The University of Michigan
Amateur Radio Club
(UM-ARC)

IEEE Information Session
March 13, 2007
Today I’ll answer some questions:

• What is Amateur Radio? (a.k.a. “ham radio”)
  – A little history
  – Activities (so many to choose from!)
  – Do I need a license?

• What does the UM Amateur Radio Club do?
  – Operate an HF/VHF/UHF/+++ station (W8UM)
  – Help others get involved in amateur radio
    • License classes!
  – Club activities/projects
  – Public service

• How can I get involved?
What is Amateur Radio?

• Amateur Radio is also called “ham radio” and amateur radio operators called “hams”
  – Technical and non-technical people, every walk of life!
• Hams have a few things in common
  – Fascination with radio and communication – the magic of radio!
  – Interested in tinkering with electronics, radios, antennas
  – A very social group of folks, many just love to talk!
• Hams have an illustrious history at Michigan
  – Amateur radio has been around almost since the discovery of radio itself – ARRL began 1914, trans-Atlantic contact 1922
  – Many pioneers in science and engineering are amateur radio operators (notably our own Prof. Tony England WØORE and John Kraus W8JK)
  – UM-ARC – 1913, 8XA
Another Bit of History

- 1928 Byrd Expedition
- Lusitania sinking
- Contesting

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**U. S. ARMY FIELD MESSAGE**

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<tr>
<th>TIME FIELD</th>
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From
At
Date Nov. 21 Hour 10:00 No. 1
To Prof. Hobbs

Kindly have KDKA handle our messages with Byrd's traffic rather than long wave stations STOP We are able to get KDKA short wave but no other stations STOP Coldest here 3 degrees below STOP Everything O.K.

Carlson & Schneider

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**College Competition -- Impending Disaster**

BY ALBERT KAHN, W4FW, ex-W6IBM

At all started pretty innocently, I think. Probably, a couple of hot operators got W6IBM, the University of Michigan's station, wound up for the DX contest. Everything was right and it turned out to be a smash.

Last year W6IBM was first in line for just about everything. They just sat there milking the roll like DX themselves. They were even working 96 as if it were the SS contest.

This stellar performance at a great university is fine. It is gratifying to see colleges enjoy ham competitions. Up to a point, that is. But what does this portend?

How does a loyal W6IBM alumna feel when he learns the so-so score of W4YF? Does he hang his head in shame when he meets a Michigan colleague? Perhaps, holding back his tears, he pretends that it is just a game and unimportant.

What is the reaction of a Purdue alumnus when he compares the score of W9YJB to UM's Anger? Humiliation? Need of revenge? Probably all three.

Are the Michigan graduates generous in their victory? Do they say, "Just a bit of luck, you'll do better next year?" Probably not, a lesson learned from football that remarks like this usually come true.

W4YF can't be expected to dominate college competition year after year any more than Minnesota could in football a few decades ago. Alumni pressure will mount. Students will organize protests. Station trustees will be hung in effigy.

Soon there will be recruiting, ham-radio scholarships, ham training tables, red-shirted and regional conferences. The Novice Round-up high scores, still in high school, will be visited by the ham-radio coaches.

Final drives for phonies, new stations and expanded staff will be under way by the 3000 colleges. Ham will become the Big Man on Campus. Letters will be burned, courses given in Amateur Radio Psychology. Then there will be no advanced degree MAG, Masters in Amateur Contesting.

All of this frenzied competition will quickly lead to expanded publicity, what with 3000 public relations offices feeding news releases to the press, radio and TV.

The weekly competition between contesters will fill the sport pages. Box scores will appear in all the papers. Statistics will be published. W9YJB, they say, has had 74.8% of its Qs answered. On 7 Ms, W9YJB has worked 92.7% of all stations called, all bands. W4FW has had an average DST signal report of 4.961 - 7.133 - 9 compared with 4.758 - 7.168 - 9 last year, same period. Nice increase, especially the LT.

Radio and TV coverage of the final hours of the major contests will preempt the regular programs. Sponsored, perhaps, by No-Dj. The courses will switch from one high score to another as they fight for time in the closing minutes. The excitement will be dimmed somewhat by the computer forecast made during the first three minutes of the contest.

Then, inevitably, on professional ham radio, the greatest spectator sport of all, Amateur amateurs and professional amateurs. Bowl contests.

Let's stamp out college ham radio before it is too late!

**SWITCH TO SAFETY!**

August 1969
Amateur Radio Activities

• Radio communication using a wide variety of “modes”
  – Voice (called “telephony”)
  – Digital (using computers with a radio “link”)
  – Morse code (many reasons hams still use code!)
  – Television (“slow-scan” and “fast-scan”)
  – Many other specialized sub-categories

• …And frequencies!
  – Amateur Radio is allowed on a wide range of radio frequencies from just above the AM broadcast frequencies (1.8 MHz) to light!
    • HF (“high frequency”) or “shortwave” very popular, useful for long-range communications, in fact all over the world!
    • VHF/UHF for local communications (with interesting exceptions)
    • Microwave (above 1 GHz) for local and satellite communications, radio “links”, experimentation
  – This also leads to a wide variety of equipment to use!
US Amateur Radio Bands

US AMATEUR POWER LIMITS
At all times, transmitter power should be kept down to that necessary to carry out the desired communications. Power is rated in watts PEP output. Except where noted, the maximum power output is 1500 Watts.

Effective Date
February 23, 2007

KEY
Note: CW operation is permitted throughout all amateur bands except 60 meters. ICW is authorized above 52.1 MHz, except for 216-220 MHz. Test transmissions are authorized above 51 MHz, except for 74-76 MHz.

- RTTY and data
- = Phone and image
- = CW only
- = SSB phone
- = USB phone only
- = Fixed digital message forwarding systems only

F = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See ARRL Web at www.arrl.org for more detailed band plans.

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160 Meters (1.8 MHz)
Avoid interference to radiolocation operations from 1900 to 2000 kHz

1800
1900
2000

E, A, G

30 Meters (10.1 MHz)
Avoid interference to fixed services outside the US.

10,100
10,150

E, A, G

140,000
144,000

2 Meters (144 MHz)

144.1

E, A, G, T

125 Meters (222 MHz)

219.0
220.0
222.0
225.0

E, A, G, T
N (5 Watts)

60 Meters (5.3 MHz) USB only

5320.5
5346.5
5368.5
5371.5
5403.5 kHz

General, Advanced, and Amateur Extra licensees may use the following five channels on a secondary basis with a maximum effective radiated power of 50 W PEP relative to a half wave dipole. Only upper sideband suppressed carrier voice transmissions may be used. The frequencies are 5330.5, 5346.5, 5368.5, 5371.5, and 5403.5 kHz. The occupied bandwidth is limited to 2.8 kHz centered on 5332, 5348, 5368, 5373, and 5405 kHz, respectively.

60 Meters (5.3 MHz) LSB only

5330.5
5346.5
5368.5
5371.5
5403.5 kHz

General, Advanced, and Amateur Extra licensees may use the following five channels on a secondary basis with a maximum effective radiated power of 50 W PEP relative to a half wave dipole. Only lower sideband suppressed carrier voice transmissions may be used. The frequencies are 5330.5, 5346.5, 5368.5, 5371.5, and 5403.5 kHz. The occupied bandwidth is limited to 2.8 kHz centered on 5332, 5348, 5368, 5373, and 5405 kHz, respectively.

17 Meters (18 MHz)

18,068
18,110
18,168 kHz

E, A, G

15 Meters (21 MHz)

21,000
21,200
21,460 kHz

21,025
21,225
21,275 kHz

E, A, G

70 cm (420 MHz)*

420.0
450.0 kHz

E, A, G, T

33 cm (902 MHz)*

902.0
928.0 kHz

E, A, G, T

10 Meters (28 MHz)

28,000
28,300
29,700 kHz

28,000
28,500

E, A, G

N (5 Watts)

12 Meters (24 MHz)

24,590
24,930
24,990 kHz

12,000
12,600

E, A, G

N (5 Watts)

1205 kHz

All licensees except Novices are authorized all modes on the following frequencies:

2390-2310 MHz  10.0-10.5 GHz
2390-2450 MHz  24.0-24.5 GHz
3300-3500 MHz  34-34 GHz
3550-3850 MHz  34.5-35 GHz
5650-5925 MHz  76.0-81.0 GHz

Phone and image modes are permitted between 7075 and 7100 kHz for FCC licensed stations in ITU Regions 1 and 3, and by FCC licensed stations in ITU Region 2 west of 130 degree West longitude or south of 20 degrees North latitude. See Sections 97.305(c) and 97.307(d)(11). Novice and Technician licensees outside ITU Region 2 may use CW only between 7025 and 7075 kHz. See Section 97.301(a). These exceptions do not apply to stations in the continental US.
Amateur Radio Activities

• Building radio equipment and antennas
  – Many hams still build all of their radio receivers, transmitters, and other station hardware!
    • Either “from scratch” or kits
  – Great resources available for learning about radio and electronics (see the ARRL handbook in the UM library!)
  – Most use commercially made, state-of-the-art equipment, but know a lot more than just how to push buttons
  – Antenna design and construction is a fascinating part of radio communication and could be a whole hobby (or career!) in itself
Amateur Radio Activities, cont’d

- Contests, Awards, and Special Events
  - Hams compete in contests to make as many contacts as possible
  - Awards such “Worked All States” and “chasing DX”
  - Special event stations commemorating a historical event

- Specialized and Advanced Activities
  - Satellite communications (amateur satellites, shuttle, ISS)
  - Microwave (very high frequency) experimentation
  - “Moonbounce” (Moon as a satellite!)
  - Radio design and construction

- Public Service—A tradition in amateur radio
  - Provide emergency communications (natural disasters, civil defense and homeland security)
  - Public event communications (races, parades, etc.)
  - Military-affiliated services
Amateur Radio Activities, cont’d

• What Amateur Radio is not
  – Broadcasting
    • Amateur radio uses **two-way** communication
    • Still, many hams enjoy *listening* to international shortwave broadcasts
  – “CB” (non-licensed, limited radio service)
    • “CB” is informal, at times bordering on “R”-rated!
    • In contrast, ham radio is quite “gentlemanly” and hams abide by on-the-air operating practices established over many years
    • “CB” operates on a narrow band of frequencies around 27 MHz
    • Amateurs have frequency allocations (called “bands” of frequencies) from 1.8 MHz to 20 GHz and beyond!
Do I need a License?

• Yes and No!
  – You DO NOT need a license to build equipment and antennas or receive amateur radio signals
  – You DO need a license in order to transmit (send signals) on any amateur radio frequency

• We encourage everyone in the club to get their amateur radio operator’s license (a.k.a. “ticket”)!  
  – Enjoy all the benefits of amateur radio  
  – It is not difficult, it just takes a little time to study  
  – “Do I need to learn Morse code to get my license?” – NO, not as of February 23rd
What does the UM Club do?

• History
  – The second oldest amateur radio club in the US (1913)
  – Club station had been on central campus until late 1990s
  – Over the last 3 years, club activity has been renewed and station moved to N. campus (EECS building)
  – Now a SSO – Student Sponsored Organization

• Purpose: Promote Amateur Radio at U of M
  – Club station W8UM
  – FCC amateur radio license classes
  – Support for soon-to-be or new hams
  – Social and technical activities for members

• Club activities
  – Radio building workshops
  – Antenna parties
  – Contests and Special Events (Collegiate QSO Party, Field Day)
The Club Station W8UM

- **Equipment**
  - Ten-Tec Omni VI HF transceiver
  - Heathkit SB-220 2 kW HF amplifier
  - Icom IC-910H satellite transceiver
  - Icom IC-2100 2m transceiver

- **Antennas (atop the EECS building)**
  - 80m/40m dipole
  - Vertical 20-40m
  - Discone for above 50 MHz
  - Rotatable 2m/70cm yagis for satellite work

- **Future plans**
  - Roof-mounted tower
  - Rotatable arrays for 40m and above, 2m/70cm terrestrial work
How do I join?

• Join the club!
  – Fill out the membership application (online also)
  – Come to Meetings (1st Monday of the Month)
  – $20 membership fee
    • Maintain and purchase equipment and supplies
  – Talk to Richard KD8APA (rtfrench@umich.edu)

• Get your FCC Amateur Radio License
  – Code requirement dropped as of Feb. 23rd!
  – Monthly exams here in Ann Arbor

• Get involved in club business and activities
  – The club is experiencing a major resurgence right now!
  – Get involved now and really make your mark on a great University tradition
  – Club activities will follow member’s interests—tell us what activities you would like the club to offer!
How do I get more info?

• Want more information on Amateur Radio?
  – Club website www.umich.edu/~umarc
  – www.arrl.org and www.eham.com (many others)
  – QST and CQ magazines
  – ARRL handbook (in library)

QUESTIONS?