the course at a time, and the time starts as soon as



the cones with the top of their canopy always facing the pylon. In all cases, the fuselage must be between the two stripes on the pylon.

tall, 5 meters across at the base, and 0.75 meters across at the top. They are made of 6 zippered pieces that can be quickly replaced if

“The race is one of the fastest sports in the world, and involves pilots flying upwards of 350 km/h mere meters above water...”

the plane passes through the starting gate. The course set-up is different between venues, but all races consist of the same air gates. The blue gates indicate that flight must be level with no more than 10° of bank in either direction. The red gates indicate ‘knife-edge flying’ with the wings having to be within 20° of vertical as the plane passes through. Going through the chicane requires pilots to fly a slalom style through

Penalties in the form of added time are given if pilots pass through the gates incorrectly. Incorrect level flying or knife edge form causes a 2-second penalty, the same as flying too high through a gate. If the pilot hits a pylon, a 6-second penalty is given. Automatic disqualification is handed out for dangerous flying, including flying too low, or exceeding 12 G during the turns. The gates are made up of a material called ripstop nylon, a material used in yachting sails and hot air balloons. They are 20 meters

a pylon is hit. The gates are filled with air from blowers at the bottom.

Each race consists of four days of flying. The first two days allow the



pilots to become familiar with the course and make any adjustments required to their planes. The third day consists of two runs, with the best time counting towards qualification for the final day. The top 10 qualification times advance, with the remaining five pilots compet-

ing in the Wild Card race for the final two spots in the Top 12. On the fourth day, the Top 12 each have one run. The top eight qualify for the Super 8. These eight pilots have another run, and the four fastest move onto the Final 4. These four again go for one last run, which

determines the winner of the race.

The race is unbelievable to watch in person, and I would recommend it to anyone who ever gets the chance to watch it at some point in their life.

RED BULL HELICOPTER

WAIT, IT'S DOING WHAT NOW?!?!?



IAN PACE AERO B (III)

No ladies and gentlemen, do not adjust your television screens, the helicopter pictured is indeed, upside-down.

The Red Bull helicopter was another aerobatic performance that was put on display when I went to see the Air Race in Windsor this summer. The helicopter, a modified MBB Bo 105, is able to perform backflips, frontflips, and

barrel rolls, all within viewing distance of spectators on the ground.

The helicopter is piloted by 60 year-old Chuck Aaron, the first civilian pilot to be certified by the FAA for aerobatics in a helicopter. He has over 18,000 hours of experience in 33 different types of helicopters, and has worked as a traffic reporter, a crop duster, and even with NASA with the Space Shuttle Air Rescue program. He has even flown in films such as the Rock and

television shows such as NCIS.

This helicopter completely defies all engineering intuition you may have had. By adjusting the angle of its blades and tilting the rotor, it achieves maneuvers that most would think to be impossible, and is something that is absolutely spectacular and astounding to see in person.

FORMULA ONE RACING

MY CANADIAN GRAND PRIX EXPERIENCE

JORDAN BRIGGS
AERO A (IV)

Formula One. It's arguably one of the most exciting and exotic forms of motorsport on earth, a thrilling display of painstakingly engineered, multi-million dollar mechanical thoroughbreds pitted against each other with no other mission but crossing the finish line first. It's a sport that is as much revered for its spectacle as for the legends it has spawned, both man and machine; names like Schumacher and Senna, Ferrari and Lotus. Being a fan of the sport myself, I set out to experience F1 and see if it lived up to all the hoopla.

cuit, located on the man-made St-Lawrence River island of Ile Notre-Dame, is a favourite among fans and drivers alike. Its long straight-aways and sharp, technical corners make it a fast, competitive track that delivers tons of thrills to fans and drivers alike, and includes such famous spots such as "L'Epingle" (the pit hairpin) and the "Wall of Champions"—so named for the many 'champions' it has knocked out of the race. A fast track, car aerodynamics are altered to provide less downforce, thus giving higher top speed by reducing drag. Top speeds around the course reach 325 km/h (a.k.a. effing QUICK!) and a side effect of this is increased

end-long event which coincides with the race, draws crowds of over 300,000 from across Canada, the US and around the World. It is said that the combination of this great track and vibrant, hospitable city make it the best F1 event for fans to go to, and I can surely say that I agree.

I arrived in Montreal on the day before the race, after booking a night in a UQAM residence room. I met up with some friends and we immediately headed into the downtown core towards Crescent Street, the heart of the city's nightlife scene and the Grand Prix Festival as well. All I can say is WOW! What a party it was! The whole street was shut down to traffic and was an absolute mosh-pit of people, music, dancing, drinking and dozens of displays, promos, and vendors. You could do everything from change the tires on a Formula Atlantic car (didn't do that) to get your picture taken with a Kamouraska model (did that!). On a more serious note, there were also Bud girls handing out free beer!

All around the downtown core anybody with any ride worth flaunting was out in force doing just that. There were dozens of exotics like Lambos, Ferraris, Masers, Astons, Porsches, Vettes, Vipers and old muscle too. You could hear engines revving and tires squealing everywhere...the city was alive with horsepower, and it was awesome. I even saw a kid in a Cherry Bomb equipped Cavalier try to outrun a Lamborghini Gallardo at a red light...hilarious! Don't forget the ladies either...that was sight in itself to behold. Basically, downtown was like testosterone-induced dream.



This summer I went to the Canadian Grand Prix, held at Circuit Gilles-Villeneuve in Montreal from June 11th-13th after a one-year hiatus during the 2009 season. This race was the 8th of the 2010 F1 season, and remains the only North American stop in the F1 World Championship series. The cir-

cuit, located on the man-made St-Lawrence River island of Ile Notre-Dame, is a favourite among fans and drivers alike. Its long straight-aways and sharp, technical corners make it a fast, competitive track that delivers tons of thrills to fans and drivers alike, and includes such famous spots such as "L'Epingle" (the pit hairpin) and the "Wall of Champions"—so named for the many 'champions' it has knocked out of the race. A fast track, car aerodynamics are altered to provide less downforce, thus giving higher top speed by reducing drag. Top speeds around the course reach 325 km/h (a.k.a. effing QUICK!) and a side effect of this is increased

Another great aspect of the track is its location. It's held in downtown Montreal, a quick Metro ride or walk across the bridge from all the fun and entertainment that Canada's second-largest city is famous for. The Grand Prix Festival, a week-



After a short sleep it was race day. The first rule of race day is that the early bird gets closest to the fence. I got up as early as I could bear after an ‘active’ evening and headed for the track after a greasy breakfast. By the time I got to there at 9:30am, the crowds were getting huge so I

feel it. Every rev match, every gear change, every time they fly by you in the blink of an eye, you feel it. It’s mechanical bliss. You can smell the exhaust fumes and the hot rubber. You watch each car zigzagging through the corners like it’s glued to the tarmac, seeming to ignore all the forces we analyze in dynamics

be on the podium. However, Button and Alonso had plans of their own. The superstar driving legend lovingly known as ‘Schumi’ (a.k.a. Michael Schumacher) placed somewhere mid-pack after another mediocre out-of-retirement race.

Patiently working my way back to-

“ There’s something to be said about the sound that an 850hp, 2.4L V8 makes screaming by at 18,000 rpm and 170km/h....”

secured a spot at near the chicanes of turns 6 and 7, and settled down for the Ferrari Challenge race and the Parade of Drivers. This turned out to be a good spot to watch the race, and I was only roughly 15ft from the fence for most of it.

If you’ve never been to an F1 race, or any type of motorsports race for that matter, you are missing out. Big time. There’s something to be said about the sound that an 850hp, 2.4L V8 makes screaming by at 18,000 rpm and 170km/h. It’s a complete shock to the senses... even with earplugs you not only can hear that violent melody...but you

as they battle for positions. It’s a series of sensations that envelopes you in a way that you’d never, ever get from watching the race on TV. This is the real deal, in real time, and my god is it ever freaking fast!

When all was said and done, teammates Lewis Hamilton and Jenson Button placed 1-2 in a McLaren-Mercedes podium ownership. Ferrari’s Fernando Alonso came third, followed by Sebastian Vettel and Mark Webber of Red Bull-Renault. The Red Bull boys and the McLaren duo had been battling it out all race long, and for a while it looked like Vettel might

towards the same Metro that 100,000 other race fans wanted to get on, I thought about how awesome this event was, and why people are so drawn to motorsports. Is it the thrill and excitement? The fascination with speed and violence? Everybody has their reasons, but for me I think it was all that and more. I can’t say for sure, but there really is something addictive about it. All I can say for sure is that I’ll be back next year!

THE F-35 LIGHTNING II

CANADA'S FUTURE FIGHTER

MATHEW TASSON
AERO B (CO-OP)

This past year was a big one for the Canadian Department of National Defence, with a large amount of money being put towards improving the Canadian Forces. **What better way to top it all off than with the purchase of one of the most advanced fighter jets of all time: The F-35 Joint Strike Fighter "Lightning II".

The fighter has been developed by Lockheed Martin and is a single pilot, single engine plane. Don't let its single engine fool you. With 164.4KN of thrust coming from its state of the art Pratt and Whitney jet engine, it can reach a speed of Mach 1.8. On the F-35 model B, it has the capability for vertical take-off and landing. It accomplishes this by tilting its exhaust nozzle towards the ground and opening

The plan is for the government to purchase 65 of these fighter jets to replace the old CF-18's as they are reaching the end of their services lives. The cost is \$9 Billion for the 65 fighter jets, but could raise up to \$18 Billion for the maintenance contracts. That grand total makes this one of the biggest single purchases of military equipment in the history of the Canadian Forces.

As expected with any kind of government purchase, there have been those who have argued against the idea and complained about how this money can be better spent. Now I'm not taking any sides here, but this jet fighter is one of the most



money wisely by just immediately awarding the contract immediately to one company. Ummm...HELLO? You awake? This is Lockheed Martin we are talking about. They designed the F-117, arguably the best stealth bomber of all time; they have been designing the F-35 for



up an intake fan on the top of the fuselage, just behind the cockpit to provide upward thrust .

advanced in the world and is very reasonably priced for the capabilities that come with it. .

decades and have put the best technology out there into the plane; they built rockets for NASA; they built tactical ships, tactical vehicles, tactical submarines; they specialise in designing the future technologies for the military. I am pretty sure that this plane won't be a dud. Hmm, I

There are also complaints about how the government is being unfair and not spending the taxpayers'

guess now you can say I took a side.

The government plans to have the first delivery of planes by 2016 to begin replacing the old CF-18 Hornets. This does, however, come after an upgrade of \$2.6 Billion to the CF-18's, which may beg the question "Why did they bother to upgrade if they were planning to purchase new anyways?" There is some reasoning behind that spending: some CF-18 will still be re-

maintaining in service, as well as being used as a trainer aircraft. Another reason would be that the new planes will not be fully delivered until approximately 2020 which is a decade away. So what was Canada supposed to do? Ground the CF-18s for a decade and wait for the new planes? I couldn't possibly see any side effects to that choice.....

Nonetheless, the government has made its choice to follow through

with the project which will allow the Canadian Air Force to become up-to-date with the new age of fighter jets. However, if the Conservative Government loses office, we can be sure that our military will be, once again, left in the Stone Age.

****EDITOR'S NOTE:** From this point on, I edited only for grammatical purposes, and not for logic in the writer's arguments.

HÉROUX – DEVTEK INC.

TOUR OF COMPANY'S LANDING GEAR DIVISION

ANTONI PASHARTIS AERO B (III)

This past summer, I had a tour of Héroux – Devtek Inc.'s Landing Gear Division in Kitchener, Ontario. The Landing Gear Division has spent over 65 years specializing in the design, qualification, manufacture, repair, and overhaul of landing gears. The company's proven quality system is recognized by AS 9100, NADCAP (National Aerospace and Defence Contractors Accreditation Program) and all major OEMs.

Héroux – Devtek landing gear products fly around the world with components on commercial aircrafts including the Global Express, Learjet 45, BA-609, Dash 8, A-380, A-320, A-340, B-787, B-777, B-767, B-737 and DHC-6. They are also found on military aircraft such as the C-130 Hercules, P-3 Orion, F-16 Falcon, KC-135R, F-15 Eagle, B-2, F-35, B-52, and CH-47.

The manufacturing site located in Kitchener specializes in the machin-

ing of medium to large size landing gear components. During my visit, I had the opportunity to see the process in which B-2 Spirit landing gears transform from raw material to the finished, painted product. Furthermore, I observed employees using a grinding machine on the raw material of a B-777 landing gear to create the basic shape.

The manufacturing capabilities at this facility are phenomenal. They include:

- Precision machining of large and complex components
- Injection drilling
- CNC Boring
- CNC Lathe and GAP Lathe
- Grinding

This division also specializes in processes such as:

- Plating – Chrome, nickel
- Temper etch
- Anodize, hard anodize
- Painting

The design of these landing gears originates from a team of experi-

enced engineers. The engineering team maintains up-to-date capabilities, skills and experience in the fields of design, modeling, drafting, structural and dynamic analysis, material, processes and also testing. The tools that these engineers use include CATIA V5, Pro/ENGINEER and the MSC suite of analysis software. The fully integrated testing facility for Héroux – Devtek Inc. is located in the Montréal area.

Overall, the site visit was an amazing experience. The landing gears are well designed, expertly built and maintained according to the high standards to ensure top quality products designed to last. This results in minimal downtime and maintenance.

Héroux – Devtek Inc. is not only a good solution for small to large landing gear systems, but they also provide expertise in flight control actuators, uplocks and other complex components.

THE MOTOCZYSZ E1PC

THE WORLD'S MOST ADVANCED ELECTRIC MOTORCYCLE

NIGEL NOBLE-HEARLE
AERO B (IV)

This is the E1pc 2010. It pushes the limits of electrical performance to the max. It packs 10 times the battery power of a Toyota Prius and has 2.5 times the torque of Ducati 1198. The E1pc has a whopping top speed of 140mph which beats the next best competitor by 38mph.

The bike is powered by 10 interchangeable lithium ion batteries. There are no wires connecting the batteries to the bike or any exposed terminals. Instead, posts on the batteries lock into receivers on the bike's frame, at once making the electrical connection and supporting the batteries' weight. As you can see, the batteries take up the majority of the space that is generally reserved for the engine.

The motor, named the Digital Drive, is the true innovation. It is small enough to fit in the swing arm of the bike and is a DC internal permanent magnet motor. It is oil cooled and custom built for this bike but the applications for this new digital drive are tremendous. The benefit of being an oil-cooled engine means that it can reach its 100HP and 250ftlbs of torque for as long as the batteries can hold out compared to an air-cooled motor which peak figures only last a few seconds. The other advantage of the small motor is that it allows for a direct connection between the throttle and rear wheel which adds precision to the performance of the bike.



The body of the bike was also redesigned from last year's model. The body is made from a "frameless" carbon fibre composite. Aerodynamics play a large role in the performance of the bike so the new E1pc has a much slimmer front and also added jet style inlets to stream air from the front through controlled radiators out behind the seat. The other limiting factor is the position the person riding the bike so the new E1pc created a second ride position. By sliding their butt off the main seat and onto what's basically a modified pillion pad at the extreme rear, the rider adopts an incredibly low, flat-backed riding position that still gives them

the ability to keep their feet on the foot pegs and hands on the handlebars; they can still fully control the bike in this position and even attack high speed corners by weighting the pegs and turning the bars.

Every one of the E1pc's components — the motor, the controller, the battery packs, the aerodynamics — is all-new and class-leading, but they're not what makes the machine so special, the real trick here has been integrating all those into a whole that actually looks and functions like a motorcycle should; a rider accustomed to a gas bike will feel right at home on the MotoCzysz E1pc.



THE PHANTOM VIBRATION

HOW YOU'RE SLOWLY LOSING YOUR MIND

STEVEN SONNENBERG
AERO C (I)

We are all part of a technological advancement, for the better or the worse. It is likely that while you read this article you will at some point take a brief pause, reach into your pocket and respond to a text message your friend just sent you. The power to communicate with the world at the tip of your fingers, a small simple machine that can browse the internet via satellites, call phones using cell towers and communicate with other cell phones over blue tooth. Cell phones have become a major part of our everyday life.

It is hard to imagine what it would be like if they all just vanished. For most people, heeding the warnings in hospitals or at the movies to “turn off your cell phone” is as

simple as pressing a button. But for a growing number of people across the globe, the idea of being out of touch, even just for a 90-minute movie, is enough to induce anxiety. Society has become addicted to the use of cell phones and it is starting to cause damage.

There are reports suggesting that cell phones can lead to cancer, brain tumours and cell damage. If that isn't enough to cause worry, cell phones are starting to have psychological effects. Have you ever been sitting in class or maybe at night and rather than have your phone ringing every time you receive an instant message, you have it set to vibrate? Do you ever find yourself thinking your phone is vibrating when it actually isn't? Believe it or not this is a psychological problem.

It's called the Phantom Vibration Syndrome. It is the phenomenon of experiencing a sensation of vibration in the pocket-region, leading one to believe their cell phone is vibrating. The sensation can be triggered by other vibrations, such as the engine in a car, but can also appear when no external stimuli are present.

Cell phones are a great technological advancement but they, like everything else in our life, need to be used in moderation. So the next time you reach for your phone and there is nothing there, you are seeing the side effects of your addiction and you may want to try to put down your cell phone for a little while. Perhaps it's time to enjoy the sounds of nature rather than the sound of your cell phone.

CHRISTMAS TOY REVIEW

MY REMOTE-CONTROLLED HELICOPTER(S)

IAN PACE
AERO B (III)

This Christmas, I received the greatest toy that an Aerospace Engineer could get, a remote controlled helicopter. Even better, I got two of them!

On Christmas morning, I opened my gift and immediately became wide-eyed as I saw what was inside the wrapping paper, and the child in me came to life. This \$30 dollar toy gave me hours of enjoyment over the next few weeks, 5 minutes of charge at a time.

What this helicopter lacked in con-

trol, it made up for in its ability to survive contact with any surface it crashed into time and time again. As a young adult with the occasional hyperness of a small child, I tested its “child-proof” rating out again and again by running it into ceilings, walls, and by-far my favourite targets, unsuspecting siblings.

My excitement only grew upon returning to Ottawa and receiving another similar helicopter, this one with even more power and even more control. I slowly began trying to perfect my piloting skills as I snuck up on roomates.



However, the helicopter could take only so much of my abuse, and it finally broke because of my child-like thought of its invincibility. I extend my heart-felt apology to the person who gave it to me for being so childish at times, but thank her for putting up with that part of me.

SURVIVING 3RD YEAR

10 PIECES OF ADVICE

JAMES SUTHERLAND
MECH (III)

1. CMAS doesn't have an unlimited quantity of course manuals, they'll order more if they run out, but that doesn't help you very much if you show up on the day of your first lab and they're sold out. Buy your manual before you need it, that way you'll have it when you need it.
2. When you register for MAAE 3901 on Carleton Central, you get placed into 2 3-hour time slots, during the first week of classes, you will sign up for a group in one of the two slots, and you won't have to show up for the other time slot.
3. Lab write-ups for both MAAE 3901 and Fluids II will take longer than you expect. Start early, that way when you spend an extra few hours doing the write-up, you won't be screwed, also, sitting down to talk through the analysis and discussion with your group members can help you figure out what you need to do in much less time than if you try to do it all yourself.
4. The TAs are there to help. Make sure to get their contact information, and if when you get stuck, ask them for help. Of course, if you ask them the night before the lab is due, you probably won't get an answer in time.
5. Not every course uses WebCT. Specifically, lab signups for Fluids II are usually done in writing on the lab door, and ALL the information for MAAE 3901 is posted on a bulletin board outside the Thermo lab, this includes the design project description, which will be posted some time during the term.
6. Speaking of starting stuff early, as soon as the design project is posted, start working on it. This is not something that you can turn out the night before its due, you will need to come up with a design and start putting it together beforehand.
7. Details matter, for 3901 especially, the little things can have big impacts on your marks, make sure to properly reference information you've pulled from another source, even if that source is just the lab manual.
8. You'll actually use the stuff that you learned in PHYS 1004 again. ELEC 3605 isn't necessarily a hard course, but it is one that you need to pay attention to if you want to pass it. There are a lot of relationships and properties that you aren't used to, so do the problem sets.
9. Pre-labs are important. Just like Solids I, you will both do the experiment and do your write-up for the lab in the 3-hour lab period for Solids II, by doing the pre-lab beforehand, you will have more time to do the rest of your write-up, this could mean the difference between having enough time to write a proper discussion and only having the time to jot down a few brief points.
10. You aren't the first person to get stuck on these problems. If you ask around, you can likely find someone who has already done the course, and maybe even remembers how to solve the problem that you're having. Again, if you wait until the last minute, this gets a lot harder to pull off, so start your work early instead of waiting until the last minute.