



The **NEWSCASTER**

The Official Publication of the Winnipeg Amateur Radio Club

<http://www.mts.net/~warc>

February 2008

IRLP # 1066

VE4BB

Win-cube Project, ARISS, and NASA

By Stefan, VE4NSA

Date: **February 11, 2008**
Time: 7:30 p.m.
Place: **Dakota Collegiate**
661 Dakota Street

Other Important Dates:

WARC: Mar. 10 - Electronic Tips,
Apr. 14, HomeBrew,
May 12,
June 9 - Marathon Field Day, Hamfest briefing

WSC: 2nd Thurs. of month - Breakfast - Garden City Inn

ARES: Jan 15th - VE6BVZ, Calgary ARES EC

Other:

WARC: Executive for 2006- 2007

Past President	John Pura	ve4qv at rac.ca
President	Geoff Bawden	ve4baw at rac.ca
Vice-Pres	Albert Sousa	albert.sousa at shaw.ca
Secretary	Ruthie Maman	rmaman at mts.net
Treasurer	Sue Collings	collings at mts.net
Membership	Mark Blumm	ve4mab at rac.ca
Program	Derek Hay	ve4hay at rac.ca
Director at Large	Vacant	

Program Chair By Derek, VE4HAY



Last month Ed, VE4EAR was out for our January meeting, where he described the City of Winnipeg communication system, from Telephones to wireless, the past & the future. We all knew that the city was using various communication devices & methods, but I for one never realized the intensity the city replies on these devices. The future holds very well for the city to save us some tax dollars by putting in their own infrastructure to establish and maintain this massive communication system. Now if only the politicians will see the light (fibre optic , light ... get it...)
And move forward on this. Thank you, Ed, The presentation sure opened a few eyes in the theatre

This month we will have Stefan, VE4NSA back to talk about the Win-cube project, ARISS and NASA. In case you did not know, Winnipeg is one of only a handful of cities that will have a space port terminal. This will allow ground to space communication for NASA. This is only one of the very interesting things that Stefan , VE4NSA has been quietly working on in the background. Come out to the meeting to hear about how, he and a handful of Hams are working with our children to teach radio, and communications and to eventually launch a satellite into space. See 2 part article in this newsletter.

March we will have Bill, VE4DL out to give us some well informed electronic tips, that I am sure that when we walk out of the meeting that evening, we will all have garnered at least one of not many ideas and recommendations for working with electronics.

April is Homebrew Nght - Are you building your project?

Our Vision - To increase public awareness and respect for Amateur radio; to provide education and support in all aspects of the hobby to our members in a social atmosphere.

Freq	Prov/State	Net	UTC
3.860	MN	Minnesota Net	23:00
3.747	MB	Evening Phone Net	19:00 local
3.937	ND	North Dakota Net	00:30
3.735	SK	SK Public Service Net	01:00
3.750	NWON	NW Ontario Net	01:15
3.700	AB	AB Public Service Net	01:30
3.660	MB, SK, AB	Prairie Traffic Net	01:30
3.743	MB	Mb Morning WX Net	14:30
145.450 -	WW	MB IRLP Net	02:00 Wednesday
147.390 +	MB	Seniors Morning Net	09:00 Local
147.390 +	MB	MRS Net Thursday	21:00 Local
147.390 +	MB	MRS Net Sunday	21:00 Local

Amateur Radio Service Centre - Industry Canada
P.O. Box 9654, Postal Station T
Ottawa, Ontario, K1G 6K9
Telephone: (613) 780-3333
Toll free: (888) 780-3333
Fax: (613) 998-5919
E-mail: spectrum.amateur@ic.gc.ca
http://strategis.ic.gc.ca/epic/internet/insmt-gst.nsf/en/h_sf01709e.html

IRLP Node 1066
145.450 MHz -600 KHz
(VE4WRS)
Comments or if you just want to reach us :
Winnipeg Amateur Radio Club
C/O VE4WSC
598 St. Mary's Road
Winnipeg, MB R2M 3L5

Minutes for January 14th, 2008

Submitted by Ruthie, VE4CRS

Meeting called to order by Geoff VE4BAW at 7:30 PM. Introductions followed. 30 members and 1 guest attended.

Motion to accept minutes of Dec. meeting as printed in Newscaster by Derek VE4HAY, seconded by Glen VE4GWN. Carried.

Business Arising

- Discussion re **Motion # 1** as printed in Newscaster: - to raise dues to \$35.00. Discussion if members can amend motion. By-laws consulted. Mover of motion #1 was not present, and does not need to be present to amend motion. Discussion re raising dues by \$5.00 is enough to keep us out of deficit. Family membership discussed.

Motion to amend this motion to raise dues to \$20.00 by Derek VE4HAY, seconded by Jeff VE4MBQ.

Amendment carried.

Amended motion Carried.

Dues will be \$20 per member starting Sept. 2008 (instead of \$15.00).

- Discussion re Motion # 2 as printed in Newscaster: - to increase Flea Market entrance fee from \$3.00 to \$5.00. Executive does not support this motion. Suggestion to be in touch with the Victoria Heritage Community Centre that we will not be using their facility until April 2009 and book Flea Markets for April/Oct. 2009. Discussion re increasing Flea Market fee will be discussed before these Flea Markets, depending on rental of space. * Vote for motion # 2 to increase Flea Market entrance fee to \$5.00 –

Motion defeated.

Treasurer's Report for 31-Dec-07

- * Income - \$30.00
- * Expenses - \$284.67
- * Book Balance available - \$6,733.96.

Motion to accept Treasurer's report by Rick VE4RA, seconded by Derek VE4HAY. Carried

DX

* Cycle 24 has arrived! As of Jan. 4, 2008. Solar storms will increase. Members were advised not to expect miracles. It may take a few years for better conditions.

* From the ARRL DXCC desk: - St Barthelemy (FJ) has been added to the DXCC, island # 338. For additional information contact:

dxcc@arrl.org

* T9A has been withdrawn, changed to E7A – Z

* Look for Bouvet Island, 3Y.Petrus, ZS6GCM is QRV as 3YOE and will be active for the next few weeks. Active on 20 m around 1500-1700z. QSL via LZ3HI

RAC

- * Contest – not too many VE4's participated.
- * Derek sent bulletin re DX stations.

Programs

January – City of Winnipeg Radio Programs
 February – Stefan is back with presentation of future of WinCube and Satellites
 March – VE4DL – Bill – TBA
 April – Home Brew
 May – TBA
 June – Wrap-up, elections and details re Marathon, Field Day, Ham Fest, etc.

- Derek is trying to arrange to get into lab at U of M to see what's new.
- Re questionnaire in Newscaster that was emailed to members: - only 2 responses. All call for articles. Show of hands re continuation to Newscaster: - Positive response!

Marathon

Meeting called for first week in February.

ARES

- ☞ ARES General Meeting TUE 15 JAN Call-outs & Equipment VE4MBQ.
- ☞ Recruiting volunteer operators for Sled Dog Raves tentatively scheduled for 16,17 FEB at or near Birds Hill Park. Festival du Voyageur is not involved.
- ☞ Jim Ross VE4AJR WPARES Member Emeritus, date Nov 07/early Dec for many years of distinguished service.

Ham Fest

- ✓ No additional news, working on reducing cost of tickets.
- ✓ Monthly meetings every 3rd Monday of month at Derek's home.
- ✓ Open chairs that need to be manned: - Program, Entertainment.
- ✓ Contract firmed by Jan. 19
- ✓ Working on budget.

No new business.

Meeting adjourned: – motion to adjourn by Rick VE4RA, seconded by Glen VE4GWN.

50/50 and membership draw both won by Jeff VE4MBQ. Prize donated by David VE4DAR won by Ed VE4EAR.

WPGARES


By Jeff, VE4MBQ -Emergency Coordinator

Since Gerry Leach VE6BVZ returned to Calgary earlier than anticipated yours truly gave a presentation on Call-Outs & Equipment at the January General Meeting.

February is shaping up to be a busy month. We're doing a Test Net SAT 9 FEB at Camp Amisk, a Test Net SUN 10 FEB out near Ladywood MB to look at coverage for a proposed Sled Dog Race and planning to cover proposed Sled Dog Races 16 & 17 FEB out near Ladywood MB (might be cut back to 16th only). We still need Amateur volunteers for Sled Dog. Amateurs with their own snowmobiles would be especially helpful.

As previously reported, we will be providing volunteer Amateur Communications again for Klondike Derby 1, 2 MAR at Camp Amisk. We appear to have sufficient volunteers now for Klondike Derby but I'll certainly register some back-ups if people are available.

Victor Griffiths VE4VG is scheduled to give us a presentation about the Winnipeg Parking Authority at our next General Meeting TUE 26 FEB 1900h at Sir Wm Stephenson Library 765 Keewatin St. We may well do a volunteer briefing for Klondike Derby too. Please note that our next few meetings will be the 4th Tuesday of the month.




Are You
A Member ?

DIAMOND IMAGE

Floyd Rolph VE4 FDR
 835 Cavalier Drive Tel: (204) 888-3227
 Winnipeg, MB R2Y 1C6 Fax: (204) 831-6400

- South Western & Victorian home decor
- ty Beanie Babies
- Balloon bouquets & decorating
- Gifts
- Printing eg: Business cards, letterhead, envelopes
- Wedding invitations



Contest Calendar

February, 2008

Vermont QSO Party	All	0000z	Feb 2
YLISB QSO Party	CW/RTTY	0000z	Feb 2
10-10 Internat. Winter QSO Party	Phone	0001z	Feb 2
Minnesota QSO Party	CW/SSB/RTTY	1400z	Feb 2
YLRL YL-OM	CW	1400z	Feb 2
AGCW Straight Key Party	CW	1600z	Feb 2
Delaware QSO Party (1)	All	1700z	Feb 2
Mexico International RTTY	RTTY	1800z	Feb 2
North American Sprint	CW	0000z	Feb 3
Delaware QSO Party (2)	All	1300z	Feb 3
QRP ARCI Fireside SSB Sprint	SSB	2000z	Feb 3
ARS Spartan Sprint	CW	0200z	Feb 5
10 meter NAC	CW/SSB/FM/DIGI	1800z	Feb 7
CQ World-Wide RTTY WPX	RTTY	0000z	Feb 9
Asia-Pacific Sprint Spring	CW	1100z	Feb 9
Dutch PACC	CW/SSB	1200z	Feb 9
YLRL YL-OM	SSB	1400z	Feb 9
9-10 Louisiana QSO Party	All	1500z	Feb 9
British Columbia QSO Challenge	All	1600z	Feb 9
FISTS Winter Sprint	CW	1700z	Feb 9
RSGB 1.8 MHz	CW	2100z	Feb 9
North American Sprint	SSB	0000z	Feb 10
SKCC Weekend Sprintathon	CW	0000z	Feb 10
School Club Roundup	All	1300z	Feb 11
NAQCC Straight Key/Bug Sprint	CW	0130z	Feb 13
ARRL International DX	CW	0000z	Feb 16
Feld-Hell Club Sprint	Feld-Hell	1500z	Feb 16
SSA Månadstest nr 2	SSB	1400z	Feb 17
SSA Månadstest nr 2	CW	1515z	Feb 17
Run For The Bacon QRP	CW	0200z	Feb 18
AGCW Semi-Automatic Key	CW	1900z	Feb 20
MOON	CW/Digi/SSB	1900z	Feb 20
Russian PSK WW	PSK31	2100z	Feb 22
CQ WW 160-Meter	SSB	0000z	Feb 23
REF	SSB	0600z	Feb 23
UBA DX	CW	1300z	Feb 23
Mississippi QSO Party	CW/SSB	1500z	Feb 23
OMISS QSO Party	SSB	1500z	Feb 23
North American QSO Party	RTTY	1800z	Feb 23
High Speed Club CW (1)	CW	0900z	Feb 24
Speed Club CW (2)	CW	1500z	Feb 24
North Carolina QSO Party	CW/SSB	1700z	Feb 24
CQC Winter QSO Party	CW/SSB	2200z	Feb 24
SKCC Sprint	CW	0100z	Feb 27

March

ARRL Inter. DX	SSB	0000Z	Mar 1
Wake-Up! QRP Sprint		0400Z	Mar 1
	And	0430Z	Mar 1
	And	0500Z	Mar 1

	And	0530Z	Mar 1
Open Ukraine RTTY		2200Z	Mar 1
	And	0000Z	Mar 2
	And	0800Z	Mar 2
DARC 10-Meter Digital		1100Z	Mar 2
RSGB 80m Club Championship	Data	2000Z	Mar 3
ARS Spartan Sprint		0200Z	Mar 4
AGCW YL-CW Party		1900Z	Mar 4
NCCC Sprint		0330Z	Mar 7
RSGB Commonwealth		1000Z	Mar 8
AGCW QRP		1400Z	Mar 8
Oklahoma QSO Party		1400Z	Mar 8
	And	1300Z	Mar 9
EA	PSK31	1600Z	Mar 8
SOC Marathon Sprint		1800Z	Mar 8
Idaho QSO Party		1900Z	Mar 8
North American Sprint	RTTY	0000Z	Mar 9
SKCC Weekend Sprintathon		0000Z	Mar 9
UBA Spring	CW	0700Z	Mar 9
NSARA		1100Z	Mar 9
	And	1700Z	Mar 9
Wisconsin QSO Party		1800Z	Mar 9
CLARA and Family HF		1700Z	Mar 11
	And	1700Z	Mar 15
RSGB 80m Club Championship	CW	2000Z	Mar 12
NCCC Sprint		0230Z	Mar 14
10-10 Int. Mobile		0001Z	Mar 15
Russian DX		1200Z	Mar 15
Feld Hell Sprint		1500Z	Mar 15
AGCW VHF		1600Z	Mar 15
AGCW UHF		1900Z	Mar 15
Virginia QSO Party		1800Z	Mar 15
UBA Spring 6m		0700Z	Mar 16
9K 15-Meter		1200Z	Mar 16
Run for the Bacon QRP		0100Z	Mar 17
Bucharest		1500Z	Mar 17
	And	1600Z	Mar 17
NAQCC Straight Key/Bug Sprint	CW	0030Z	Mar 20
RSGB 80m Club Championship	SSB	2000Z	Mar 20
ARLHS Annual Spring Lites QSO Party		0001Z	Mar 21
NCCC Sprint		0230Z	Mar 21
BARTG Spring	RTTY	0200Z	Mar 22
UBA Spring 2m		0600Z	Mar 23
SKCC Sprint		0000Z	Mar 26
NCCC Sprint		0230Z	Mar 28
CQ WW WPX	SSB	0000Z	Mar 29

What have you done to "promote amateur radio this week"

That line we credit to an old News stalwart, Peter Parker with using in his old VK1 and VK3 casts many years ago and it still stands true --WIA

News from the Net

New Prefix for Bosnia-Herzegovina Officially Announced

In response to a request from the Ministry of Communications and Transport of Bosnia and Herzegovina in August, the International Telecommunication Union (ITU) withdrew the call sign prefix allocation T9A-T9Z for Bosnia and Herzegovina and made a new allocation, E7A-E7Z. The change was made initially on a provisional basis under authority of the ITU Secretary-General and was confirmed by the 2007 World Radiocommunication Conference to be effective November 17, 2007. According to International Amateur Radio Union (IARU) Secretary David Sumner, K1ZZ, the Ministry of Communications and Transport (BiH) held a press conference in Sarajevo on December 18 to formally announce the change -- *WIA*

DX Help

John Scott VE1JS of Sandy Cove, Nova Scotia is RAC's representative on ARRL's DX Advisory Committee. The committee is currently dealing with questions concerning remotely-operated stations, and whether such operations should count for the DXCC Award. John requires your opinion on the following questions:

- Should QSOs made with these remote stations count for DXCC?
- Is it necessary to require that operations from remote countries only use the receiver located at the remote location? What if the operator listens to a local receiver, or any other receiver, as well as the one located at the remote transmitting site?

Please contact John at scotts@sandycove-ns.ca for more details of the discussion, or to offer your opinion. -- *RAC Bulletin- 2008-01*

Code tests continue to linger

A recent ad hoc survey of International Amateur Radio Union Region 3 member societies, has found that a number of countries still require a Morse code proficiency test for their higher grade of amateur licences. These include China, India, Japan, Malaysia and Sri Lanka. Most have retained a 5wpm test requirement, although Malaysia remains at 12wpm with a proposal to drop it to 8wpm. China has experienced a growth of some 30,000 new radio amateurs in the past four years, and at the moment considers the Morse code tests for its Class 1 and Class 2 licences are necessary to maintain the more traditional style of HF amateur radio. The concern appears to be that new arrivals to the hobby may change its culture dramatically through their use of new perhaps internet-inspired vocabulary and style of operating. Elsewhere in the region, Australia, Hong Kong, New Zealand, Papua New Guinea and Singapore are among those

in the region who are part of the world-wide trend to fully abolish the code requirement. This has occurred as a result of the World Radio Conference 2003 Article 25 change, making code proficiency no longer be an international mandatory requirement for access to amateur frequency bands below 30 MHz. -- *WIA*

Online help to identify data modes

There are a bewildering number of digital modes on the air these days. While decoders are readily available, it can take a practiced ear to work out what mode is in use. Recognizing this issue, the British Amateur Radio Teledata Group has put downloadable samples of around two dozen modes on its web site. The idea is that by listening to the samples you can more easily identify modes you hear on the bands. You can get the files from www.bartg.org.uk by following the Datacom link on the site. -- *RSGB*

Problem operators on all Bands....

A heckling radio ham known as the Filipino Monkey, who has spent years pestering ships in the Persian Gulf, is being blamed today for sparking a major diplomatic row after American warships almost attacked Iranian patrol boats. The US navy came within seconds of firing at the Iranian speedboats in the Strait of Hormuz on January 6 after hearing threats that the boats were attacking and were about to explode. Senior navy officials have admitted that the source of the threats, picked up in international waters, was a mystery. Unfortunate that the international press has labeled the intruder as a "Radio Ham", which probably is NOT the case, just that he does have access to a MARINE BAND radio! And now the US navy's journal, Navy Times, has claimed that the threats, which were broadcast last week by the Pentagon, are thought to have come from infamous radio prankster "the Filipino Monkey", who could be more than one person. Monkey listens to ship-to-ship radio traffic and then interrupts, usually with abusive insults. Rick Hoffman, a retired captain, told the paper: "For 25 years, there's been this mythical guy out there who, hour after hour, shouts obscenities and threats. He used to go all night long. The guy is crazy. -- *WIA*

Winnipeg Amateur Prevails Over City

On 23 January 2008, Gilbert Restiaux, VE4GIL learned that the City of Winnipeg had dropped their objections to his tower. In 2002, Gil moved to a new neighbourhood. After checking with planning authorities in the city, he received their verbal agreement to erect a 48-foot tower and HF yagi in his back yard. Five years later, one of Gil's neighbours complained to municipal authorities because he "did not like" the appearance of Gil's tower. The neighbour lodged complaints by telephone twice a day every day for several months. The City of Winnipeg eventually laid two charges against Gil of violating Winnipeg's zoning by-law. Gil hired

a lawyer, did a great deal of research, and enlisted the help of Tim Ellam, VE6SH of RAC's Antenna Structures Committee. Tim provided Gil and his lawyer with documentary references that were of assistance to Gil's lawyer in arguing that the city's attempts to regulate Gil's Amateur Radio antennas were beyond municipal jurisdiction. On 23 January, the day before Gil was scheduled to attend court on the matter of his tower, Kerri Tymchuk, a solicitor for the City of Winnipeg wrote to Gil's lawyer informing him that the city "will not be pursuing this prosecution." Although not clearly stated in Tymchuk's letter, Gil's lawyer suggested that the City of Winnipeg understands it does not have jurisdiction over Amateur Radio antennas. -- *RAC*

The WinCube Project

By Stefan, VE4NSA

Manitoba High School Students involved in pico-satellite construction, amateur radio and high altitude balloons

Abstract

The WinCube Project is a cooperative effort among Manitoba high schools, the Manitoba Satellite Interest group (MSIG), the Faculty of Engineering at the University of Manitoba, Maples Collegiate Space Exploration Academy, the Manitoba Aerospace Human Resources Coordinating Committee and numerous aerospace industry partners.

Through a mentorship program, Manitoba high school students will be involved in the design, construction, and launch of a pico-satellite with technical support provided by aerospace faculty and engineering students. Basic system design and construction experience for the high school students is provided by the construction and launch of high altitude balloon payloads. Students learn first hand about space mission design, telecommunications, programming, electrical and mechanical engineering and amateur radio through a summer camp program, ongoing workshops and courses.

WinCube

The WinCube project is a multi faceted approach of exposing high school students to amateur radio, aerospace, science and technology. It's core areas involve a satellite project (CubeSat), an annual summer space camp, a high altitude balloon project (B-Cube) and annual amateur radio classes combined with hands-on construction projects, as well as the operation of existing and future amateur radio satellites through a new satellite ground station.

1. CubeSat Project

The CubeSat Project was initiated in the Spring of 2006 by the Manitoba Satellite Interest Group (MSIG) Inc., and MindSet the Manitoba Network for Science and Technology to provide Manitoba High School Students with the opportunity to be involved in the design, construction, and launching of a pico-satellite.

Initial funding for the project was obtained through NSERC (Natural Sciences and Engineering Research Council of Canada) and MindSet, the Manitoba Network for Science and Technology as a program of Manitoba Science, Technology, Energy and Mines. The project is designed to challenge students in the fields of science and technology. The pico-satellite is based on the California Polytechnic State University (CalPoly) CubeSat Program design and specifications of a cube satellite with the dimensions of 10x10x10 cm and a maximum mass of 1 kg. These small, relatively inexpensive satellites are capable of real data gathering as demonstrated by their utilization by universities and space researchers as an economical method of research.

To achieve this lofty goal of creating and launching a pico-satellite, a number of key factors need to be put into place for the high school students:

- Mentorship through aerospace industry and university students
- Gaining experience in payload design and construction through high altitude balloon work (B-Cube Project)
- Defined educational goals
- Amateur radio certification and ground station operation

For high school students to create a CubeSat, the Faculty of Engineering at the University of Manitoba with assistance by Bristol Aerospace provided initial design support for the satellite. This is necessary to meet the CalPoly specifications for a space worthy satellite. A Preliminary Design Review (PDR) Report was created by a cohort of 4th year Engineering Students at the University of Manitoba during the 2006-2007 school year [1]. The PDR proposes the design of the satellite and includes:

- Structure
- Electrical Power
- Communication System
- Command and Data Handling
- Attitude Control
- On Board Science
- Integration and Testing

The "on-board science" [1] will be responsible for gathering scientific data that will be transmitted back to

earth for analysis. The science component of the satellite is what the high school students will contribute directly to. When the CubeSat is in orbit, participating high school students will communicate with the satellite via amateur radio. Data gathered will be processed and published by the high school students.

High school students will also take an active role in the construction of the CubeSat. Starting in the fall of 2007, students will be mentored by University of Manitoba Engineering Graduate Students during the next phase of construction and testing of the satellite utilizing the new University of Manitoba space lab. To prepare the high school students for the satellite construction, they will gain experience in satellite design by constructing and testing a scientific payload for a high altitude balloon launches. The high altitude balloon work is referred to as B-Cube.

2. *Manitoba Space Adventure Camp*

It is necessary to increase students' basic knowledge of space studies and related concepts before they begin their work on a satellite. Students in the program range in grades from 10 through 12. It is necessary that students have the basic concepts and vocabulary necessary to understand space science. A "space camp" experience is provided to bridge students' knowledge of high school physics and the concepts and vocabulary they will encounter during their CubeSat experience. The "Manitoba Space Adventure Camp" as it is called has been held for two years at the Canadian Forces School of Aerospace Studies, 17 Wing, Canadian Forces Base Winnipeg. It is designed to make high school students more aware of science and technology as it relates to aerospace. The Manitoba Space Adventure Camp actually involves two separate camps: a first year camp and an advanced camp for returning students who continue their participation in the CubeSat project. While most of the activities take place at the Canadian Forces School of Aerospace Studies, students also have the opportunity to build and launch model rockets, operate satellite navigation devices, participate in a research balloon launch and work with amateur radio via satellites. Our other activities include tours and lectures, geocaching and various lab sessions (<http://appsacesol.com/spacecampmain.html>).

The key event of the 2007 Manitoba Space Adventure Camp was the successful "school" contact with the International Space Station (ISS) which took place on July 12, 2007. The maximum elevation of the ISS was 70° and the contact lasted for over 9 minutes. Astronaut Clayton Anderson answered 18 questions on a variety of issues and some of students who took part in the 2006-07 winter amateur radio class had their first ISS QSO as certificate holders (<http://www.msig.ca/iss%20contact.html>).

3. *B-Cube (High Altitude Balloon) Project*

The CubeSat student design team from the University of Manitoba and MSIG identified a number of key engineering areas for the satellite. As stated earlier, the technical expertise required for a space-ready satellite is beyond the skill set for most high school students and science teachers and since the first year of satellite design was primarily theoretical a real life hands-on project was developed to provide a basic understanding of the intricacies of payload design and fabrication. High School students are given the challenge to create a payload for a high altitude balloon. Some of the similarities between the B-Cube payload and the CubeSat are taken from the Preliminary Design Review (PDR) Report by the University of Manitoba's Satellite Team [1]:

- Payload Frame
 - o Structure
 - o Thermal Design
 - o Passive/Active Thermal Control Systems
- Electrical Power
 - o Power Budget
 - o Active/Standby Mode
- Communication
 - o Requirements
 - o Amateur Radio Use
- Antennas
- Command and Data Handling

The CubeSat once constructed will undergo a number of tests to evaluate its space readiness including exposing the craft to a hard vacuum, extreme temperatures, and vibrations. For the B-Cube, testing will include physical impacts, cold temperatures, and systems tests. The B-Cube tests can all be carried out at each high school by the students.

- Payload Frame -

The engineering points listed are those that only apply to the B-Cube design concept. For example, in designing the B-Cube payload frame, students must take into consideration temperature drops and how the electronics within the payload react as the balloon reaches a potential altitude of 30 km and external temperature drops as low as -60°C.

Areas for consideration in the B-Cube structure by high school students include the material for the walls (aluminum, foam core, foam insulation) [2], type of adhesives for the structure walls (silicon adhesive, hot glue, Velcro, aluminum tape) and the dimensions of the structure. Students may need to refine payload dimensions to effectively contain all equipment necessary for the balloon launch, yet limit the mass of the structure to the overall 1 kg payload mass. The design of the B-Cube structure must also allow for the venting of the internal volume to adjust to external

atmospheric pressure changes, internal heat loss/gain, and possible moisture damage from clouds [2].

- Electrical Power -

High school students will also learn about electrical power budgets in the design of their B-Cubes. The B-Cube payloads are expected to operate for 2.5 hours of flight and run an audio beacon upon landing for an extended period of time to aid with ground retrieval. The choice of batteries will also require investigation and testing for suitability.

- Communication -

Communication plays a key role in the tracking and data gathering of both the satellite and the B-Cube payload. The high school students are required to obtain their amateur radio certificates since balloon to ground communication will utilize amateur radio frequencies similar (VHF, UHF) to those planned for the satellite. The certification will allow the students to communicate directly with the future CubeSat while in orbit via a ground station located in Winnipeg. First hand application of amateur radio operation is done by having the B-Cube payloads tracked by a GPS radio beacon that is transmitting on 144.390 MHz based on APRS (Automatic Position Reporting System). The students will use amateur radio transceivers and computer software to track and retrieve the balloon payloads.

- Command and Data Handling -

Command and Data Handling of the B-Cube payloads will be done with Basic Stamp chips. The Basic Stamp is reliable and uses PBasic programming. Students will create programs that meet the needs of their mission designs. This includes the timed operation of a balloon flight termination device, as well as the control of on-board cameras. Future projects will involve real live ATV transmissions.

B-Cube payloads are tested for impact survival. Students construct a number of prototypes of payloads that contain a mass that places the test container to a total of 1kg. Payloads are first tested by dropping them (e.g., off the school roof) to evaluate the structures impact survivability. Payloads are then dropped off with various dimensions of parachutes, comparing the time of descent. The third drop test involves a drop from an elevated altitude with the use of a kite or a tethered balloon. The payload is released via a cut down mechanism (termination device), and the payload floats to the ground with the use of a parachute, again recording the time of decent and the altitude it was dropped from. In all of these tests, students are determining the relative strength of the payload structures and best dimension of the parachute design for optimal results versus mass constraints.

A key component for any payload is to be able to operate in extreme temperatures. Both the WinCube and

B-Cube must have measures taken to allow the operation of the electrical system at all times during flight. In the case of the B-Cube, extreme drops in temperature are an issue, as low as -60oC. The B-Cube payload can utilize either an active or passive thermal control system, to be determined by the students. One possible test for temperature is to place an operational payload in a cooler filled with dry ice [2] or a freezer. In either case, the payloads should be running during the tests, with internal and external temperatures of the payload continuously monitored.

In order to help High Schools in Manitoba and beyond to engage in a high altitude balloon project (independent of the satellite project), funding was obtained from the Canadian Space Agency (CAS) to design and construct a ready-to-be-assembled B-Cube kit. Currently, preliminary prototypes of the kits are being developed and tested. These kits will be available in the beginning of 2008. This “plug and play” approach is very important for many science teachers in order to quickly incorporate such a project into the ongoing science curriculum of their school and guarantee a certain level of success.

One of the key elements of high altitude balloons using APRS is the possibility to closely work with local amateur radio operators for the purpose of testing payloads, radios, balloon tracking and recovery. These “balloon chase” events are very popular and significantly enhance the working relationships of local hams with high school students and teachers.

4. Educational Goals

Educational goals for the WinCube project were developed from the Common Framework of Science Learning Outcomes (Pan-Canadian Framework) written by the Council of Ministers of Education, Canada (CMEC) [3]. General Learning Outcomes (GLOs) from the Pan-Canadian that apply directly to the WinCube Project include Skills, Communication and Teamwork.

Pan-Canadian GLO for Skills includes planning investigations to record and analyse data using a variety of techniques [3]. For the B-Cube payload design or the science component of the satellite, students will develop the function of these payloads while attempting to address a scientific issue.

The GLO for Communication and Teamwork involves the effective communication with others in regards to issues and ideas, and comes up with a strategy that has a consensus to move forward on [3]. For the B-Cube component, students will work as a team to design a payload within a high school. The satellite will require students from

participating high schools to discuss and agree upon what the science component will accomplish once in orbit.

Specific Learning Outcomes (SLOs) from the Pan-Canadian Framework found in the WinCube Project include Initiating and Planning; Performing and Recording; Analyzing and Interpreting [3].

Initial BCube payload designs will be very basic, to simply launch and retrieve a payload. Subsequent payload designs will have more specific scientific goals. The SLO of Initiating and Planning involves the investigation of practical problems and issues and the creation of scientific investigations to gather data [3]. The SLO of Performing and Recording will have students carry out experiments while controlling variables, effectively collecting and compiling data [3]. With data collected, students will analyze evidence, provide conclusions, and display information using a variety of formats as part of the SLO Analyzing and Interpreting [3].

Further educational opportunities include ongoing certification in amateur radio and potentially high powered rocketry. During the 2006-2007 school year, participating high school students took part in classes for amateur radio certification. Amateur radio is a key component of the WinCube project that allows students to track their B-Cube payloads and communicate with amateur radio satellites including the WinCube CubeSat. The amateur radio course will again be offered during the 2007-2008 school year.

A planned additional course to be offered to participating students in the fall of 2007 is a junior certification in high powered rocketry. The rocketry course will provide students with a better understanding of the physics of launching payloads into space.

Conclusion

The WinCube is now in its second year and has integrated a number of different projects under one umbrella. The combination of these projects makes the WinCube idea novel and exciting for all participating partners. In addition, such a multi faceted approach has been very appealing for external funding groups and agencies and will be used to further enhance our ability to deliver these programs to High Schools in Manitoba and beyond.

Acknowledgments:

Our special thanks and appreciation go to the Winnipeg Amateur Radio Club (WARC), ARISS (Amateur Radio on the International Space Station), the 17 Wing (Winnipeg). We gratefully acknowledge the financial support provided

by NSERC, CAS and MindSet and thank the following individuals for their great involvement and support:

Alan Thoren VE4YZ, Steve McFarlane VE3TBD, Dieter Schliemann KX4Y, Greg Linton VA4GL, Albert Sousa VA4AS, Geoff Bawden VE4BAW, Fred Venema VE4FV, Gerry Baker VE4GTB, Rory Winters VE4RJW and Melanie Rennie.

Stefan Wagener (VE4NSA)¹, Jeff Cieszecki (VE4CZK)¹, Barbara Bowen², Wayne Ellis³, and Norm Lee⁴

1. Manitoba Satellite Interest Group (MSIG), Inc., WinCube Project Team
2. Manitoba Aerospace, WinCube Project Team
3. AppSpace Solutions, WinCube Project Team
4. MindSet (Manitoba Network for Science and Technology), WinCube Project Team

References

1. Shambrock, J., W. Whaley, B. Klimenko, P. Wheatley, D. Boyd, S. Tully, J. Eady, C. Bosecke, J. LaRue, T. vanBeek, R. Le Neal., University of Manitoba Win-Cube Project 2006-2007 Preliminary Design Review, Winnipeg, Manitoba, 2007.
2. Koehler, Chris, "BalloonSat: Mission to the Edge of Space", Proceedings of the 16th Annual/USU Conference on Small Satellites, Logan, Utah, August, 2002.
3. Council of Ministers of Education, Canada (CMEC), Common Framework of Science Learning Outcomes: Pan- Canadian Protocol for Collaboration on School Curriculum, Council of Ministers of Education, Canada, Toronto, 1997.

Manitoba Blue Book updates

The is pals underway to produce another MB Blue Book in time for the Winnipeg Hamfest. As this may be the last printed version of the Blue Book for a very long time, we need to make sure that we have correct addresses and phone numbers for everyone.

If you have moved or changes your phone number since early 2004 (the last Blue book date) or your info was inaccurate in the last Blue Book, please send updated information to Bill, VE4UB at bluebook@ve4sss.ca.

If you would like to advertise in the Bluebook please contact Bill at the above email as well. Your advertising will be view able for many years do it definitely worth the minor costs involved



Winnipeg
Amateur
Radio
Club

Hamfest

August 8 – 10, 2008

Hilton Suites – Winnipeg Airport
1800 Wellington Avenue
Winnipeg, MB R3H 1B2
voice: 204-783-1700
tollfree: 1-800-HILTONS
fax: 204-786-6588

www.winnipegairportsuites.hilton.com

All bookings must mention [Winnipeg Amateur Radio Club](#) in order to get the negotiated group rate.

Hamfest Web site:

<http://www.mts.net/~warc/hamfes†>

In conjunction with the
Radio
Amateurs Of
Canada
Annual General
Meeting & Forum



Remember this may be the last blue book for a very lone time.

QTX~

By Derek, VE4HAY



Did you know:

- ☎ There is a web site that lists all the Cellular towers in Canada and who is on them Check out this web link http://www.ertyu.org/steven_nikkel/cancellsites.html

GOTA 2008 - Guides On The Air!

Saturday 16th February & Sunday 17th February 2008

10 meters 28,488; 28,588

15 meters 21, 288

20 meters 14,133; 14,288;

40 meters 7033; 7288

80 meters 3733; 3788; 3888;

We are operating VE4GGC during these 2 days at the clubrooms of WSCRC. Ed, VE4YU, is the coordinator of our GOTA activity at the club this year - and already we have a reservation by a group from Windsor Park United for part of Sunday afternoon. Ed is in charge of Sunday activities. The Saturday slots are all open. We usually operate from 10 a.m. until 3 p.m.

And now for a (short) word from the President By Geoff, VE4BAW

I will be pithy [look it up!].

I am proud that WARC will be hosting the 2008 RAC Annual General Meeting and we will have a Hamfest on August 8th, 9th and 10th.

We want to profile Manitoba and amateur radio. A number of presenters have come forward but there are a number of choice spots for you. Let us show that we Tobans take a back seat to no one!

Come and make a presentation. And if you don't make a presentation, be there to be with your VE4 friends and your new friends from across Canada.

Plan to come if only to give your Executive and the RAC executive a hard time!

See you there. Put those dates in your calendar now.

Amateur Radio *~* A Community Resource