

# The Communicator

## SUPERSTITION Amateur Radio Club, Inc

PO Box 1551

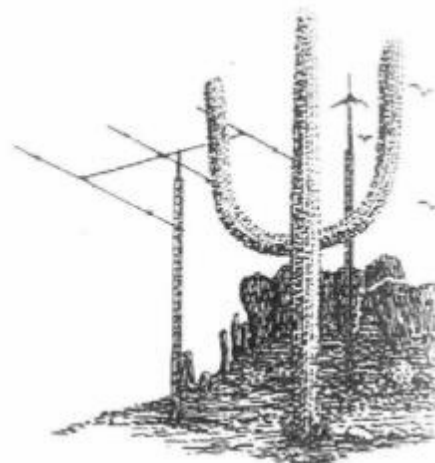
Apache Junction, Arizona 85217

Editors:

Rodney Bevill, K7RLB

Larry Kuck, WB7CRK

WB7TJD Repeaters  
147.12 MHz (+) 162.2  
449.60 MHz (-) 100.0  
Mesa, Arizona  
On the Internet:  
<http://WB7TJD.org>



## New ARES Group being formed in Pinal County

The Amateur Radio Emergency Service (ARES), long unheard of in Pinal County, is making a return via a new ham radio organization. The Pinal County Emergency Communications Group (PCECG) was been recently established and much work has been done towards building the membership base. The group's primary goal is to gain acceptance by county emergency management as a recognized ARES organization and become an asset to served agencies, according to recently appointed District Emergency Coordinator (DEC) for Pinal County Luis Martinez. Luis can be reached at (520) 705-4268 or email [luis.martinez@netbeam.net](mailto:luis.martinez@netbeam.net).

The group has enrolled ten hams and continues its membership drive to ensure an adequate supply of trained hams. The Amateur Radio Emergency Service (ARES) is the emergency communications branch of the Amateur Radio Relay League (ARRL). ARES consists of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service when disaster strikes.

Every licensed amateur, regardless of membership in ARRL or any other local or national organization, is eligible for membership in the ARES. The only qualification, other than possession of an Amateur Radio license, is a sincere desire to serve.

The date and location of PCECG's first organizational meeting will be posted in the recently established website, which can be found at [www.kd7gmk.com/PCECG](http://www.kd7gmk.com/PCECG). The website has additional information and an application, should anyone desire to join now. PCECG has received authorization to use a Pinal Peak repeater for a training net on Tuesday nights at 7 pm. The frequency is 147.200+ pl 162.2, and the first net session will be held June 8.

— Luis Martinez, KD7GMK

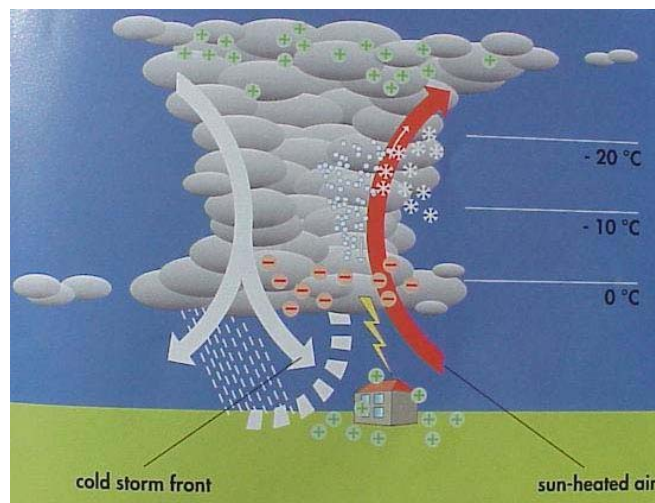
## Lightning Basics

by

Steve Gurley, KJ7WK

(Part I)

Arizona summers are not generally fraught with lightning storms, but a basic understanding of this physical phenomenon is necessary to design and install a ham station properly.



Lightning Creation Diagram

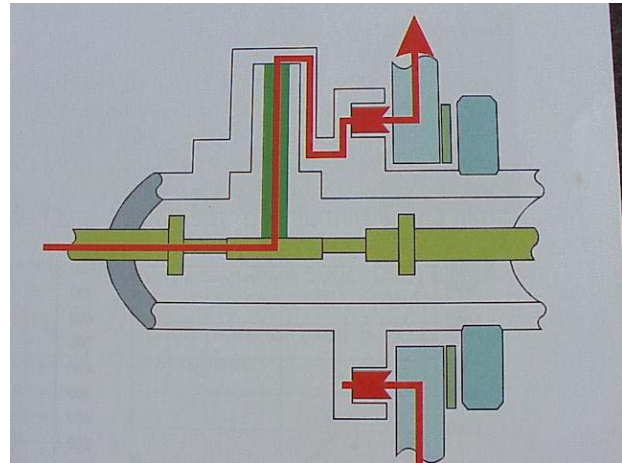
Lightning is created when a cold storm front penetrates a warmer sun heated area. This forces the warm moist air to rise. The temperature decreases with altitude and the water vapor condenses to small water droplets. This is accompanied by the creation of heat which accelerates the air current, reaching altitudes with sub-zero temperatures. This freezes the water drops to ice crystals, producing a heating effect which forces the ice crystals to an even

higher altitude. This quickly moving air reaches speeds of over 100mph and altitudes of up to 60,000 feet high. As the ice crystals grow bigger, they race downward becoming hail, some of which fall to the ground. This causes electrons to be stripped from the ice. A wide surface area containing these electrons, not unlike a plate of a capacitor is formed. When the field strengths reach 100KV per yard, discharges occur from cloud to cloud or cloud to ground depending on the ease of

only protect against the weakest of transient currents, and the MOV devices will fail after use. Even Silicon Avalanche devices, when used, will eventually fail. Lightning protectors sold by many consumer outlets may or may not be adequate to handle the speed and current density of transients occurring during a lightning storm. There are several types available, but for this discussion, we will deal with only the quarter wave stub and gas capsule devices. A quarter wave stub device is



**Montana Fire Starter**



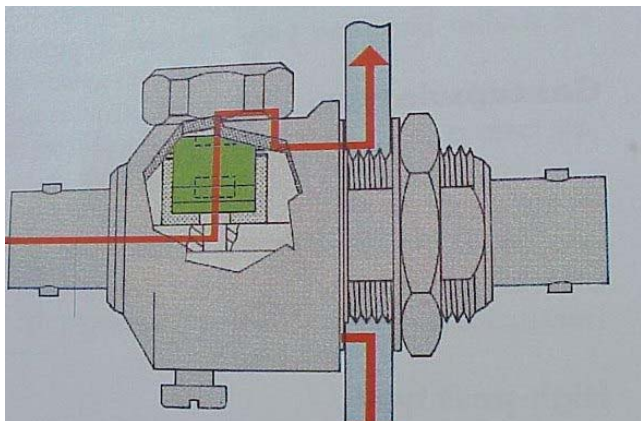
**Quarter Wave Stub Device**

flow between the two potentials. Think of it as a cloud with lots of negative charges, and the earth with lots of positive charges. When the voltage threshold reaches a high enough point, a leader charge develops and tries to find the path of least resistance to "dump" the excess electrons from the charged cloud. When a path is found, the electron flow begins and builds to 100KV @ up to 100 kilo-amperes. This charge lasts only several milliseconds, but with devastating force. The temperature increase is so high in the lightning channel that it expands with an explosive force. This "thunder" can be heard as far away as 15 miles.

### **Lightning Protection Systems**

The ultimate in lightning protection is complete disconnection. It is not enough to simply disconnect the antenna cable from the back of the rig, because lightning can enter the radio through both the ground system and the electrical power buss supplying it. Power strip protectors will

manufactured using a stub matched to the middle frequency you wish to operate on. It has its end short-circuited, and it becomes a band-pass filter which will send to ground any transient outside of the band pass frequency. Lightning usually has an RF frequency of Around 100KHz, so any of our Ham Bands ranging from 2Mhz to 2 GHz are well out side of the damage frequency. In regular operation, the RF signal reaches the entry point of the shorting stub, runs along the stub to its starting point which corresponds to a 90 deg. Phase shift. At the shorting point, the signal is reflected and a sudden 180 deg. Phase shift is created and flows back to the starting point, where it has another 90deg phase shift. As a result, the reflected signal is again in phase with the arriving signal which then does not detect the actual short. The quarter wave stub is however, relatively narrow in band width and will only allow operation and protect equipment at the design frequency.



**Gas Capsule LP Device**

For a broader bandwidth, a high quality gas capsule device will protect against transients from DC to 2.5 GHz. It uses a hermetically sealed gas capsule containing Tritium. This gas ionizes when it sees a transient energy pulse, becomes a very low resistance path, and shorts the transient to ground. During this time the radio is off the air (not connected to the antenna through the center conductor) (about 8 microseconds)

Once the transient energy is dissipated and other transients are absent from the feed line, the capsule de-ionizes and becomes a high resistance to ground again, allowing the signals to pass through the Lightning Protector to the radio. It is important to note that when installing the gas capsule device at your station, ensure that the capsule container itself is OUTSIDE your shack. Most folks install a ¼" thick brass bulkhead in the wall of the shack, and then mount the lightning protector to the bulkhead with the capsule on the outside part of the bulkhead which is attached to the earth ground. Since the transient energy flows to the grounded part of the device, it makes sense to keep this energy pulse outside where it cannot affect any equipment in the radio room.

These two simplified explanations of the two basic types of protectors are in no way comprehensive and much more goes into the design of a good protection system, which could fill volumes.

(End Part I next month Part II titled **Grounding**)

## W7ASC ADAW Column

If you have been checking the news link at [www.w7asc.org](http://www.w7asc.org) you have been reading for a long time about the Satellite rotor. Well there is more good news. Saturday April 16th a work party of George Stickney W7BXW, Bob Lowry KD7UNL, Ralph, KV0R, and our hero who fixed the rotor John Golembeski, WB2DIH, made the journey up the three flights of ladders to the top of the Science Center. The rotor system is now in operation. Now if we can get some cooperation from the satellites [and the satellite software] we are up and running. Take a look at the pictures on the W7ASC web page courtesy of George Stickney.

We have one maintenance operation left but it will be a piece of cake. Many of you know that our antennas cannot be attached to the roof or the parapet walls. The satellite system is held down by the weight of six five gallon buckets of water(!). The sun is an enemy and has damaged the buckets and some of the water has leaked. We need to replace the buckets and refill them with water. Keep tuned for a future work party.

Those of you who are interested in a little public speaking, can volunteer to learn the new presentation written by John Ekiss and David Ray. It is called Satellites Around Us. The Science Center is pleased with the presentation and it will be an integral part of the new traveling exhibit on Space.

—Ralph KV0R

A reminder that starting Memorial Day, we will be changing to the summer hours (10 AM to 3 PM). We are currently at a bit over 50 volunteers with a few more scheduled to fly north for the summer. We will be holding a "Board" meeting May 15th, updates from the meeting will be in the next ADAW.

The Spring No-Code Tech Ham License class is over. All 5 students that took the test passed! In addition, 2 passed the element 1 (CW) test. Expect that the new calls will be posted by May 18. The next No Code class will be scheduled to start this fall, probably Saturday October 2nd. Contact me if you know someone that might be interested.

--Regards, Bob Burleson

## 2004 Officers

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## Committees

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Alternate: Myrna Cross, KN7M

### Membership Committee

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Editor: Rod Bevill, K7RLB.. 480-839-0057..rodbevill@earthlink.net

### Net Control Station

Wednesdays: KG7FA, John ..... 147.12 MHz Repeater at 8:00 PM

Thursdays: WB7CRK, Larry ..... 147.12 and 28.47 MHz at 7:30 PM

Amateur Radio Newslines both nights: Provided by the net host

**COMMUNICATOR** is the official publication of the Superstition Amateur Radio Club, Inc., and is published monthly.

Beginning with the February 1998 issue, this publication is also being made available via Email for use by the blind.

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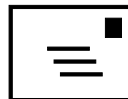
### Submitting articles, classified ads

Please submit articles and Classified Ads by the 25th of the month for inclusion in the next month's issue.

Please submit via Email to:  
rodbevill@earthlink.net

Or typewritten copy preferred, by U.S. Mail to:

Editor  
1358 W. Los Lagos Vista  
Mesa, AZ 85202



## Meeting House

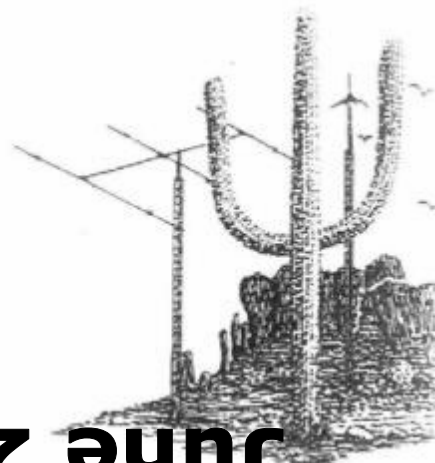
*The Club Meets at the Mesa Community College, at Southern and Dobson in Mesa.*

*Our meeting room is in the basement of the Clock Tower, center of Campus.*

*Our General Meeting is on the Third Tuesday of the month at 7 PM, June 15, 2004.*

*The Board meets at Peter Piper Pizza, Gilbert and Main, Mesa, NW corner, at 6:30 PM on the second Tuesday, June 8.*

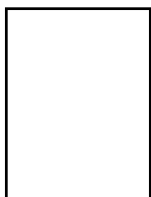
*VE Testing is held at 6 PM on the third Monday at Mesa Utilities Office, 640 North Mesa Dr. June 21*



**June 2004**  
 Apache Junction, AZ 85217-1551  
 PO Box 1551

**Superstition**  
 Amateur Radio Club, Inc.

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***HAMFest***

**June 4-5:**

Kachina ARC in Show Low.

**July 2-4:**

Arizona State Hamfest, at the Williams, Arizona Rodeo Grounds

**August 27-29:**

ARRL Southwester Division Convention at the Wild Horse Pass Resort & Spa.

There is talks of trying to plan a new Hamfest for Yuma.

***Newsline Scripts found on  
 WB7TJD.org***

Check there if you miss a week's report or need a Web address.