K7EAR
February 2012

EAARS open repeaters. PL is 141.3 unless noted otherwise

Helio 146.860 and 440.700 EAARS Network, 146.900, 447.825 w/ closed remote PL 100.0

or 141.3. Packet 145.010 **MT. Lemmon** 147.160 EAARS Network **Pinal Peak** 145.41

EAARS Network **Guthrie Peak** 147.28 EAARS Network **South Mountain, Alpine**

145.27 EAARS Network **Greens Peak** 146.70 Eaars Network **Jacks Peak, NM**

145.21 EAARS Network **Mule MTN** 147.08 EAARS Network

GMRS Repeater on Helio 462.625 PL 123.0

Website HTTP://WWW.EAARS.COM

Election Results

We retained the same officers except the president is now Dave N7AM and the net manager is Grace KB7CSE

Next Meeting

Tuesday March 20th the first day of spring. Arrive at 6:30 PM, meeting stats at 7 PM. I plan to have a short movie before the meeting.

Repeater Status

Pinal is a little erratic on receive sometimes it seems to hear good, sometimes not at all. Not sure the mountain is accessible without a snow cat so it will remain the same until the guys can get there

EAARS Net

If you would like to be a net control operator occasionally contact Grace KB7CSE

Control operators for the EAARS Net

KE7EDP February 5th and March 4th

Pink K7ILA February 12th and March 11th

Richard N7DZH February 19th and March 18th

Grace KB7CSE February 26th and March 25th

Newsletter

I will continue to do the newsletter until we can find a volunteer to take it over. I will work with anyone

WHAT IS ATV?
Presented by Amateur Television Network (www.atn-tv.org)

SECTIONS

SECTIONS

Section 1: What is ATV?

Amateur Television (ATV) is divided into two primary types: Slow Scan - a system used on the HF bands occupying the audio bandwidth of an amateur station to transmit a few still pictures per minute to another station usually over long distances and Fast Scan - a system of sending broadcast quality full motion pictures over shorter distances on the UHF and microwave bands.

In this presentation we will examine the Fast Scan version of ATV. Back in the late 1940's hams in many parts of the country helped develop commercial television. The old Amateur 5 meter band was used for this mission. They were very helpful evaluating

reception of different system types and many engineers were also hams using their vast technical knowledge for television development. The hams - being hams - decided to build their own stations.

In the early days it was home brew or converted war surplus UHF equipment.

By the 1960s home brew and converted UHF two-way radios were used. By the 1970s technology changes were afoot with modulator and downconverter kits and completed boards followed a few years later by a complete ATV station in a box were available from PC Electronics and other manufacturers. By the mid 1970s Metrovision in Washington DC was the group that had built and licensed the first ATV repeater in America. By 1979 WA6SVT had built the first wide coverage repeater in California on top of Mt Wilson. Over the years a group called Amateur TV Network (ATN) was formed to support the repeater and many more repeaters soon followed. ATN now has six state chapters across the country.

Today it is easier than ever to get on the air with ATV for less than $700 for all new equipment and less than $100 for the builder. The oldest and most widely used mode of ATV is AM and a related modulation - Vestigial Sideband (VSB). A cable ready TV set can directly pick up ATV on the 420 MHz band. A downconverter is needed for the higher bands. Your camcorder can be used for your ATV camera. All that is needed is a transmitter and antenna and you are on the air!

FM ATV is one of the fastest growing modes of ATV. FM ATV uses 4 MHz deviation (the terrestrial commercial TV standard used for studio to transmitter links and ENG) in the 0.9, 1.2, 2.4 GHz and higher bands. A few ATVers use the satellite (TVRO) standard of 11 MHz on the 3.3 GHz and higher microwave bands. FM ATV using converted part 15 TV room to room links - such as the WAVECOM units - is available from ATV vendors. FM ATV is the preferred mode in Europe on 1.2 and 2.4 GHz bands.

Digital ATV is just starting out by converting analog video to MPEG-2 bit stream with QPSK, 8-VSB, and DVB modes of digital modulation. Most of the research to date is done in Germany by the DATV group using standard definition DTV on 434 MHz using 2 MHz of occupied bandwidth and HDTV on 1.2 GHz using 6 or 7 MHz of bandwidth. In this country ATN has started experiments using the methods above and using internet pipelines to link distant ATV repeaters (see http://www.atn-tv.org) and look under ATN on the internet for more details). The HSMM group is experimenting with multimedia formats including ATV using 802.11b and WiFi part 15 equipment occupying 22 MHz in the 2.4 GHz band.

Section 2: Operation

ATV is unique in that it enables a ham to show and tell another ham in real time his shack, latest project, field day, home video of the family's vacation, and other events. ATV for public service allows pictures in real time to be sent to emergency operation centers to report storms and damage assessment.

Most ATVers use a 2 meter calling and coordination frequency to set up ATV contacts. 144.34 MHz is popular in the Midwest and

Most ATVers use a 2 meter calling and coordination frequency to set up ATV contacts. 144.34 MHz is popular in the Midwest and some areas of the East Coast. 146.43 MHz is popular in the west. Most ATV repeaters have a 2 meter receiver on site to mix in the calling channel audio with the TV audio. On the 420 MHz band polarization is usually vertical with areas that use 434 MHz and horizontal in areas that use 439.25 MHz and areas with inband 421.25 MHz out and 439.25 MHz in repeaters. Most cross-band repeaters use vertical polarization on both bands.

Lighting is important for good ATV pictures. More detail is available in "Advancing the ATV Art Workshop" produced by ATN. A camcorder, CCTV camera and most analog output computer cameras work well for ATV. Antennas should be above the tree line for good DX on simplex and operation to far off ATV repeaters. Low loss feedline should be used. A low noise preamp is a good idea if you use a cable ready TV or an older downconverter. At least 10 watts is needed for good ATV distance and 100 watts or more for long haul DX work.

ATVQ magazine (http://www.hampubs.com) is a good resource for information on what is happening in your area on ATV, projects you can build, ATV group information and advertising for the latest ATV gadgets for sale by reputable ATV vendors and manufacturers.

Section 3: Receivers

The simplest ATV receiver for AM or VSB is the standard TV set using a 6 MHz wide channel. A cable ready TV can receive the 420 MHz band ATV signals - just add an antenna (and preamp for even better performance) and you are ready to receive ATV! For a non-cable ready TV add a downconverter and for the higher bands a downconverter is needed for all TV sets.

FM ATV needs a TV with A/V inputs or a video monitor, both requiring a full FM TV receiver. Low cost Part 15 domestic units work well on 2.4 GHz and imported Part 15 type units work well for 1.2 GHz or 2.4 GHz bands. A satellite receiver can work on 0.9 and 1.2 GHz bands for FM TV but are set up for wideband FMTV and need a preamp and filter for better operation. They work well for Wideband ATV with a downconverter on the 3.3 GHz band and above.

Section 4: Transmitters

It used to be said that AM TV on the 420 MHz band was the easiest way to get on ATV and that is still probably true but the Part 15 FM TV units are also simple to use on 2.4 GHz. Most ATVers use off the shelf transmitters or a transmitter with a built in downconverter. Transmitters use crystal control or PLL to set frequency and AM modulate the carrier directly with video. Audio is modulated on a 4.5 MHz subcarrier and mixed in at the video modulator. The transmitter is double sideband occupying 9 MHz. The easiest way to build a VSB ATV transmitter is to either add an external RF 6 MHz wide bandpass filter to your existing AM transmitter or use a CATV Modulator.

CATV modulators are rack mountable and are much more sophisticated. They modulate a 45.75 MHz IF with video then filtered though a VSB 5 MHz wide IF filter. The audio is modulated on a 41.25 MHz carrier at 25 KHz deviation. Usually the aural carrier is phase locked to the visual carrier maintaining a precise 4.5 MHz difference. The aural and visual carriers are mixed to the final output frequency and amplified. Most CATV modulators can produce an output to 550 MHz making them suitable for the 420 MHz band. The modulator output is in the 10 to 20 m/w level requiring amplification with a class AB RF power module.

The easiest FM ATV transmitter is a Part 15 TV unit on 2.4 GHz. The frequency chip can be changed to put all four channels into the ham band on coordinated ATV frequencies. Amplifiers are available from ATV vendors. Imported Part 15 type TV units for 1.2 GHz band are available from ATV vendors.

Section 5: Antennas

The antenna system and its placement is one of the most important items in designing any ham station. In ATV we need more signal as compared with voice modes due to our larger bandwidth. Base stations should use a directional 13 dbd or better gain antenna to get as much signal as possible and to reduce co-channel QRM and multipath. The polarization is dependent on what is used in your area. Stacking yagis or using larger microwave dish

QRM and multipath. The polarization is dependent on what is used in your area. Stacking yagis or using larger microwave dish antennas will give better DX on ATV.

The best location for your antenna is above the roof line and trees. Stay away from RG-58, RG-8 and other HF-VHF feedlines. They have too much loss at UHF and even more on microwave. The same goes for the PL-259 connector. Use type N or other quality connectors. LMR-400, 9913 and heliax are preferred feedlines for ATV. Try to keep losses under 3 dB. Waveguide is used for the 5 and 10 GHz bands. DX can reach 50 to 100 miles with good antenna systems and several hundred miles with tropo ducting. KH6HME's ATV transmission from Hawaii was received by ATV stations 2500 miles away in California in full color with tropo ducting.

Section 6: Repeaters

ATV repeaters are fast becoming popular for ATV activity. Today many hams are finding themselves in antenna restricted communities reducing simplex ATV to about 10 miles but an ATV repeater on a high tower or mountain top allows longer distant ATV contacts. Many ATV groups and individuals have built ATV repeaters. ATN has a linked network of interstate repeaters allowing ATV contacts over hundreds of miles.

The two types of repeaters are:

Inband where both the input and output are in the same band (popular in the Midwest since existing ATV simplex stations do not require additional equipment to use the repeater) and

Cross band repeaters have the input and output in different bands allowing the sending station to see his own picture, make adjustments to his station and hear distant stations talk back to him over the repeater via the ATV 2 meter calling channel audio mixed at the repeater. A separate antenna and downconverter or transmitter is needed compared to simplex operation.

The Microwave Experimental Television Society (METS) uses a wideband FM input on 10.4 GHz using Gunplexers to transmit and slightly modified domestic C band satellite receivers to receive their 3.4 GHz wideband FM TV repeater output.

ATV repeaters are located in a high centrally located area and use omnidirectional antennas. The repeater's transmitter is keyed up upon detection of horizontal sync on the repeater receiver. ID is usually done visually by momentary interruption of the received ATV signal by an ID screen or done via video overlay.
Some repeaters have two inputs: one is the old 420 MHz channel and the 2nd is a 2.4 GHz FM TV channel.

MPEG-2 Motion Picture Engineering Group's broadcast digital video standard
DVB European HDTV and DTV standard
QPSK Quadature Phase Shift Keying
8-VSB 8 Level digital Vestigial Sideband, the US HDTV and DTV standard

2012 Officers

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Nets

EAARS Net; Sunday Night 7 PM general

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Net Control Operator Grace Wells KB7CSE	**Skywarn Net** 3rd Tuesday 7 PM
Helio Site Trustee Joe Montierth K7JEM	**Weather Net** Daily 5:30 AM collect local weather information
Technical Adviser Milt Jensen N5IA	**MERC Net** Second Saturday at 8:45 AM Emergency communications group
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