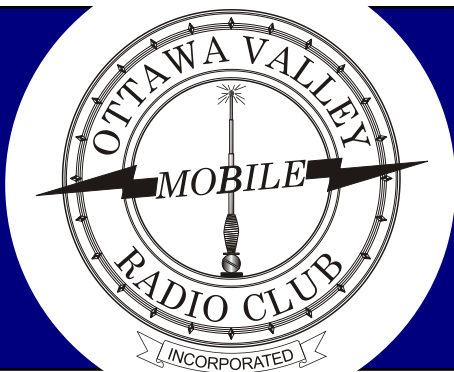


Rambler

Newsletter of the
Ottawa Valley Mobile
Radio Club
Incorporated



May 2013

Edition 57

Page: 1

President's Rambling

May 16 is OVRMC annual Mobile Show n Tell. You are all invited to bring and demonstrate your mobile or portable station to the other members of the club. This event will take place in the parking lot of the Science and Technology Museum. For this event, we start at 7 PM.

We just learned that parking is no longer free at Science and Technology Museum. As of May first, parking charges will apply. We have been told " All visitor parking areas are based on the rate of \$1.00 per half-hour to a daily maximum of \$6.00. This measure is in effect 24/7 (not just when the museum is open to the public). The parking lots will be monitored by Vinci Park. They issue City of Ottawa parking tickets so they will be processed as any other municipal parking ticket. "

For the Show n Tell meeting (May 16) and Annual General Meeting (June 20), for the members who wish the club will provide a compensation of four dollars towards the parking. This is a temporary measure and other options are being explored.

I recently authored a book entitled Software Radio for Experimenters with GNU Radio, Octave and Python. The book covers the topics Software Defined Radio and

Cognitive Radio, from a technical perspective. For a limited time, all book chapters are open access and can be viewed at:

people.scs.carleton.ca/~barbeau/SDRBook/.

Michel Barbeau, VE3EMB
President
michel.barbeau@sympatico.ca



Graduating qualification course class.

L to R they are:

Dave Hunt, VE3EAU;
Mike Taylor, VA3MMP;
Murray Kellett, VE3MYR;
Xavier Gomez-Smith, VA2XGS;
Ken Evans, VE3EKN;
Phil Perfitt, VA3PRF; and
Alex MacKinnon, VE1XXX.

Missing from the photo:

Gary Bazdell, VA3GBZ;
Ben Carey, VO1XXX; and
Eric Daguilh, VE3NUB.

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Meeting Date

Club Meeting:

May 16th

**Mobile Stations
Show n Tell**

OVMRC Executive 2012-2013

President:

Michel Barbeau, VE3EMB
barbeau@scs.carleton.ca

Vice-President:

Vacant
ve3vcf@yahoo.ca,

Treasurer:

Joe Lemieux, VE3EUS
ve3eus@rac.ca,

Secretary:

Brian Williams, VE3KNE
bdwill@rogers.com

Standing Committee Chairpersons

Amateur Radio Exhibit:

Darin Cowan, VE3OIJ
ve3oij@amsat.org

Amateur Radio Training &

Accredited Examiner:

Ernie Jury, VE3EJJ
es282@freenet.carleton.ca

613-728-3666

Membership:

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Technical:

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paul.labbe@usa.net,

Newsletter Editor:

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va3sm@yahoo.ca
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For information about the duties and responsibilities about all Executive and Chair positions, please visit the OVMRC forums, Member section or contact any member of the Executive.

Sponsors

The OVMRC acknowledges the following organizations for their support of our activities:

• **ACCEPTABLE STORAGE,**
Ottawa, ON

• **BYTOWN MARINE,**
Ottawa, ON

• **ELKEL LTEE.,**
Trois-Rivières, QC

• **KENWOOD ELECTRONICS
CANADA INC.,**
Mississauga, ON

• **TRAVEL-MOR TRAILER SALES,**
Ottawa, ON

The club's web site is hosted by:

MAGMA COMMUNICATIONS LTD.

www.ovmrc.on.ca

OVMRC Life Members

Maurice-André Vigneault, VE3VIG
Ralph Cameron, VE3BBM
Doug Carswell, VE3ATY
Doreen Morgan, VE3CGO
Ed Morgan, VE3GX
Bill Wilson, VE3NR (SK)

OVMRC Repeaters

147.300 MHz(+)

444.200 MHz(+)

Amateur Radio Exhibit

VE3JW

Web site:

ovmrc.on.ca/ve3jw.htm

Canada Science & Technology
Museum

The Rambler is the official newsletter of the Ottawa Valley Mobile Radio Club Incorporated and is published 11 times a year (monthly, except for July). Opinions expressed in the Rambler are those of the authors and not necessarily those of the OVMRC, its officers or its members. Permission is granted to republish the contents in whole or in part, providing the source is acknowledged. Commercial use of the contents is expressly prohibited.

Submit articles to the editor or by e-mail to:

[Robert Cherry, VE2AGE](mailto:robert_cherry@hotmail.com)

Ottawa Valley Mobile Radio Club, Incorporated

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www.ovmrc.on.ca

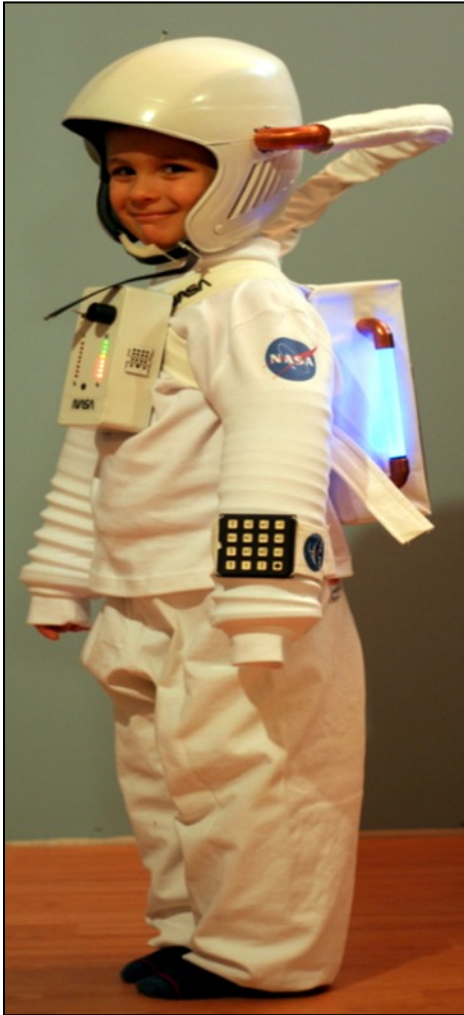
**Visit the OVMRC Store
at**

<http://www.cafepress.ca/ovmrc>

AMATEUR RADIO IN SPACE TRIGGERS YOUNG VISITOR

How do we recruit new astronauts?

Very early.



Cédric Côté in a play suit, shortly after visiting the Science museum.

Chris Hadfield, at 10 years old, got bitten while watching the Moon landing.

Cédric Côté from Montréal, 11 years, got the bug lately when visiting the Museum of Science in Ottawa.

Read the following interview where Cédric explains how he initiated and accomplished

an ARISS "Chat with an astronaut" contact.

Interviewer: "How did you organize to talk with an astronaut?"

Cédric: "I went to the Museum of Science and Technology in Ottawa where there was an Amateur Radio operator, Maurice-André Vigneault, who introduced me to Amateur Radio. I liked that very much. At the end, he mentioned that there was a program to talk to astronauts on the International Space Station, it was called ARISS (Amateur Radio on the International Space Station). He said that I could present a project to my school principal and obtain permission to embark on the program."

Interviewer: "And you went to see your school director?"

Cédric: "Yes, and she said that she liked the program and she would present it to all the teachers. And that's how the project got started at my school."

Interviewer: "So, you got to talk with Chris Hadfield, a Canadian astronaut, what did you think of that?"

Cédric: "It was very exiting and very interesting."

Interviewer: "Do you think you would like to become an astronaut?"

Cédric: "Yes, because it sounds like a lot of fun and it is very special."

This is the story of a young student who had a dream and he overcame all obstacles to accomplish it. He presented his project to his school director and under the guidance of his parents and school staff he got the whole school involved.

Addition to the curriculum to cover space, satellites and astronauts, there was a school wide

competition to write questions for Chris Hadfield and to design posters; coordination from a local Amateur Radio club; selection of a proper date and time for the contact; involvement of the School Board; support from external organizations such as the Cosmodome; presentations to the press and public; invitations to dignitaries; and interviews such as the one above, were all tasks completed for this project.

Before the contact took place, someone twitter'ed Chris Hadfield on the ISS informing him of Cédric's venture. Chris responded with a personal message to Cédric saying:

Bonjour Cédric, Merci pour l'invitation de parler avec vous! J'ai hate de savoir toutes les questions. Felicitations a votre originalite et vos efforts! A bientot - Chris

(Good day Cédric, thanks for the invitation to talk with you. I look forward to receive all the questions. Congratulations for your originality and your efforts! Till then - Chris) Upon successful completion of the ARISS contact, it goes without saying that they had one proud budding astronaut hailed at the school and through the community. Cédric will cherish this moment forever.

Thanks to the Canada Science and Technology Museum for opening a window to space for young visitors and a career goal for them to strive for.

Maurice-André Vigneault, VE3VIG
AMSAT Canada Delegate
ARISS International Working Group
School Selection Committee

NOTICE OF CLUB ELECTIONS

CALL FOR VOLUNTEERS TO FILL EXECUTIVE POSITIONS

FISCAL YEAR 2013-2014

Members in good standing are invited to consider running as Directors or Chairs of Standing Committees for the fiscal year that will begin on September 1, 2013.

Elections will take place at the Annual General Meeting that will be held in June 2013. All positions are open. Those interested in serving their fellow Club members should contact any of the current members of the Club Executive to indicate their willingness to serve and which of the many positions available they might be prepared to fill.

Signed "Joe VE3EUS," Treasurer

OVMRC ELECTION SLATE, 2013-14

The members listed below have volunteered to act as directors or chairs for the Club fiscal year that begins on September 1, 2013 and ends on August 31, 2014. Additional volunteers are required, notably for the positions of Vice-President, Amateur and Membership Chair.

DIRECTORS

President:Sandy, VE3HAZ
Vice-President:.....OPEN
Secretary:.....Brian, VE3KNE
Treasurer:.....Joe, VE3EUS

CHAIRS

Amateur Radio Exhibit:Darin, VE3OIJ
Amateur Radio Training:Ernie, VE3EJJ
Membership:OPEN
Newsletter Editor:.....Robert, VE2AGE
Newsletter Publisher:Bill, VA3WMH
Radio Operations:James, VE3MYZ
Technical:Paul, VE3NJS
Webmaster:.....Chris, VA3SM

NON-VOTING ADVISOR

Past-President:Michel, VE3EMB



Ecole des Cardinaux, Ste Rose de Laval, school staff and Cédrick (front row to the left) showing their ARISS poster. Notice Chris Hadfield photo in the background. Third from the right is Joel, VE2WIZ, the Amateur Radio coordinator for the event.

2013 Meeting Dates

Club Meeting Date:

May 16th

June 20th

Rambler deadline

Meeting date minus 13 days

June.....7th

Jul/Aug.....9th

Please submit articles for the Rambler to the editor:

[Robert Cherry](#)

No later than the deadline for the desired edition.

May Rambler submission deadline is:

Friday, 7th June

Software Defined Radio

How Luke Learned to Love the Source

By Marcus Leech

Slides follow:

Software Defined Radio

How Luke Learned To Love the Source

Marcus Leech

Science Radio Laboratories

<http://www.science-radio-labs.com>

In The Beginning...

- A long time ago, in a laboratory not so far away
 - Marconi was messing with metal plates
 - Fessenden was futzing with FM
 - Armstrong was analyzing the Audion
 - Bardeen and Shockley had seized on semiconductors
 - **THERE WAS HARDWARE....**
 - Lots and lots and lots of hardware
 - Incalculable masses of coils and capacitors, and resistors and glass and plastic and ceramics and...

The Evolution of DSP

- Throughout 1980s and 1990s, more “ceramic and silicon” functions moved into the digital domain.
 - Many amateur receivers had “DSP” options, that allowed various types of IF tuning and audio processing
 - Commercial world used DSP techniques all over the place—radios, modems, TVs, VCRs, etc.
 - Payoff was in *flexibility*, and not always overall project costs.
 - BOM costs reduced
 - Software Development costs increased (sometimes infinitely!!!)

Sampling the Analog World

- Way back in 1924, Nyquist (and later Shannon and Whittaker) discovered that:
 - For a signal of F (Hz) bandwidth
 - You only need $2 \cdot F$ samples/sec to be able to reconstruct the signal
 - Led partially to the birth of *Information Theory*
 - Important result in digital systems using sampling techniques.

So, what does this mean?

- Signals can be processed in the digital domain
 - Signal processing in the analog domain uses functions that are ***analog approximations*** of precise mathematical functions
 - Some implementations are higher fidelity (better approximations) than others.
 - Difference between \$100.00 stereo and \$1000.00 stereo is in improving the quality of those *analog approximations*.
 - Converting to digital domain as early as possible gives you better control of mathematical fidelity.
 - Gives you *tremendous flexibility*, without having to break out the soldering iron!

So, what's SDR, then?

- Functionally identical to DSP that has been around for a couple of decades.
 - Different implementation
 - Use (as much as possible) general-purpose compute hardware, rather than custom/semi-custom DSP processors.
 - Modern desktop hardware has some pretty impressive capabilities for DSP work:
 - Even modest desktop systems are capable of several hundred MFLOPS (Million FLOating-point Operations Per Second).
 - A few Giga-FLOPs common on higher-performance general purpose computing gear.

Where do I plug in the antenna?

- Does that mean I can receive 1296Mhz FM on my computer directly? Where do I plug it in.
- Sadly, **some** hardware is still required!
- Need high-speed A/D and D/A I/O in and out of the machine
 - Need a way to downconvert/upconvert signals to bands of interest.
 - Typically use *Direct Conversion* techniques.
 - Signals represented in *baseband quadrature* form.
 - Signals are *in quadrature* (90 relative phase shift).

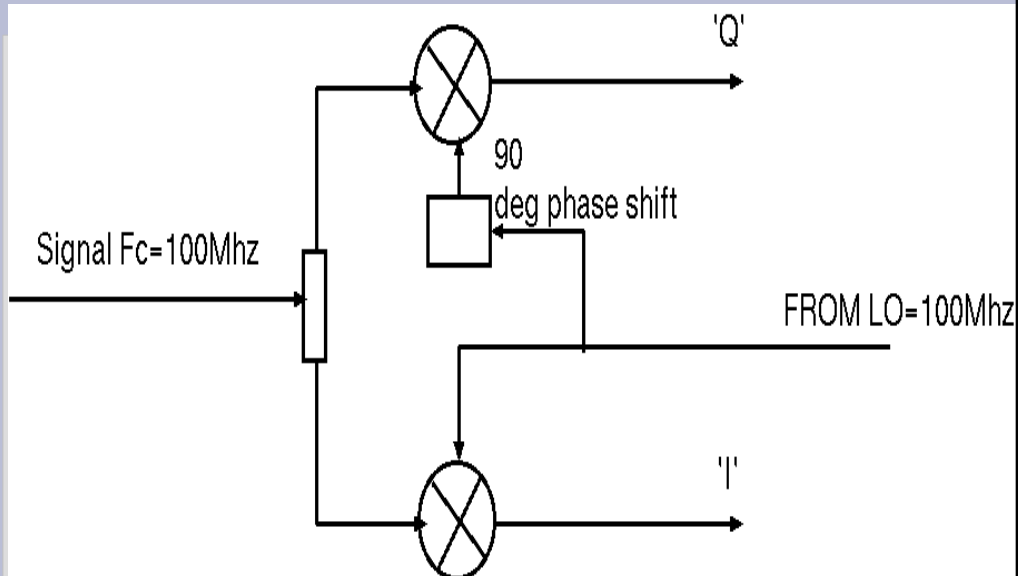
Watch your Is and Qs.

- Signals have an in-phase (I) and quadrature (Q) component.
- Quadrature signal of bandwidth BW:
 - Starts at $F_c - BW/2$
 - Ends at $F_c + BW/2$
- Use simultaneous-sampling A/D and D/A hardware to maintain phase relationship.
 - Very common these days, **because** of SDR!!
- Signal up/down conversion results in:
 - Signals centered around “DC”
 - Lowest component $-BW/2$, highest component $+BW/2$

Signal Quality

- Both amplitude and phase mis-match between I and Q can degrade system performance.
 - Controlled by that ugly-old **analog** world!
 - NCOs (Numerically-controlled Oscillators) used to provide well-phased down/upconversion LOs.
 - Amplitude imbalance is at the mercy of amplifier design.
 - Amplitude and Phase imbalance can be compensated for later digitally, at least partially.

Typical D-C receiver front-end



Products for the Amateur

- SDR-1000, FLEX-5000, FLEX-3000
 - Transceiver based on SDR
- SDR-14, SDR-IQ, SDR-IP
 - Receive only
- USRP and USRP2
 - General-purpose receiver, transceive, transmit
 - Daughter-cards map into various bands
 - USRP1 and B100 uses USB-2.0 for PC I/O
 - N210/N200/USRP2 uses 1GiGe
 - E100/E110 embedded platform
- It's my favourite :-)

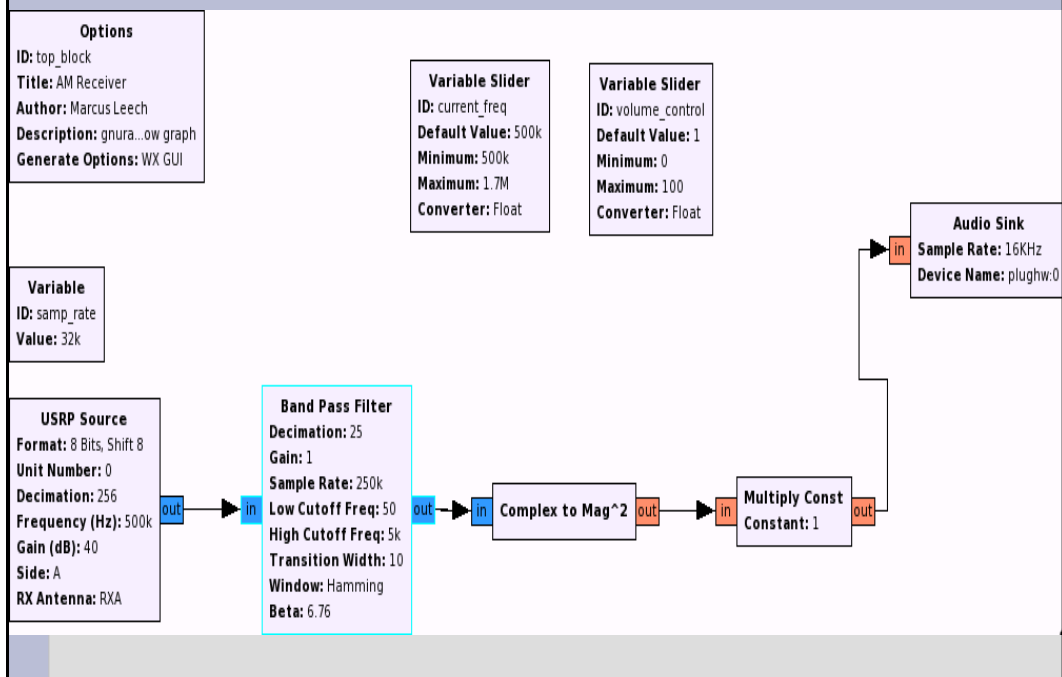
More products for the Amateur

- RTLSDR
 - RX only – actually DVB-T USB “Dongle”
 - Discovered “hidden” SDR mode
 - Really cheap: \$10-\$20.00 on eBay
 - 24Mhz to 1.8GHz
- BladeRF
 - New kickstarter project
 - TX/RX
 - About \$450.00
 - 300Mhz to 3.8GHz

SDR development frameworks

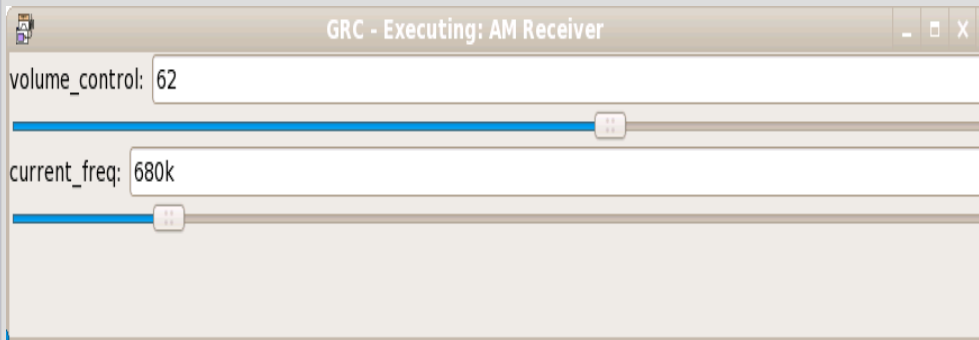
- Many commercial frameworks
- Most popular Open Source framework
 - Gnu Radio (<http://www.gnuradio.org>)
 - Has dozens of different signal-processing blocks
 - Most critical blocks have been ruthlessly optimized for various PC hardware.
 - Now has a GUI-based “constructor” to make life easier for running experiments.
 - A little bit like playing with LEGO
 - Somewhat like LABView or MATLAB
 - Needless to say, it's the only one I use!!

What's after the front-end?

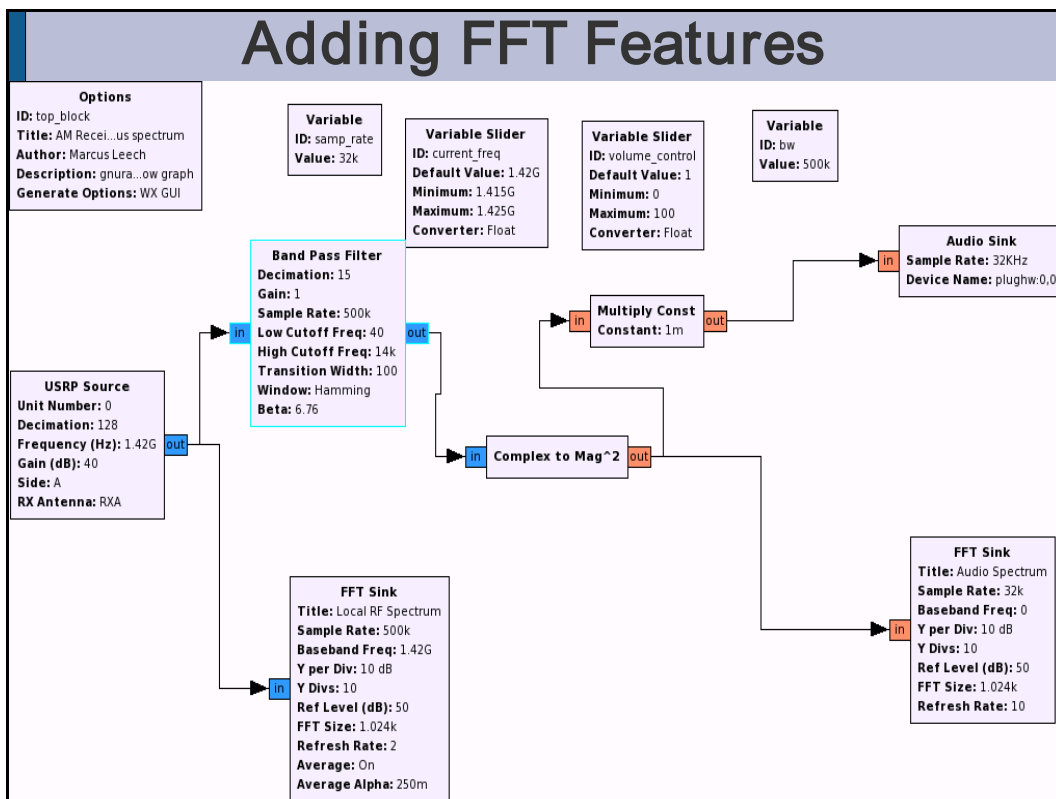


Running AM Receiver

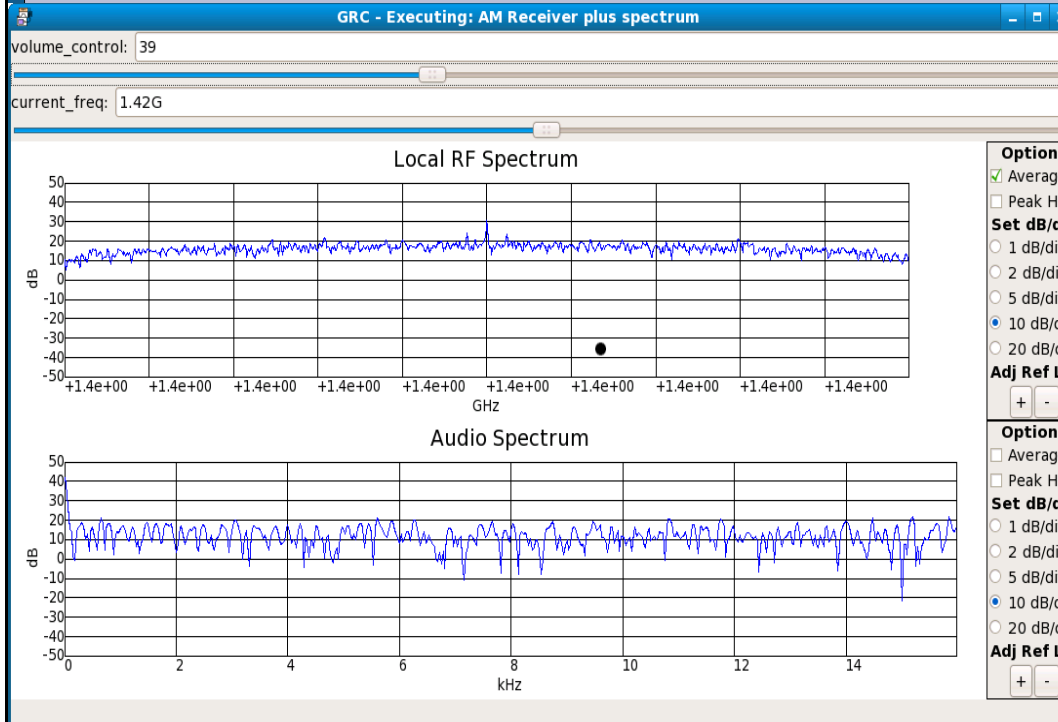
- Running...



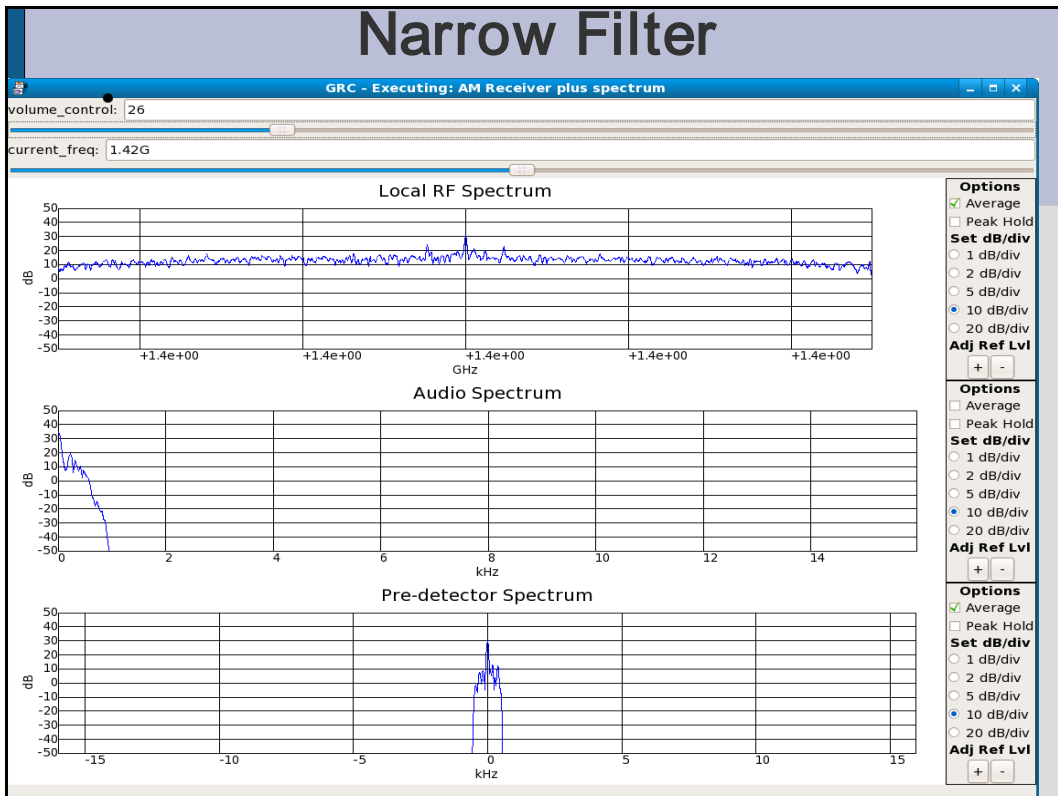
Adding FFT Features



Running New Receiver



Narrow Filter



Flexibility: Different GUI

Form Design

Detector Value Peak Value

LMST Run time

Pulsar Rate

Folding Const

DM

Delay (ms) PhaseErr

Show

Transients

Power Threshold

Transient Duration

Current Declination

Current RA

RF Controls

Tuner Frequency (Hz)

Sky Frequency (Hz)

GC A

GC B

EXIT

LOCK

RF Gain

Spectral Integration

Continuum Controls

DC Gain Mult.

Show Int.

Offset Integration Refmult

Dicke Mode: OFF

SETI Analysis

FREQ C RATE SIGS

1.00

Sigma_K

SETI Integration Show

15.00

PLEASE WAIT...

STAT

Science Radio Laboratories <http://www.science-radio-labs.com>

Sophistication limitless

IRA Spectrum

Compressed Spectrum

Power Spectrum

dB

MHz

Spectral Maximum (dB)

59

Compression Method

Average

Flatten

DISMISS

Notch Filter Length

103

Spectral Span (dB)

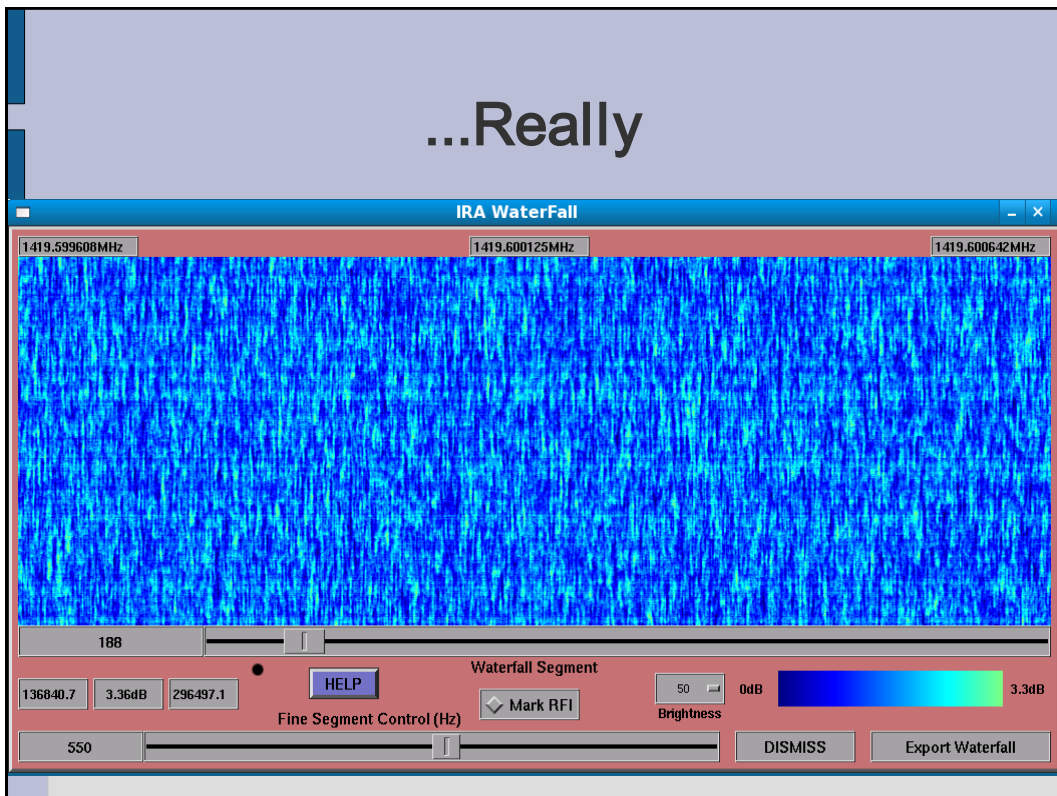
50

Create PostScript

Clear Notches

HELP

...Really







Resources

- <http://www.gnuradio.org>
- <http://www.ettus.com>
- <http://www.science-radio-labs.com>
- http://www.tapr.org/kits_janus.html
- <http://www.rtl-sdr.org>
- <http://bladerf.com>



MEMBERSHIP FORM

-  *The membership year starts in September and runs to the end of August of the following year.*
-  *Regular membership is open to licensed amateurs.*
-  *Associate membership is open to all unlicensed radio enthusiasts.*
-  *Membership includes an e-mail subscription to the Club newsletter, the OVMRC Rambler.*

Date: **PLEASE PRINT**

RENEWAL NEW CHANGE OVMRC NAME TAG (COST \$10.00) NO YES

Call Sign	Surname	Preferred First Name
Street		Apartment Number
City	Province	Postal Code
Home Phone	Work Phone	E-mail Address
Are you a member of Radio Amateurs of Canada (RAC) Yes <input type="checkbox"/> No <input type="checkbox"/> RAC ID: _____ Expiry Date: / /		

- | | | | |
|--|--------------|--------------------------|--|
| Full Membership (Not a Member of RAC) | \$35.00/year | <input type="checkbox"/> | |
| Full Membership (Member of RAC) | \$25.00/year | <input type="checkbox"/> | |
| Associate Membership (Unlicensed) | \$15.00/year | <input type="checkbox"/> | |

Amount Enclosed

\$ _____

Cheque Cash

- My Interests are:
- | | | | |
|---|---|---|--|
| <input type="checkbox"/> Satellite | <input type="checkbox"/> VHF/UHF Phone | <input type="checkbox"/> VHF/UHF Digital | <input type="checkbox"/> VHF/UHF CW |
| | <input type="checkbox"/> HF Phone | <input type="checkbox"/> HF Digital | <input type="checkbox"/> HF CW |

Current Occupation:
If Retired, Former Occupation:
Skills: *(Please list them all)*

COMMENTS

OVMRC NAME TAG – ORDER DETAILS

First Name: _____

Call Sign: _____