

# ATV & Public Safety

Jim Andrews

KH6HTV



# This is an ATV success story for ARRL, ARES & RACES



The Boulder County Amateur  
Radio Emergency Services  
(BCARES) has been providing  
Amateur TeleVision (ATV)  
services to the various Public  
Safety agencies in Boulder  
County, Colorado since 1990.

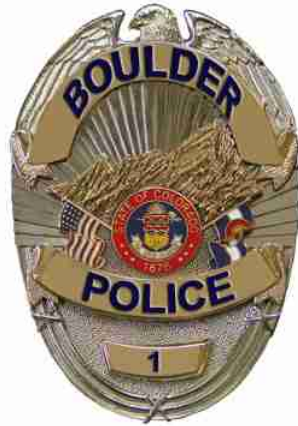
# Primary Served Agencies



- Boulder City/County - Office of Emergency Management
- Boulder County Sheriff - also includes county fire departments

# Other Served Agencies

Boulder, Longmont, Broomfield &  
University of Colorado Police Depts



# BCARES

- Organized 1976 after Big Thompson flood
- Incorporated as Non-Profit.
- Governed by a Board of Directors. Board members include reps from Sheriff, OEM, & county ham clubs. Chairman (EC) is elected by Board – not appointed by ARRL.
- Primary served agency is Boulder County Sheriff
- Joint ARES / RACES recognized in MOU
- Funding from FEMA, served agency grants, corporate & private donations. No dues.

# BCARES key points contd.

- Office in Boulder County 911 Center / EOC with all mode (HF, VHF, UHF) capability
- Equipment cache in 911 Center (24/7)
- 2m Voice Repeater, Packet Cluster & TV Repeater use Sheriff & Police dept's remote radio sites and microwave network
- ATV receive stations in Police mobile command posts, plus headquarters

# BCARES Members

- Must be FCC licensed amateurs
- Must be approved by Sheriff, after background check
- ID Card issued by Sheriff
- Must attend training classes





# BCARES key points contd.

- 80+ members
- 1/2 of members are trained for ATV
- 6 members are special trained, Video team for Sheriff's SWAT team and respond on all missions.
- Officers & key members carry Sheriff's radio pagers

# BCARES Services

- VHF & UHF voice - several repeaters
- VHF Packet Radio
- D-STAR (*not fully operational yet*)
- HF SSB
- HF Winlink
- Television

The #1 most requested service is

**ATV !**

# Police Chief's Comments

- “Having BCARES video allowed me to have an actual visual picture of distant events vs. my EOC team having to paint a mental picture based on radio comms”
- “The amount of radio traffic was down considerably due to having video”
- “I watched the quad video much more than the tactical messages on the computer”
- *Republican State Convention - 2008, Broomfield*

# BCARES

- Participates in several agency training exercises every year
- Responds to several emergency call-outs every year
- Provides ATV for all CU home football games

**BCARES limits itself to only providing emergency communication services to Public Safety agencies.**

**BCARES does NOT provide it's services to the large number of foot races, bicycle races, parades, etc. that occur every year.**

This is because we receive way too many requests and we would overwhelm our volunteer resources if we added these on top of our training and public safety missions. We refer these requests to the local ham clubs.

# Other ARES Groups

**NOTE: For many ARES groups elsewhere, parades, races, etc. are their only public service activities.**

1. Remember, per FCC rules, hams are not allowed to participate in money making operations, nor broadcast entertainment.
2. Carefully screen requests for ham radio or ATV assistance.

# Bolder Boulder 10K Race

The Bolder Boulder 10K Race is held every year on Memorial Day with over 50,000 runners.

A couple of years ago, race organizers asked BCARES to provide ATV coverage. Upon further investigation we found it was not for public safety purposes — but they wanted to display the video on the Jumbotron screen at the finish line in the CU football stadium. We turned down the request because this was blatantly “entertainment”.



# Memorial Day, 2013

This year however is dramatically different. Because of the recent terrorist bombing at the Boston marathon, the Boulder Police, OEM and Dept. of Homeland Security have tasked BCARES with providing a large network of ATV cameras for crowd security at the Boulder Boulder 10K Race. This will be our largest technical challenge to-date.

# Time Line of Major ATV Events

- 1989 - Boulder Sheriff requests BCARES develop ATV capabilities
- 1990-91 - Gulf War - multiple anti-war protest marches
- 1992 - TV repeater installed in Boulder mountain park to provide coverage of city of Boulder and eastern 1/2 of county
- early 90s - Halloween “Mall Crawl” (40,000+ rowdy, costumed partiers)
- 1995 - Univ. of Colorado Police request ATV coverage of home football games

## ATV Time Line contd.

- 1996 - Sheriff requests ATV coverage of SWAT missions
- 1997 - CU student riots, 3 straight nights, rocks, bottles, bonfires in streets, multiple SWAT teams, tear gas, injuries, etc.
- 1999 - Columbine High Massacre, SWAT
- 2001 - 9/11, SWAT critical infrastructure protection
- 98 - 2001 - several more, minor CU riots

# 2001 to present

- continued supporting CU with ATV coverage of home football games
- response to forest fires every year
- response to flooding in Boulder Canyon
- 4/20 Weed Day protests on CU campus
- 2008 - Republican state convention in Broomfield
- 2010 - Four Mile Canyon Forest Fire, 7000 acres & 160+ homes burned

# Four Mile Canyon Fire

BCARES mobilized for a week



# BCARES had ATV fire spotters on several mountain tops

(credited with saving half dozen homes)







# More views from BCARES cameras











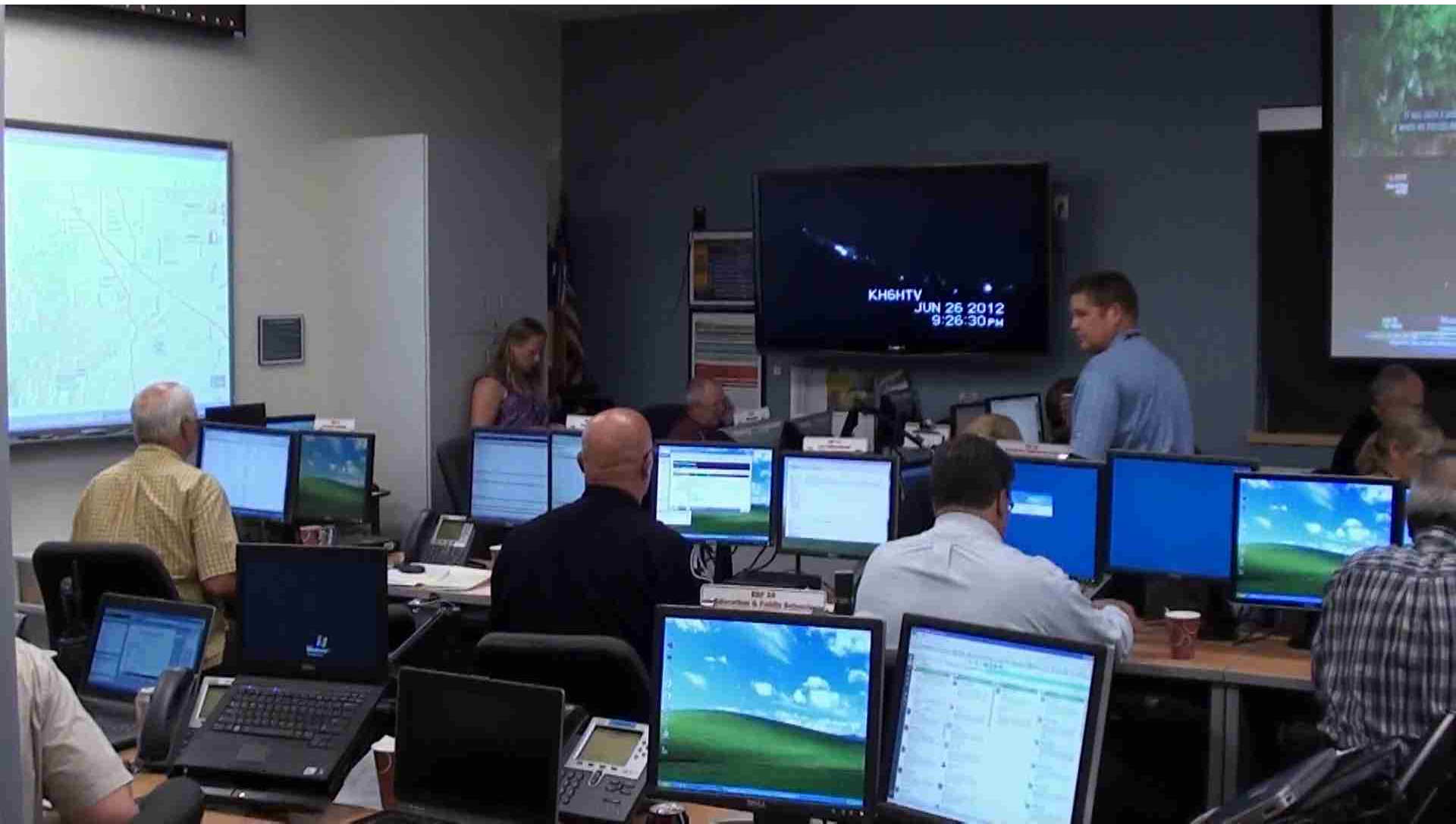


# Night-Vision (IR) Camera



# EOC Command Center

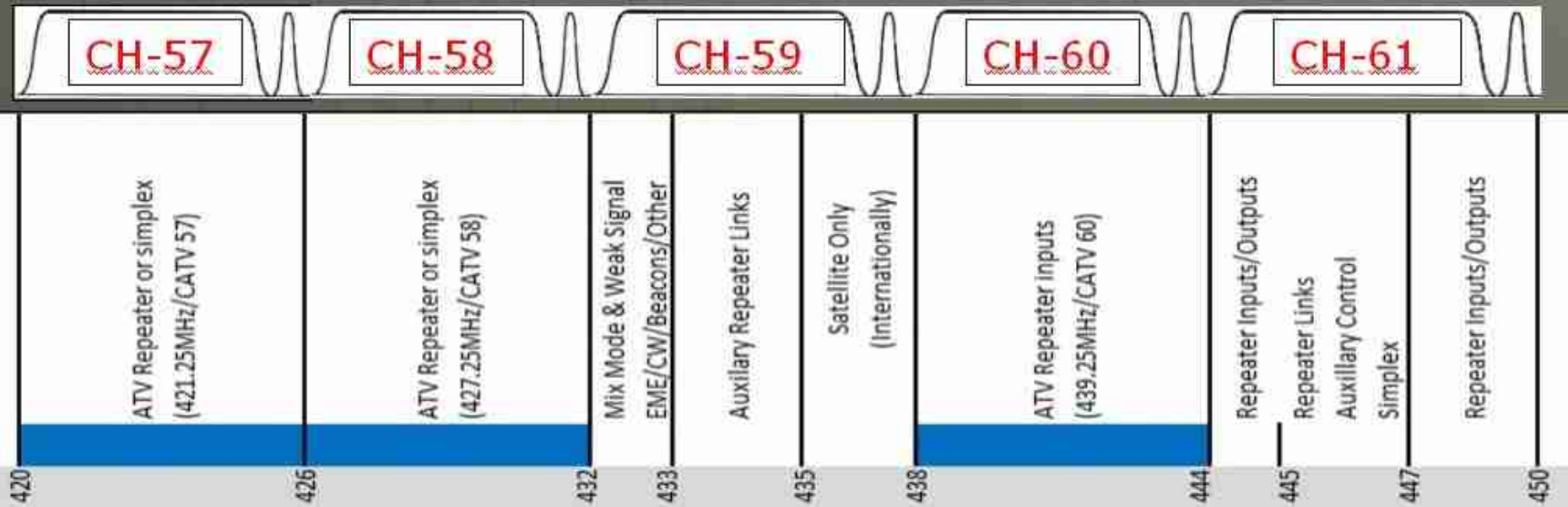
note: fire video on main monitor



# BCARES ATV Eqpt.



# 70cm Band (420-450MHz)



Each ATV Channel has a 5MHz Bandwidth.

- ◆ CH-59 & CH-61 are NOT recommended due to their likely interference to Repeaters and other active frequencies.
- ◆ Vestigial Sideband (VSB) is recommended for ATV



## Video Backpack

SONY video camera  
20 ~ 40 x optical zoom  
on screen titling (for ID & time)  
12 volt power supply

7 amp-hour gel cell and power  
distribution

The backpack also contains  
a vestigial sideband filter and  
an ATV transmitter





We are now using this basic, 3 watt, 4 channel, AM-TV module. The frequency can be changed using 4 dip switches.



Videolynx **VM-70X**  
P.C. Electronics [www.hamtv.com](http://www.hamtv.com)

## VSB

Vestigial Sideband Filter

A 6 MHz, VSB filter is used to reduce the AM-TV lower sideband by  $\sim 80\%$ . The reduced bandwidth significantly helps minimize adjacent channel interference. These are mandatory when we operate with AM-TV transmitters on 4 channels simultaneously, i.e. channels 57, 58, 59 & 60



# New Generation ATV Eqpt.



70cm 10 Watt VUSB & DTV transmitter  
23cm, 3 Watt, FM-TV transmitter  
70cm, 25 Watt, Ultra-Linear Amplifier

# Remote Controlled ATV platform for SWAT operations



# 23cm FM-TV Hex-Copter





# ATV Receiving Stations

We typically operate four TV transmitters simultaneously on 70cm channels 57, 58, 59 & 60.

We use commercial quality, CATV receivers plus low-noise preamplifiers.

We use a Quad Processor to display all four pictures on a large, flat screen monitor for the police/sheriff/fire commander.

# Quad Display



Picture provided to Broomfield ICV during the 2008 Republican State Convention

# BCARES officers KI0HG & KB0LRS in CU Police Command Post at CU Football Game





# Sheriff's SWAT Quad-Box



# W0BCR-TV Repeater

- 421.25MHz VUSB output, 50 W erp
- 1277.25MHz FM input, primary
- 439.25MHz VUSB input, secondary
- 600 ft above City of Boulder



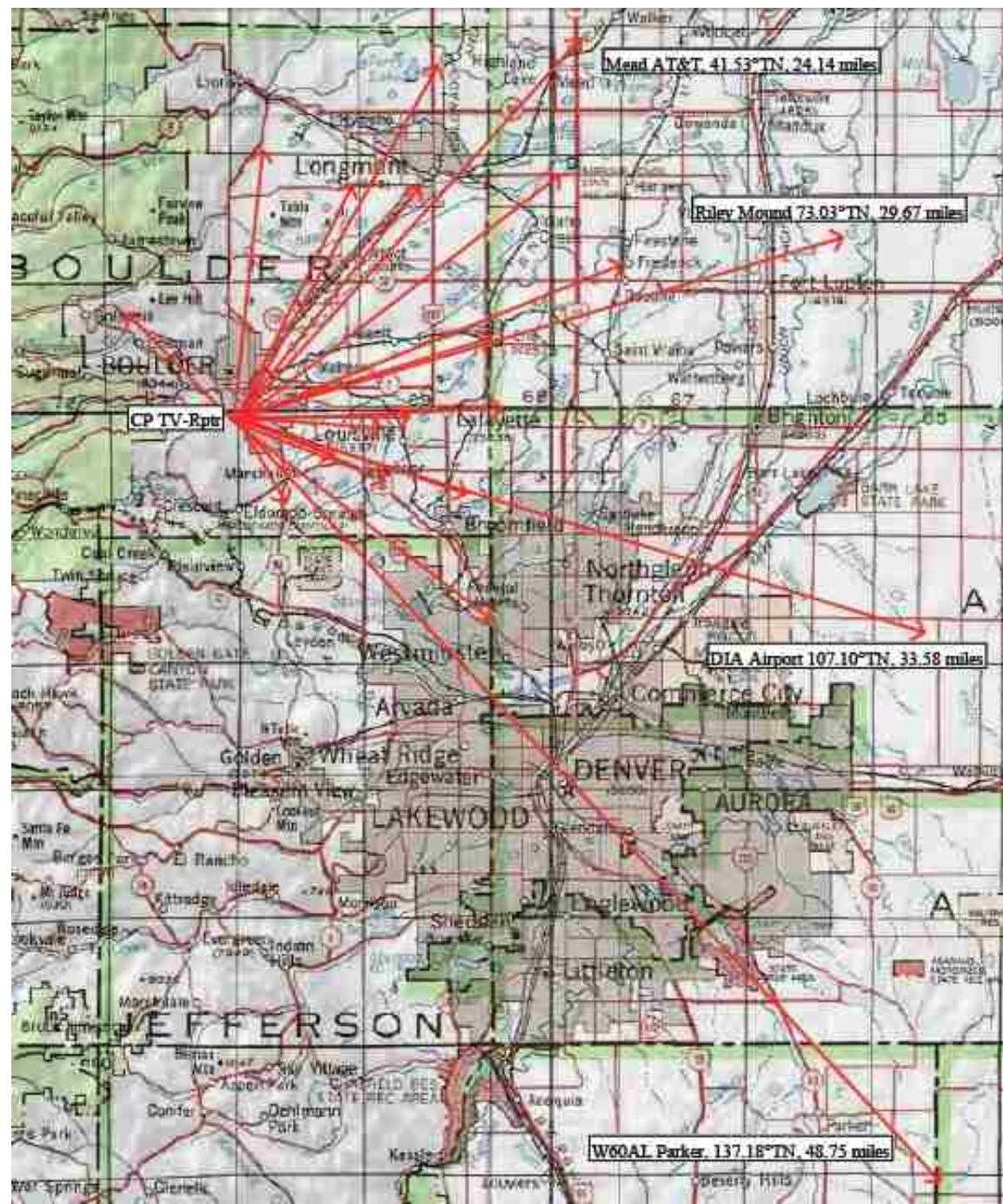


Repeater Shack on mesa in front of Flatirons



View of Boulder Valley from Repeater Site





# Portable ATV Repeater built in 1992 by WA0NHD & NV0M



# www. Resources

- KH6HTV VIDEO web site  
[www.kh6htv.com](http://www.kh6htv.com)
- BCARES web site  
<http://bouldercountyares.org>
- BCARES TV Repeater, W0BCR  
[www.qrz.com](http://www.qrz.com)



**KH6HTV**

# ATV & PUBLIC SAFETY

Presented by  
Jim Andrews, KH6HTV  
at ATV Forum  
2013 Dayton Hamvention

(kh6htv, rev. 5/25/2013)