The Dummy Load

Official Bulletin of The Cambridge Amateur Radio Club (SWARC Inc)
serving the community since 1964

Club Executive and Volunteers

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Call Custodians
VE3SWA
Calvin Benoit VA3CBE
VE3SWR
Tom Franks VE3MAH

Web Master
Steve Nyul VE3USP
http://www.cambridgeham.ca

Club Net
An information net is held every Wednesday on VE3SWR at 9 pm. Local time.
All comers are welcome.
VE3SWR is an open repeater
146.790 MHz
–600 KHz offset

VE3SWA
DXCC HONOR ROLL
(335/335)
WAZ, WAC, WAS.

Next Meetings

Second Monday of every month
Preston Arena Boardroom at 8:00pm
Mon May 11, 2015
Mon June 8, 2015
Mon September 14, 2015
October ?
Visitors are always welcome

Editor's column

Well – it is June already and antenna work has begun in earnest at many stations. Repairs are usually necessary as a result of the inclement winter months. Bob VE3MF has taken his ailing rotator out and replaced it with his 'backup' unit; I have been repairing and replacing Neil VE3LEE's G5RV and coax (not done yet); my own installation needs some basic maintenance and straightening of both the 5 band beam and 6 meter dipole. (The beam did not like the winds while the dipole did not get along with a couple of very large birds). Ken VE3SKX tells me he has put up a new tower, purchased a super heavy duty rotator and deciding on a new 5/6/7 band beam to complete the installation. Bert VE3BGG has a 'new' J-pole mounted to replace his now removed 2 meter beam. No more sketchy signals from his station in the mornings! Joe VE3JWK now has a 2 meter radio for his shack. Hopefully we will hear more of Joe in the mornings or on the weekly club net. So – if you have not yet started to get those antenna projects underway – there is no time like the present.

Speaking of the VE3SWR repeater, the backup machine was reinstalled May 14th and run with no errors for the next week. Even with a 6 minute time out timer and ½ second courtesy reset, some members still managed to have it shut down. The backup machine does not give any warning before it stops transmitting and then takes about 5 seconds to resume after the timer is reset. Remember to listen for the courtesy beep on both machines before you transmit in order to reset the timer. So – why do we need a timeout timer in the first place? The rules for the operation of a remote station (ie: repeater) are that it must be both remotely controllable as well as locally controlled should something go wrong where the transmitter stays on.

The US amateurs are at it again – attempting to change their HF band plans to include more space for RTTY and Data transmissions. Most of the changes increase the sub-bands allocated to digital operations by extending the existing frequency limits upwards into band segments usually used for phone communications outside the US. While modern receivers may be able to separate and process only the phone contact, those of us using high end but older receivers may be forced to just listen to the data squawks and many harmonics produced by poorly adjusted transmitters. The proposed changes can be seen on the ARRL website or the April 2015 edition of QST. See the RAC's response later in this issue.

Tom ve3mah@bell.net

Cambridge Amateur Radio Club
(SWARC)

May Monthly meeting as recorded by president Calvin **Minutes for May 11, 2015**

The meeting began at 8pm local time with ten members present on a motion to open by Scott VE3ANT, and Shawn VE3PSV
Minutes were read by Bob VE3MF, and accepted by Mike VA3MP, and Jerry VE3NXV
Treasurer's report was presented with a balance of $XXX.XX and accepted by Jerry VE3NXV and Shawn VE3PSV.

Old Business:
There was discussion on the draft constitution changes, Jerry VE3NXV would like to see a "proxy" vote to be included into the new constitution, Tom VE3MAH will make such change to the document. All present liked the proxy vote so there was a motion by Jerry VE3NXV to accept the changes, unanimous vote to accept by all present.

Tom VE3MAH informed members that the backup repeater will be put into service; the backup rig has had some maintenance and would require some exercise to verify all is OK with the rig.

Bob VE3MF was doing a follow up on the banquet, and only request from those attending were decaffeinated coffee, and the food could have been a bit hotter.

Calvin VA3CBE will be sending out an e-mail looking for volunteers to help dismantle Sean's VE3PSV station for his upcoming move in July.

Jeff VE3WIF accepted another term of "member at large" voted in by all.

Donation draw was won by Calvin VA3CBE for the amount of $10.50.

Motion to adjourn at 8:37 by Jerry VE3NXV and Jeff VE3WIF.

Present at meeting: VA3CBE, VE3IHM, VA3WIF, VE3MAH, VA3MP, VE3MF, VE3NXV, VE3JOI, VE3PSV, VE3ANT

Field Day 2015

Don't forget to mark your calendar for the weekend of June 27 and 28. Whether you are operating, helping with set up or just going to visit – Make sure you communicate your intentions to Steve VE3USP so the appropriate plans can be made. Let's consider reconsidering the Saturday club member and family barbeque – a tradition that goes back many field days.

Please see the last page for a map of Valens.

To get there from Cambridge: The most direct route is to take Clyde Road going east from Franklin Blvd. Clyde road turns into Concession Road 10 West. After passing through the village of Clyde, you will pass Cooper Road and then at Foreman Road concession 10 changes to gravel. In a few kilometers you should see a sign on the left pointing to a gated drive on your right. This is the back entrance to Valens circled on the map. Drive in and turn left at the first break in the trees – here we are! Please be careful driving into the site as there may be antenna supports spread around our site.

Should you decide to go via Regional Road 97; go past the entrance to Valens and take the next road on your left Valens Road. Turn left at the end and look for our sign.

Distance is about 13 kilometers and takes about 15 minutes from Franklin Blvd.

Long Time Cambridge Amateur Celebrates 90 years. by Joe VE3JWK

The years were turned back for me a couple weeks ago when I attended, with my wife, Mary, a 90th birthday party for her Uncle, Earl Kaufman VE3CTY. Earl has been an Amateur Radio Operator for many years. The call sign VE3CTY was originally held by Earl's brother Keith who passed away suddenly in 1971. Earl stepped in and applied for his licence shortly after and to pick up Keith's call. Back in the 70s Earl and many others from around the area could be heard on all bands at one time or another. Particularly on 80m. Unfortunately, Earl has not been active on the air for about 3 years. I was able to get a few pictures of some of us old timers at the time and would like to share them with you.

Here we have, on the left, Dave Bell VE3CSB and Harold Braun VE3CD (VE3DWH) along with 3 more of the old gang; Rocco Furfaro VE3YJ, Earl VE3CTY, Joe Ketchabaw VE3JWK.

Above, Harold VE3CD chats with Tony Figueiredo VE3HDA and his XYL
Along with Mike Falla VE3GYN

Editors note: Earl was a member of SWARC for 12 years starting in the membership year 1972/1973. He served as Secretary in 1974/1975 and as President in 1975/1976,1976/1977 and 1977/1978.
Earl won the Keith Kaufman Field Day award in 1974 and 1975 for 75M Phone.

On a Wednesday evening net in May it was requested that a paper Jeff wrote for his master studies be submitted for the dummy load. The topic is computers and planetary space craft.
Following is Jeff's paper. (I'm guessing he got a passing mark Hi)

The advancement of computer technology in planetary spacecraft.

Athabasca University

Survey of Computing and Information Systems

COMP601

2015 01 25

Jeffrey C. Rombough

Abstract
Planetary spacecraft operate in hostile environments far from human contact. They must perform their data collection missions autonomously and safely. The advancement of computing devices has made these spacecraft able to meet increasingly complex missions. Much of the use and the advancement of these computing devices has come from NASA's Jet Propulsion Laboratories(JPL) division. From the late 1950s to the present day JPL has been responsible for designing, controlling, and collecting the data from NASA's planetary spacecraft. The use of automatic control devices started with hard-wired control sequencers. These were replaced with software control sequencers which could be reprogrammed after launch. These were eventually replaced by microcomputers which enabled the computers to be able to complete simple calculations which would assist in automatic course corrections. Single computer spacecraft were replaced by multi-computer spacecraft on the Voyager missions. These missions would also include advances in computer memory and inter-computer communication. The Galileo spacecraft contained many individual processors. Most of the devices which were used for scientific experiments had their own computer processor. JPL designed a command and coordination system so the data from all these devices could be collected and sent to earth. Advances in redundant systems and error-checking have also increased the autonomy of the spacecraft. The advanced computer technology has allowed NASA to create capable spacecraft which have been operating without direct human intervention for many years.
Planetary spacecraft have become more capable due the advance of computer technology.

Introduction
Designing planetary spacecraft has always presented unique challenges. One of the greatest challenge is how to control spacecraft which are very far away and cannot be serviced. These spacecraft are in an unforgiving and relatively unknown environment. Their missions usually take many months if not years. During this time the spacecraft must operate autonomously with only limited communication from earth. The must orient themselves to maintain contact with earth, perform their mission objectives in the safest manner possible, collect data about the planet they are visiting, and send that information back to earth. The use of computers and other automatic systems are critical in order for these spacecraft to complete their mission. This report describes the how the advances in computer technology created more capable interplanetary spacecraft.

Background
The progress of computing and control systems used in planetary spacecraft during the 1960s mirrored the progress of computing and control systems on earth. At the beginning of that era automatic control systems were hard-wired which provided little flexibility once the spacecraft was launched. By the end of the 1970s computers possessed the capability and autonomy which allowed for a much more capable spacecraft. Much of this progress was due to the engineers at Jet Propulsion Laboratory (JPL). JPL has constructed most of NASA planetary spacecraft. JPL initially designed its own custom-built sequencing and computer processing equipment. Toward the later part of the 1970s JPL was able to use off the shelf components which had been designed for the rigors of military and interplanetary space environments. The number of computer processors aboard the spacecraft also increased as well as their inter-processor communication. These advances allowed the spacecraft to be able to control themselves and have less dependency on direct human communication. This autonomy provided greater flexibility which enabled spacecraft to collect more data and perform more experiments from more remote areas.

Discussion
The first systems used to control unmanned spacecraft to the moon used fixed hard-wired sequencers and manual interaction. These sequencers were organized in terms of the sequence of milestones of the mission. The milestones are referenced in terms of the time which has elapsed since the start of the mission [1]. As an example, 45 minutes after launch a spacecraft will activate its up-link radio. 50 minutes after the launch the spacecraft will turn its camera on and so forth. During the Ranger missions to the moon the manual commands would be developed at JPL and then delivered by telephone to the Deep Space Network (DSN) station currently in contact with the spacecraft. An operator at the station would send the commands to the spacecraft after verifying them [2]. If contact with the craft was lost a hard-wired sequencer would take control of the spacecraft. This hard-wired sequence was created before the spacecraft was launched. This meant if any course correction or other mission changes were required they would not be able to be implemented unless they were performed manually. Since the moon's distance is relatively close these manual changes could be sent in a near real time manner. For lunar missions limited autonomy could be accepted since manual control was still possible.

The planets are much greater distance from the earth than the moon. Commands send at the speed of light take a longer time to reach the spacecraft. In lunar missions this time is measured in seconds. In planetary missions it is measured in minutes or hours. Manual control at this distance is not an option. The programmable sequencer was the first step in allowing for spacecraft autonomy. The programmable sequencers allowed the sequence of the missions to be altered after the launch of the craft by using software based commands instead of hard-wired commands [3]. Mission control could rewrite the sequence so that the spacecraft had a different sequence after its launch than it would during other milestones of the mission. “Whether the final mission destination is as close as the moon or as far as Neptune, probe spaceflights consist of the same milestones and activities: launch, mid-course maneuver, cruise, and encounter [4].“ The programmable sequencer also allowed the engineers to maximize the amount of memory used by dumping or erasing the memory which contained the sequences which dealt with milestones or activities of the mission which were complete [5]. New sequences for the next milestone were then uploaded to the spacecraft. The programmable sequencer also allowed the engineers to develop a simple method of checking the memory for corruption. This was done by summing all the values in the memory and then comparing those two values. If a mismatch occurred between these two values then each memory location would be individually compared [6]. Its important to note that although these programmable sequencers were a great advancement they were still not fully functional computers in that they were still directly following the instructions which were given to them from earth. They could not compute the values need for the next step in the mission themselves.

In preparation for the longer missions to Mars the Viking probes were designed not only with many redundant systems but also computing machines which could determine the next best step for the mission autonomously [7]. These computing machines, or microcomputers, share the fundamental components which have become familiar with in modern computing [8]. They include conditional registers, data bus control, an accumulator, a program counter, the ability to do simple mathematical calculations, and programmable interrupt capabilities. The autonomy gained from these advancements was such that during the Viking mission to Mars the lander portion of the spacecraft was able to complete its own course correction during its landing on the planet [9]. This type of real time course correction without human intervention would not have possible without this more advanced computing device.

The Voyager spacecraft each contained three programmable computer systems. These computer systems accepted sets of several thousand instructions that could provide autonomous operation for days or weeks at a time. The three systems were the Attitude and Articulation Control Subsystem (AACS), the Flight Data Subsystem (FDS), and the Computer Command Subsystem (CCS). The FDS system is responsible for the data storage, handling, and collection. This is the system which is responsible for recording Voyager's scientific data to the magnetic tape which is played back to the earth [10]. The AACS is responsible for orientation of the spacecraft. This system controls the alignment of the spacecraft with the earth and points the scientific scan platform to their target. The CCS is the computer in command of the spacecraft. The CCS computer on Voyager was basically the same as the CCS computer aboard Viking. It initiates heartbeat messages to the other computers and handles their response [11]. This heartbeat allows the CCS to detect any anomalies with the other two computers. Voyager also included two new advancements in computer memory technology. One was the use of direct memory access (DMA). This now common feature allowed the computers to access memory with only a minimal use of processor cycles. The processor can continue to process other functions while other systems access memory [12]. The other memory advancement was in the use of higher speed volatile CMOS memory. We now know this memory as common random access memory (RAM). It is fast and uses a small amount of power but once the power is lost the data is destroyed [12]. The increases in speed and efficiency were well used during the capture and relay of the thousands images of the outer planets we have become familiar with.

The advance and commonality in microcomputers allowed the Galileo spacecraft to have many more computer processors. "Finally, computer system complexity is further increased by the number of science experiments on board and the fact that they are largely computer controlled as well. Eight of the nine instruments have microprocessors for control and data handling. These have to communicate with the Command and Data System, itself containing six microprocessors. Attitude and Articulation Control has dual computers, and the probe also contains a dual microprocessor system. In all, Galileo contains 19 microprocessors with about 320K of semiconductor random access memory and 41K of read-only memory [13]." With this many new systems a new controlling subsystem was needed so JPL created the Unified Data System (UDS). This new system would combine advancements in computer technology as well as their experience with the Voyager spacecraft. The UDS system included a hierarchical structure organized into high-level modules and terminal modules. The terminal modules was specific designed for one subsystem of the spacecraft while the high-level modules coordinated and communicated between these modules. This separation of duties allowed the program for each processor to be optimized for its particular usage. Each module operated as its own virtual computer as each had its own processor and memory and each had its own program [14]. In many ways this design is similar to the client-server model which is a common architecture among computer systems today.

Originally the UDS and other systems were to be programmed in a high-level language instead of assembly language which had been used on the Voyager and Viking craft. The standard programming language, HAL, did not work with the processors which had been chosen for Galileo. The processors which had been chosen, the RCA 1802, were the best available processor which could tolerate the rigors of space flight [15]. This processor was used in satellites and military craft but its commercial version had been available to the common market. The consumer version of the RCA 1802 was used in hobby computers and for video games [16][17]. Instead of high-level languages most of Galileo was programmed in assembly but with heavy use of structured macros. Structured macros allow the programmer to define conditional statements and control flow without needing to know the exact memory location of the data. This greatly reduces the complexity of the programming process. One microprocessor used in the scientific experiments was programmed with the high-level language called FORTH [18]. The advancement of programming methods allowed the engineers to concentrate more on the design of the program than the syntax and lower-level functions of the programs themselves. This allowed the engineers to spend more resources on the actual functionality of the computer systems. This functionality allowed more data to be captured, stored, and sent back to earth, thus fulfilling the capabilities of a more capable spacecraft.

Conclusion

The advancement of computer and control systems allowed JPL and NASA to create more capable spacecraft. The progression from hard-wired systems to multi-processors systems has changed the spacecraft from a vehicle which must maintain near constant communication with the earth to systems which may not contact earth for weeks at a time. This progress has seen early systems perform pre-calculated steps which must be completed on earth to computing the the calculations needed to land on surface of a planet autonomously. It has seen use of proprietary single use machines give way to hardened versions of commonly used microcomputers. This commonality allowing the engineers to concentrate more on the functionality of the system than its lower-level functions. The progress in computer technology has created more capable planetary spacecraft.

References

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RAC Comments on ARRL Proposed Changes to US HF Band Plans

ares-admin | 2015/05/28

The American Radio Relay League (ARRL) published proposed changes to the US HF band plan for comment in the April edition of QST. Being proactive, the RAC Band Planning Committee reviewed their proposals for potential impacts on Canadian Amateurs.

Most of the proposed ARRL changes increase the sub-bands allocated to digital operations by extending the existing frequency limits upwards into band segments usually used for phone communications outside the US. While the RAC Band Planning Committee understands and supports the ARRL's goal to provide additional space to accommodate the growth in digital modes, the proposed changes will have unintended consequences. As Canadian phone operations in the 80m and 40m bands take place primarily below the current US phone sub-bands to minimize mutual interference, the effect of the proposed changes would be to reduce the space available to Canadian Amateurs. On 40m and 20m, the proposed changes would also negatively impact DX phone operations throughout the Americas, and the rest of the world.

RAC has formally communicated our concerns to ARRL with the request that they include these concerns in their consideration of any changes to the US sub-bands.

George Gorsline, VE3YV
RAC International Affairs Officer

RAC no longer requesting priority on 14.135, 7.135, 3.675 due to Alberta fires

Geoff | 2015/05/28

Alberta ARES has advised that they no longer need priority access to 14.135, 7.135 and 3.675 MHz and thank everyone for their consideration.

Bill Boskwick, VE4BOZ
RAC Chief Field Services Officer

Upcoming Events

Mississauga Amateur Radio Club; **Saturday and Sunday, June 6/7, 2015**; The special event station will operate from 1400z - 2000z both Saturday and Sunday. The Mississauga Amateur Radio Club operates a special event station at the festival for QSL & certificate collectors. Operating times are 1400 to 2000 UTC on each day. SSB frequencies are 7.230 and 14.240 MHz +/- QRM. Requests for QSL cards to MARC, c/o Michael Brickell, VE3TKI, 2801 Bucklepost Crescent, Mississauga, ON L5N 1X6 Canada, with an SASE.

GARC & KWARC Flea Market; **Sunday, June 7, 2015**; Waterloo Regional Police Association Recreation Centre R.R. 2, 1128 Rife Rd. North Dumfries Township Beside Hwy 401, between Exit 275 (Homer Watson Dr) and Exit 268 (Cedar Creek Rd) We recommend you enter via Exit 268 (County Road 97, Cedar Creek Rd)
Location: 43.345 -80.419; Watch for the signs. Vendors 7am, Tailgaters 8am, Public 9am to 12 noon. General Admission $7 (under 12 free) Vendors: Inside 6' tables $20.00 Includes 1 admission. Additional inside tables $13.00
Tailgater spaces $15.00 Includes 1 admission. Additional Tailgate Pads $8.00. 41 years and still going strong- bringing together ham radio operators, hobbyists and enthusiasts just before Field Day and the summer heat. Indoor tables and tailgating; major vendors, loads of collectibles; free prize draws, tasty refreshments. Easy parking.

London Vintage Radio Club; **Saturday, June 13, 2015;** Guelph Ontario. Event takes place in the east side of the parking lot. Hammond Mfg. address is 394 Edinburgh Rd. North, Guelph (at corner of Speedvale and Edinburgh). 7AM for public and vendors alike. $10.00 for vendors, no charge to public. This flea market is an annual club event, held outdoors at the Hammond Manufacturing Ltd parking lot in Guelph. Bring your own table. You will find antique and vintage radios,
ham / amateur radio equipment, tubes, radio collectables parts, magazines and all sorts of radio goodies for sale, trade etc. The club has over 150 members.

Burlington Amateur Radio Club Flea Market; **Saturday, July 11, 2015**; Milton, Ontario. Opening times: 07:00 Inside & Commercial Vendors; Robert St Gate 08:00 Tailgate Vendors; Robert St Gate 09:00 General Admission; Thomas St Gate ONLY. General Admission: $7.00; Tables: $14.00 each; Tailgate Permit: $7.00 per space. SPECIAL GUEST - Greg Jurrens (K5GJ) VICE PRESIDENT, SALES & BUSINESS DEVELOPMENT FlexRadio Systems Courtesy of RadioWorld.ca

London Amateur Radio Club Inc. Flea Market; Sunday, September 20, 2015; London, Ontario; HELLENIC COMMUNITY CENTRE. 133 Southdale Rd.W. Coming from the East on Hwy 401, exit onto Wellington Rd. and go North until Southdale Rd. Go east until Notre Dame Dr., turn right into entrance of Hellenic Centre; 9am - 12pm; Admission- $8
Tables **-** $15 first one $10 for each extra one; VA3LON, 147,060 PL 114.8

The Hamilton Amateur Radio Club Flea Market; Saturday, October 3, 2015; Located in the School Fair Building at the Ancaster Fair Grounds 630 Trinity Road, Ancaster, the south-west corner of highways #52 and #53, just west of Ancaster; General Admission: Doors open at 9:00 a.m.; Vendor access : After 7:00 a.m.; General Admission: $7.00 per person
Vendor Tables: $12.00 per table; Talk-in 146.76 (-) with tone 131.8 VE3NCF Parking on site.

DX News

As already announced Da Nang city-Vietnam will be the next destination of the Mediterraneo International Dx ClubTeam and so it will be soon on air any mode/any band. With the call-sign: **3W3MD**. Antonio, IZ8CCW the leader and the co-leader Gabriele, I2VGW will share this new adventure with 24 dxoperators coming from 9 Countries
Save the dates because from **October 31 to November 10** , they will be on air from the beach of Da Nang. According to the evaluations that they have done, they are confident to give to a lot of dxers the possibility to work this Country in the Low bands, Warc and especially in the Digital modes. Any donation will be very very appreciated by the team. For any further news and updates please visit the official web site of this new great adventure 3W3MD

For Sale / Swap / Free

The intention of this section of the bulletin is to provide a space where **members** can advertise items of a ham related nature to other members of the club. It is not intended as competition to the many on air and internet based swap shops.

For Sale: New copy of Windows Home Premium 64 bit. Never registered. Currently selling for $110 + tx. Substantially reduced price for club members. Tom VE3MAH

Free: Kodak Digital Camera. Easyshare DX6340. All original accessories. Cary case also available. Tom VE3MAH

For Sale: 440 ohm Ladder line. About 66 feet available – enough for 2 G5RV's. Price is ½ Maple Leafs advertised price. $.30/foot. Tom VE3MAH

Real Swap Sites:

KWARC Swap Shop -- one of the best around. http://www.kwarc.org/swapshop/index.htm

Maritime Swap Shop -- http://www.ve1pjs.com/swapshop.html

ONTARS Marketplace -- http://www.ontars.com/cgi-bin/classifieds/classifieds.cgi?session_key=&search_and_display_db_button=on&results_format=headlines&query=browse

Membership / Information update form: Membership in the Cambridge Amateur Radio Club is $20 per calendar year. Please help the Treasurer by printing this page, filling in your information and giving it to him. If mailing, please use the address listed.

Cambridge Amateur Radio Club
% Hugh Martin
310-400 Champlain Blvd.
Cambridge, Ontario
N1R 7J6

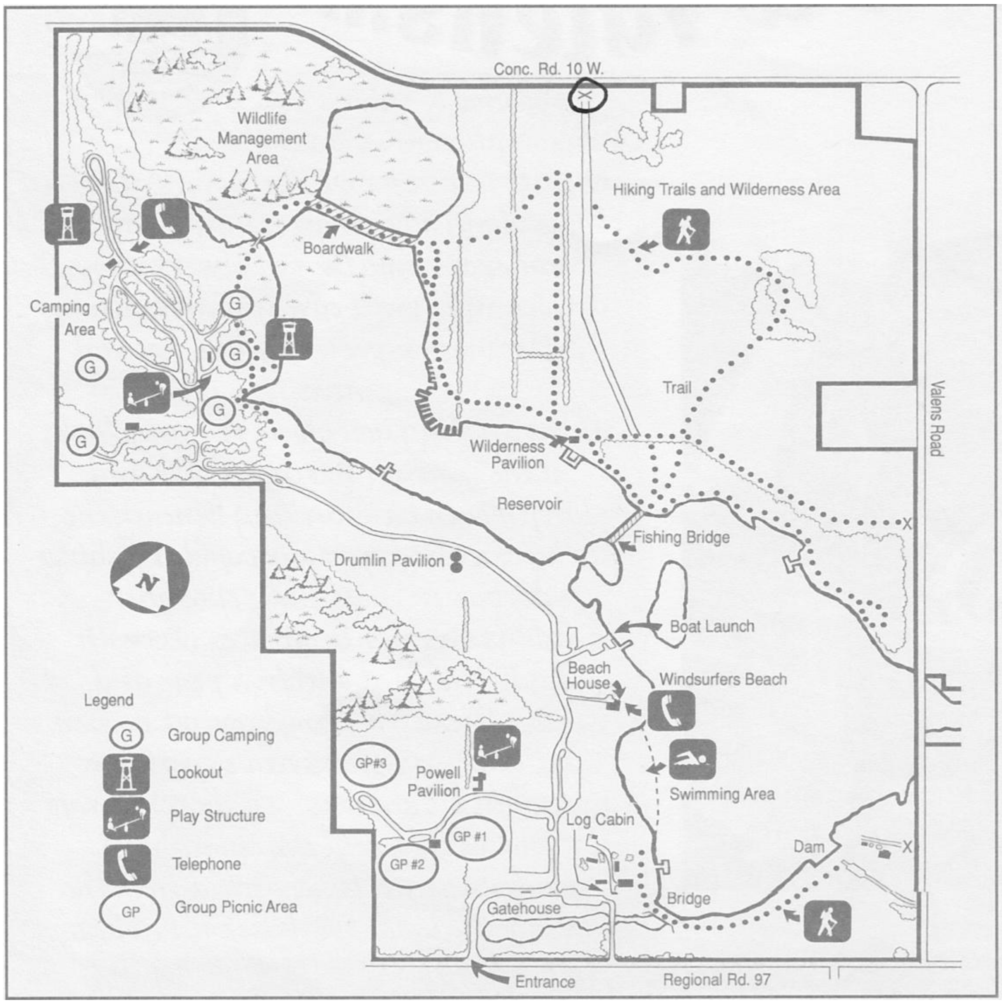
***First Name: ________________ *Last Name: ____________________ * Call Sign: _________**

***Address: ____**

***Email Address: ________________________________ Telephone Number: ______________**

Full membership $20 ☐ Renewal ☐ New Member Associate member $5 ☐ Renewal ☐ New

*required – your information will not be shared with third parties.



Conc. Rd. 10 W.
Wildlife
Management
Area
Hiking Trails and Wilderness Area
Boardwalk
Camping
Area
Trail
Valens Road
Wilderness
Pavilion
Reservoir
Fishing Bridge
Drumlin Pavilion
Boat Launch
Beach
House
Windsurfers Beach
Legend
Group Camping
Lookout
Play Structure
Telephone
Group Picnic Area
GP#3
Powell
Pavilion
Swimming Area
Log Cabin
GP #1
GP #2
Dam
Bridge
Gatehouse
Entrance
Regional Rd. 97