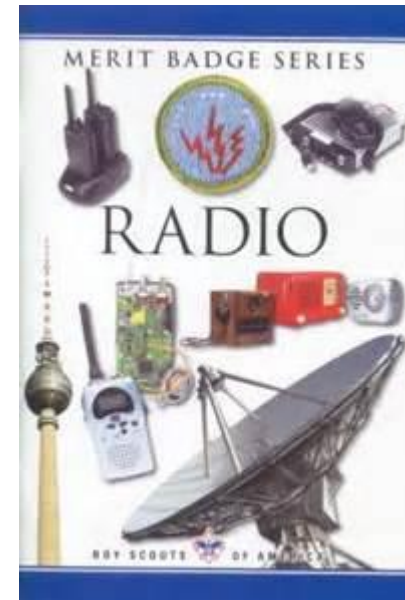




Radio Uses in Scouting

- A Course Plan developed to support STEM related Electronics and Radio Merit Badges which are in the NOVA awards group for scouts.
- A High-Tech Amateur Handheld was applied to Troop activities and applications in several troops.
- Both activities support Scouts understanding and using Amateur radio in Scouting and their personal growth in STEM.





How Radio can be used in Scouting!!!



- **Safety** – Radio communications will help reduce accidents. Potential hazards and safety concerns that crop up; can be communicated to troops immediately over line of sight distances or greater.
- **Improve Management of Troops on the move**– Radio will reinforce the scout leadership allowing more independence while leaders can monitor. SPL calls the shots and PL take action; the patrol method.
- **Career Tool** – Radio skills will help teach and maintain Scouts' interest in STEM skills they can use in military, education and other career plans.
- **Radio will reinforce other Scout skills** – Example: Emergency Preparedness, Map and Compass, Search and Rescue and Basic communication skills of groups.
- **Scouts to develop ability and skills in radio** to establish Radio communications anywhere under all conditions.
- Radio can be used by Scouts like Swiss army knife in their applications.

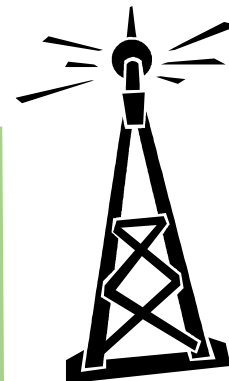




- All youth are welcome; not just scouts
- Scouts can earn Radio, Electronic and about ½ of their Electricity merit badges if they apply themselves
- Learn soldering and radio talk techniques
- Kids build their own Morse code practice oscillator
- Optional FCC exam session at the end



BSA Radio & Electronics Merit Badge Course with FCC Amateur Radio license exam

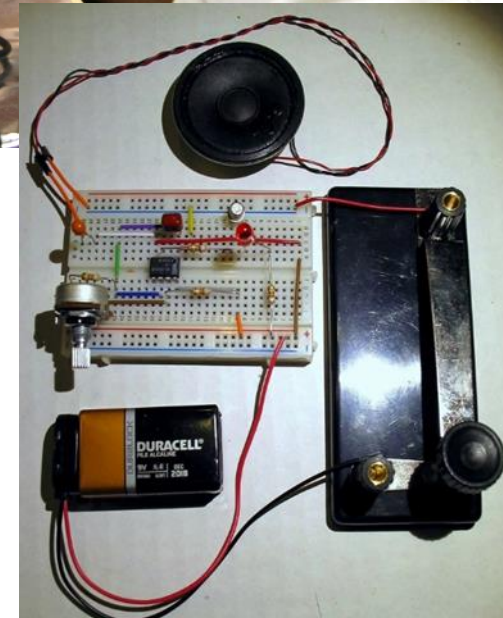
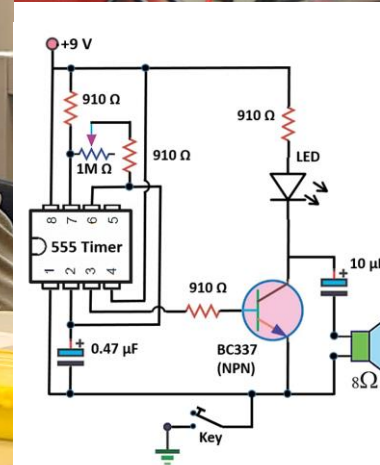
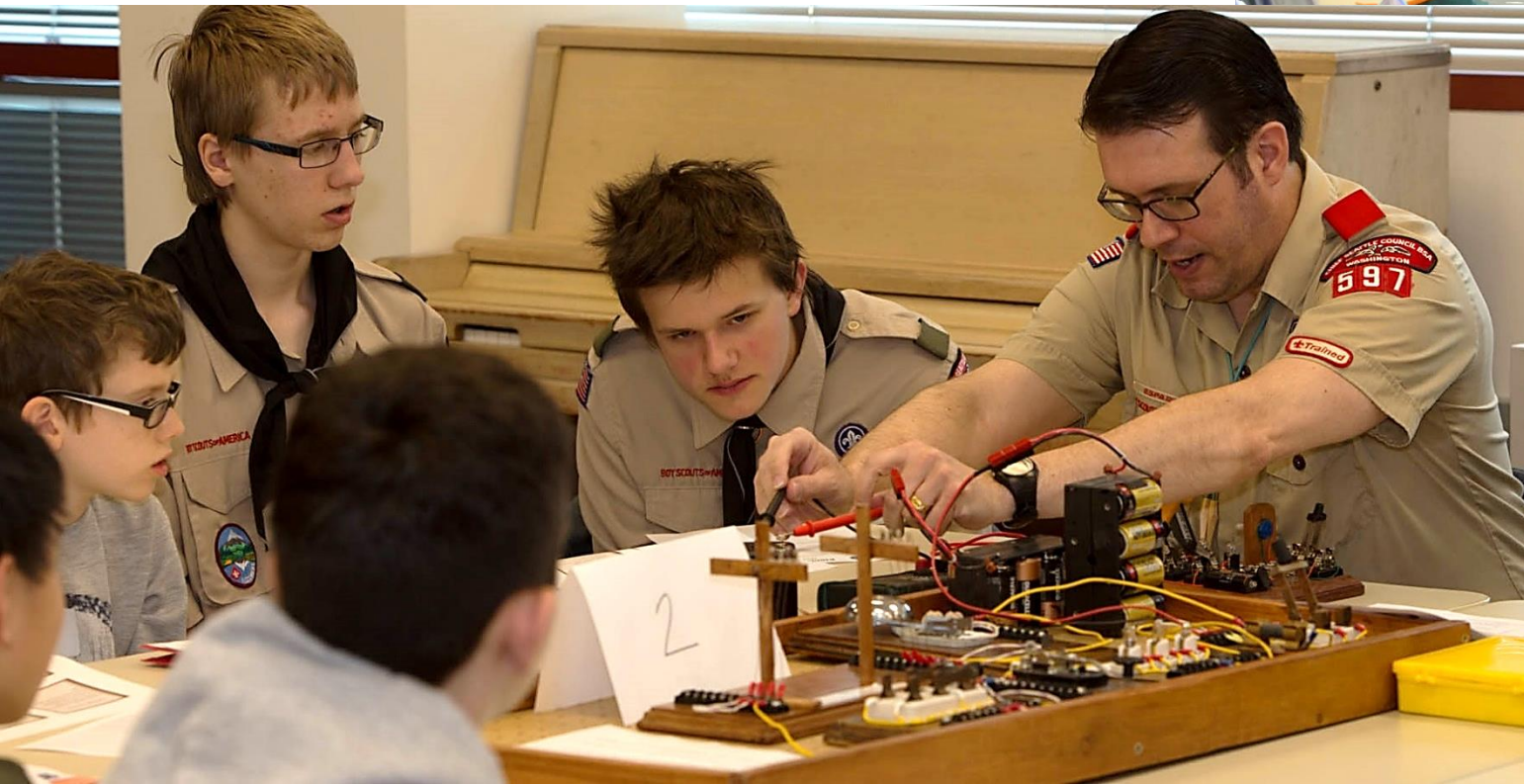
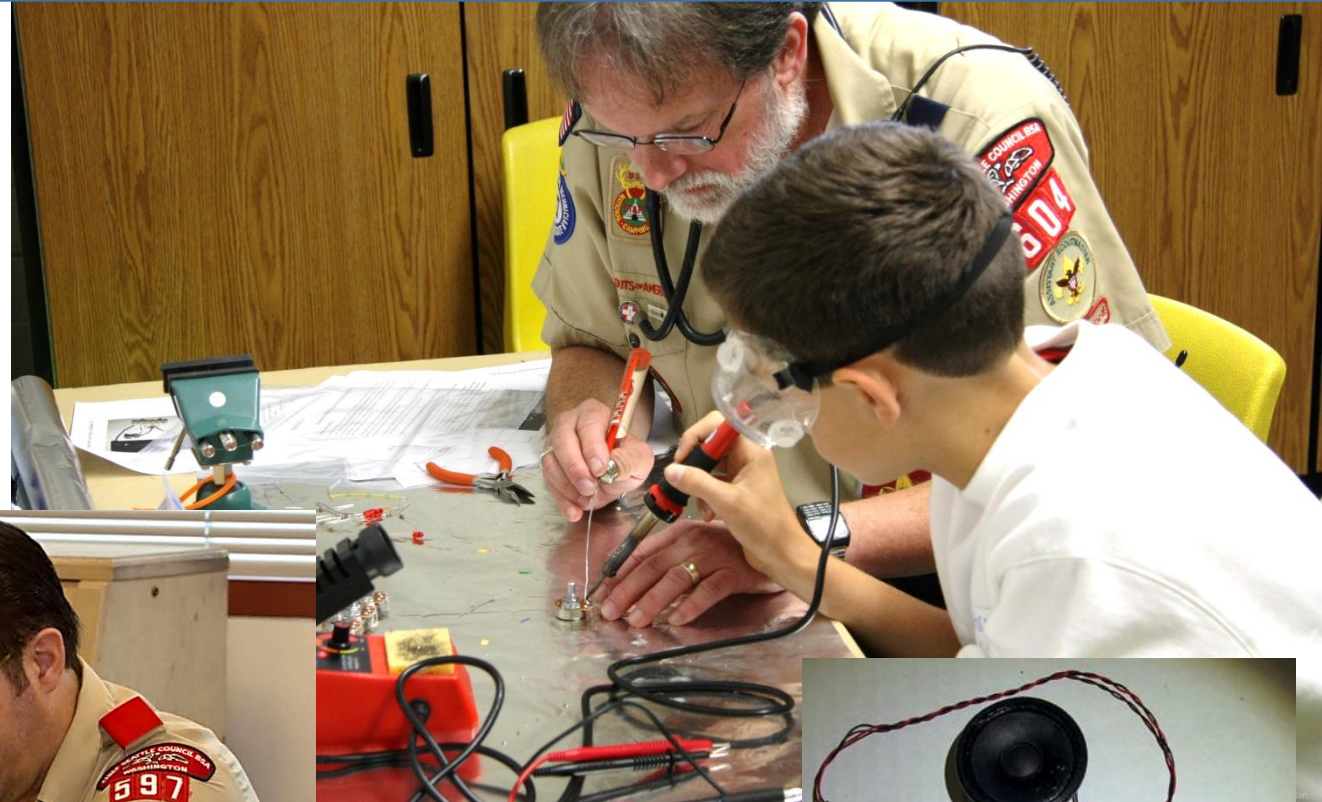


April 26, 2014 9am – 5pm
7720 126th Ave NE, Kirkland



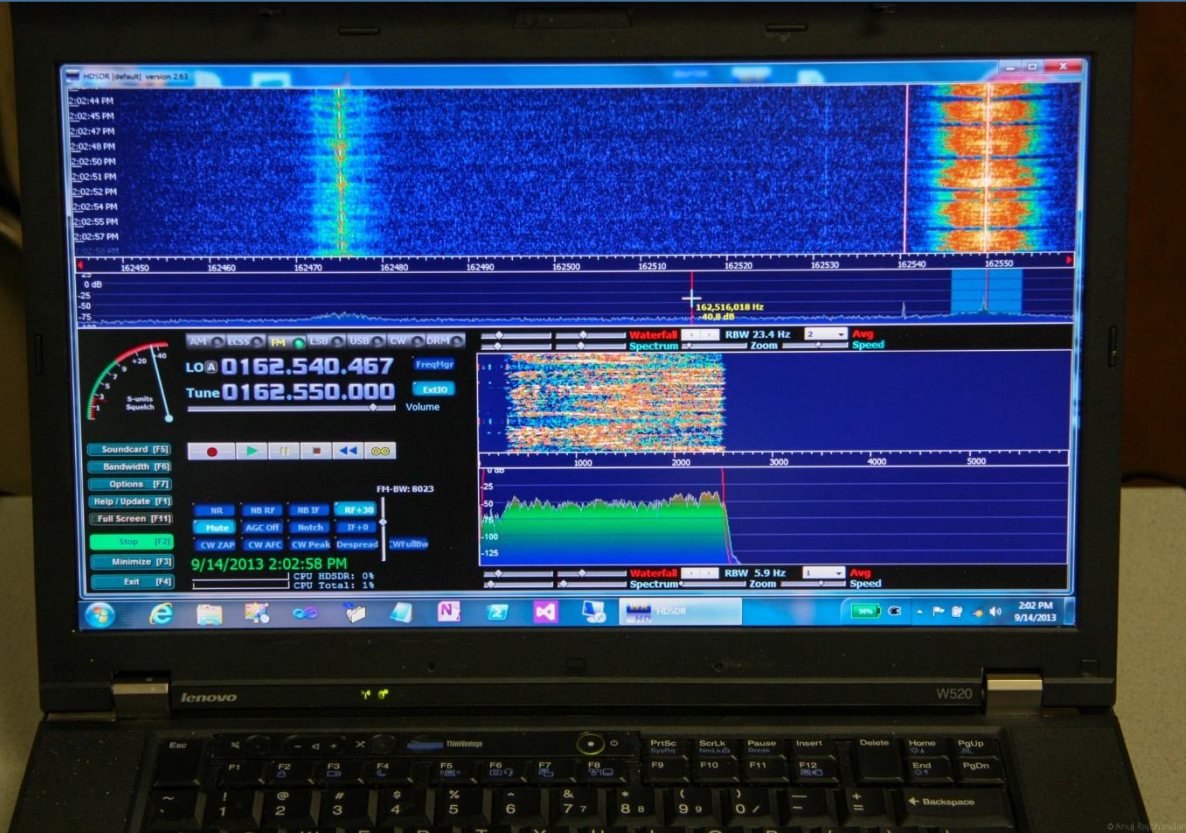
Help us teach kids ham radio!

Kits are a great learning tool



Help us teach kids ham radio!

Explaining 'modes' using SDR!



Also can be set to explain
radio operations

Help us teach kids ham radio!

At the end of the day we have an optional FCC exam session for adults, kids and walk-ins

- The cost for the exam is bundled into each kid's registration so it is no additional cost to them to try for their license
- We run through ~40–60 adults and kids
- Using two or three VE team

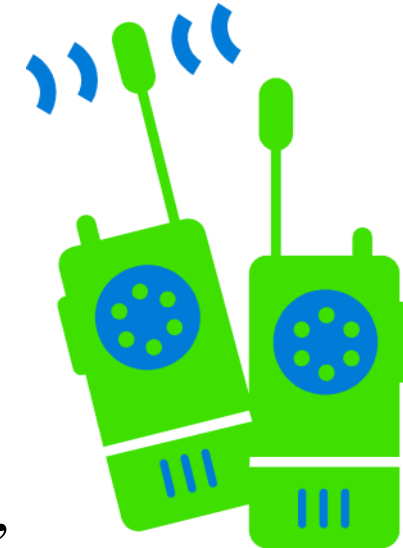




High-Tech Amateur Handheld offers Scout Applications on board the Radio.

IC 31A was used in two troops.

- The IC31 has just one band, 0.7 meters but with analog and digital.
- Scouts use mostly Simplex; but, Duplex is available.
- Apps investigated were:
 - Digital Data,
 - Search for local repeaters with GPS
 - Latitude & Longitude, APRS
 - GPS screens, Back tracking, Station to station bearing,
 - Dongle used tie to Reflectors, IRLP on analog repeaters,
 - SD recording of messages, Band Scope, Vox
 - DRats.



***IC 31A ties scouts to skills, STEM and
World wide communication***

Radio Power management



Here is the DEAL!!! Balance usage to charge and be ever-fresh

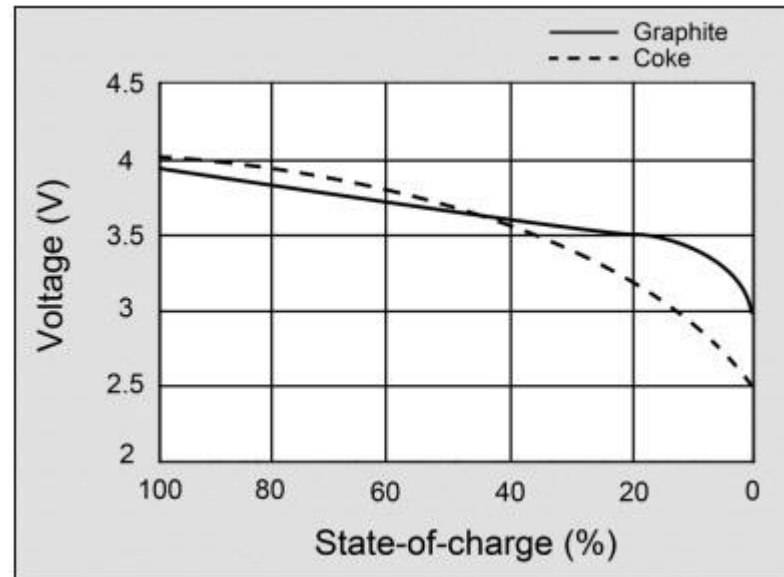
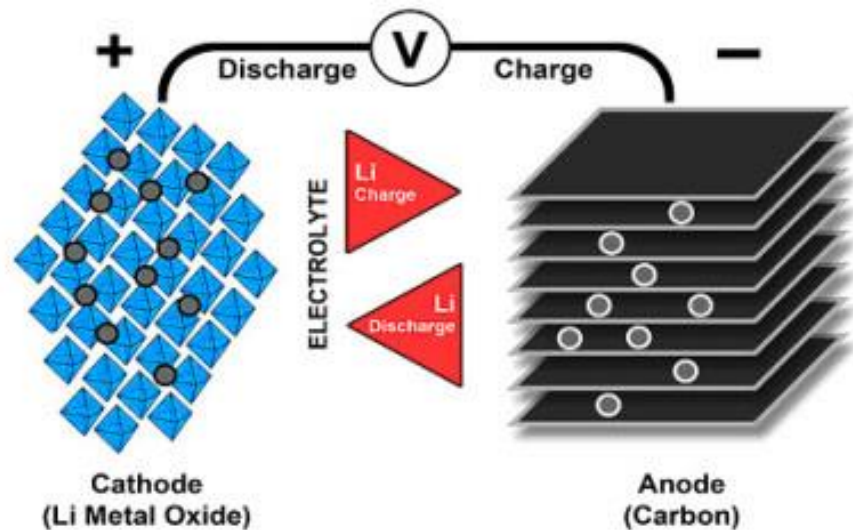


Scout's Radio systems need an **ever-fresh source** of battery power that matches or exceeds usage. This will require usage planning, conservation and technical understanding of energy generation.



How Li Batteries Work?

Power management Studies support STEM



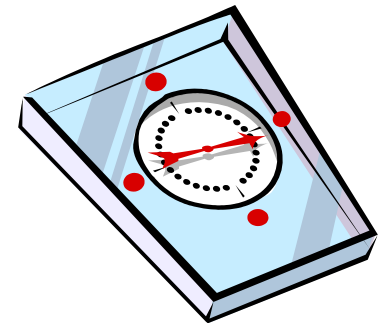
- Single cell working range voltage Li 4.2v to 2.65v
- Don't charge cell above and work battery below
- Higher voltage of charger is the charging force
- Circuit should do this automatically



Map and Compass

GPS works with Magnetic compass

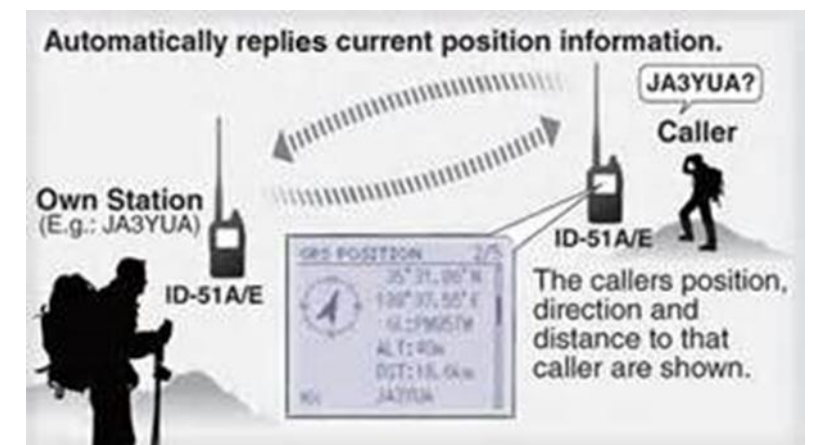
IC 31a radio keeps all in touch



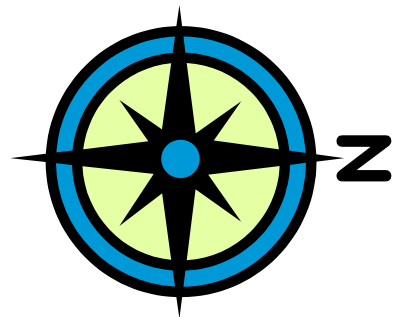
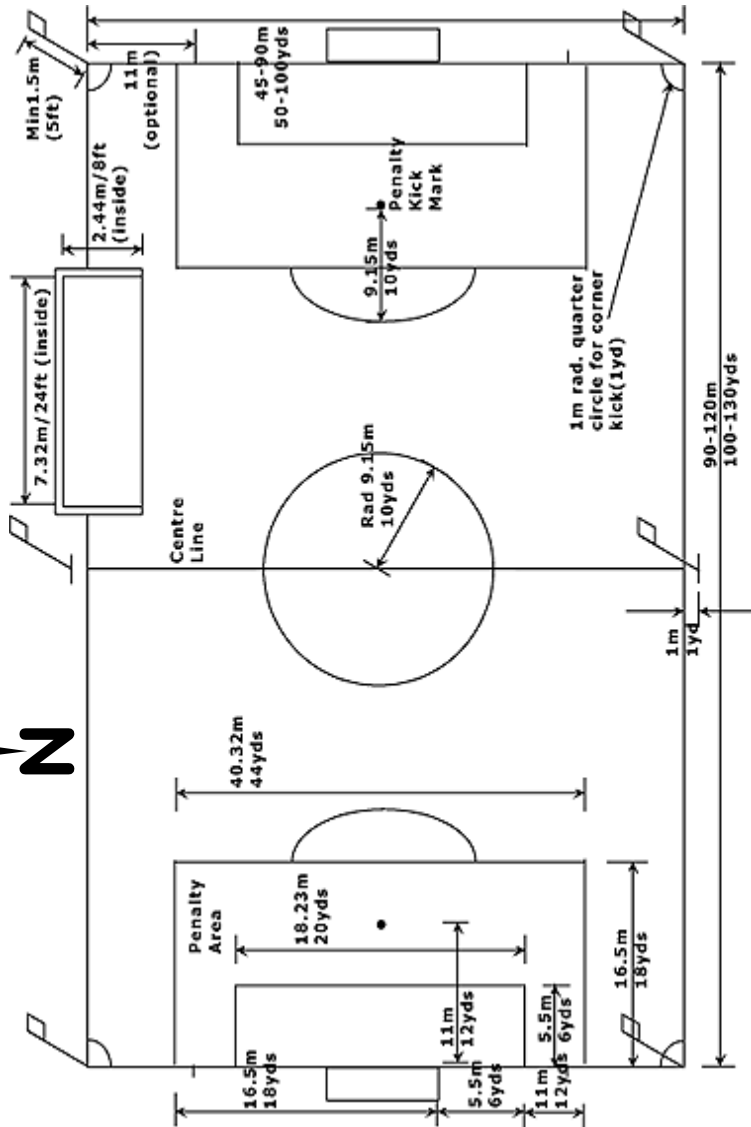
GPS is on Board the IC 31A



- GPS very sensitive and displays: Number of satellites altitude, and Latitude and Longitude.
- Three GPS Screens
 - First presents present position and location.
 - Second shows distance and bearing from each other as you are in contact.
 - Third shows position from known location—like start point
 - Exact Path can be tracked with APRS feature
 - Lots of games using Magnetic compass with maps and GPS



Soccer field Game with Magnetic Compass and GPS



Game can use Compass or GPS. Patrols receive bearing and distance to move by radio.
Each Patrol reviews moves on SD card

1. Soccer Field 100 yds by 50 Yds; Scale line 40 feet / inch scale; Draw on 8 ½ x 11
2. Add Scale line and compass; Print and orientate.
3. Scouts Establish Pace and Orientate map North
4. Patrol 1 Start NE corner Bearing 315 deg. 75 ft;
5. Patrol 2 Start NW corner Bearing 135 deg. 75 ft
6. Patrol 3 Start SW corner Bearing 45 deg 75 ft
7. Patrol 4 Start SE corner Bearing 315 drg. 75 ft
8. Include second step as bearing and sin function for distance.
9. Link 3 will be supplied by radio.
10. Questions by radio to PL APL
11. Show last as bearing and distance for field center.
12. Win on time and finish point
13. Run field twice with Mag compass and GPS..
14. Record time to complete.

High-Tech Radio Applications tested

- DVaps and the Raspberry tie the IC31A World Wide via Wireless
- VOX, GPS with Dstar is fun application on the Bike or boat
- DRats ties in the tablet / laptop via simplex or repeater or internet and makes a great Digital Data system for troop meetings and events.



Summary



- Amateur Radio Supports the Troop's Patrol Method
- Amateur Radio Supports Scout Skills
- Amateur Radio Helps Keep Scouts in Chemistry, Physics, Engineering, and Applied Math

ARRL Give them a Hand
Keep them in the game



Results and Conclusion

- Electronic and Radio Merit Badge courses can be an effective tool for stimulating interest in Science, Amateur Radio and demonstrating knowledge and some of the skills needed for becoming a licensed Amateur Radio Operator.
- IC 31A, High-Tech Handheld, offers a lot to support the Scout's development of Scout skills and the chance to apply Science, Technology, Engineering and applied Mathematics.
- ARRL clubs and HAMs need establish long term youth relationships, be innovated and patiently supportive of youth, clubs and troops for them to gain the benefits of Amateur Radio.
- Radio should be embraced by Scouts as a required skill like the square knot---ARRL can help

Key Team Members

- **Phil Sohn, K7APS**, Assist. SM, Woodinville ARES, Lake Washington Ham Club
- **Dave Wickert, AE7TD**, Merit Badge Counselor, MicroHams, Lake Washington Ham Club, Woodinville ARES Advisor
- **Eric Jarvi, AD7F**, Assist. SM, Lake Washington Ham Club, MicroHams
- **Tim Myers, KK7TM**, Merit Badge Counselor, MicroHams officer, Lake Washington Ham Club
- **Horace Hamby, N7DRW**, Former Scoutmaster, Present Merit Badge Counselor, Lake Washington Ham Club Secretary, Woodinville ARES Advisor
- **Ed Morin, WB7UBD**, Kit Designer, Lake Washington Ham Club
- Many Thanks to the 30 to 50 plus Hams the helped as Learning Coaches, VEs, JOTA coaches from multiple organizations.