



# Capers

April - 2017

Candlewood Amateur Radio Association

P.O. Box 741 – Hawleyville, CT 06440-0741

Visit us on the Web at <http://www.CaraRadioClub.org>

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**CAPERS is the MONTHLY NEWSLETTER of the  
Candlewood Amateur Radio Association**

**Co-Editors: Jay Albano, N1NRP & Dan Fegley, W1QK**

***Next CARA Meeting: Friday, April 7,  
Stony Hill Fire Station***

***Doors open at 7:30, meeting begins at 8:00 p.m.***

***Agenda topics:***

- ***501(c)3 tax filing status – Update***
- ***Discussion of the new CARA Constitution and Policies & Procedures***
- ***W1JGM - CARA Hamfest update***
- ***KD1YV - Webmaster update***
- ***NG1R - New England QSO Party update – CARA operating from W1AW***
- ***Field Day - discussion***
- ***Presentation by AB1WV: K6BEZ Arduino-based antenna analyzer***
- ***Short coffee break***
- ***Club members organize CARA antennas, antenna ropes, and coax storage bins for Field Day and other upcoming events***

## ***President's Message - de AB1WV***



Photo Credit: Greg Davis, KB1YHW

Hello all,

This last week, we finally finished the new CARA Constitution and Policy documents, with feedback from the presentation at the March meeting. We are ready for a vote at the May meeting. Per our current Constitution, we must distribute it to all active members at least 30 days before a meeting at which it will be brought to a vote. If you are current on your dues, then you can expect an email from me in the next day or two with .pdf copies of the documents. They are not very long, and I would request that you review them and send any questions about them back to me. I will try to answer them.

This is the document we will bring to a vote at the May meeting, and there will be no more modifications before the vote. Of course, there will be opportunity for discussion before the vote and your opinions and comments matter. This is your club and your constitution.

If you are not current on your dues, this is a great opportunity to get those dues in, so that you can vote at the May meeting.

The meeting this Friday, will include a short presentation on the K6BEZ Arduino Based Antenna Analyzer recently built by yours truly. Also on the agenda, is an organizing activity to ready our gear for Field Day and other activities. It should be a fun time and as always, the coffee and conversation are free.

73  
Marcus  
AB1WV

## Vice-President's Message - de N1NRP



Photo Credit: Greg Davis, KB1YHW

Hello fellow club members and friends of CARA:

I want to thank all the members who renewed their annual dues as a result of my outreach.

Remember that membership benefits include voting privileges on club business, the use of the CARA Reflector, a subscription to Capers – our monthly newsletter, as well as support of the repeaters and all other club activities.

We need your participation to move forward - so anyone who may have overlooked their renewal; there's still time to take care of this.

Also, if anyone is having difficulties with this, we encourage you to speak with one of the members of the Executive Board.

According to our club Constitution and By-laws, any member who doesn't renew by the end of March will no longer be considered an active CARA member.

Our April meeting promises be another good one; and I hope to see you all there.

73 – Jay Albano, N1NRP

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## March 10- CARA Meeting Minutes de N1GSA

The Pledge of Allegiance was recited, led by Jay Albano, Vice President.

Introductions with names and call signs were given around the room.

Cheryl Reedy gave a presentation regarding the 501c3. The form must be filled out online. The requirements DO include by-laws, non-profit, etc. A EIN (employer identification number) is required. The State of Connecticut will require filing with them as a non-profit AFTER you are accepted as a 501c3. A 990 tax form is required to be filed with IRS on a yearly basis. More information is available at [IRS.gov](http://IRS.gov) followed by information about the 501c3 designation. MEMBERSHIP fees are NOT considered as a charitable donation. A charitable donation must be wholly designated as such.

Motion was made and seconded to start the process to making the club a 501c3. Discussion followed. Vote in the affirmative. This will involve some further changes to the By -Laws.

Meeting Minutes from February were accepted as read.

Balance in the Treasury as of this evening is \$6481.07.

Update on the repeater by John. The Motorola repeater has been taken off line and the Yaesu machine on Spruce Mountain has been reactivated. John, W1JGM, has an associate that came over and checked the Motorola. The machine receive is just fine. There is a distinct possibility of the problem being in the antenna itself, either a loose connection or a bad coax.

John gave an update on the progress for the Hamfest. The date is set, the ARRL has been

notified, invitations have been sent to various vendors for participation. A mailing list is being prepared for notification to last year's attendees. The entrance fee was discussed and agreed to be kept as it was last year.

Jim gave an update about the website. The program has been updated with the names of the officers which will allow them to add and edit information. Jim has made a website specifically for updates for the website from the membership. There will be a notification for all, regarding the payment of dues and the loss of reflector and Capers privileges until the current dues are paid.

The NEQP is upcoming on May 6&7. A show of hands showed 7 members interested in participating. CARA is penciled in on Sunday the 7th for operating. Roger will have a signup sheet for operating hours.

The (new and updated) Policies and Procedures were discussed and gone over. Some changes will still need to be made to conform to the 501c3 requirements. This will be posted on the reflector when completed.

Field Day was brought up and the consensus was to again have it at Terrywile Park. Roger will check with them and pencil the date if it is open.

Harlan gave a presentation on Chokes and Baluns.

Dan was commended on his participation and score in the IARU HF Contest.

Any other business was called for. None being heard the meeting was adjourned at 10:05 pm.

Respectfully Submitted:

Gary Adams,  
Secretary

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## **CARA REPEATER COMMITTEE**

Re: Repeater Committee 20 Feb. 2017  
Status Report

### **CARA Repeater Committee Members 2017**

KB1YHW chair, W1QK trustee, AB1WV CARA president-ex officio, N1NRP, W1JGM, W1SOP, WX1T. CARA members interested in serving, please contact the chair.

### **CARA Linked 2m Meter / Motorola Project Report:**

CARA 2m repeater service was transferred to the Yaesu DR-1x repeater on Spruce Mountain at 2:30pm Saturday 18 Feb 2017.

Linked repeater service into the NA1RA & KB1AEV ARES networks is temporarily unavailable.

### **March 5 Update – de N1NRP:**

Jeff Dwyer, N1AKN, assisted the CARA repeater committee on March 4 in trouble shooting issues with our Motorola MSF-5000 2-meter repeater.

The repeater checked out OK - but we discovered an issue with the antenna, which appears to be intermittent with a possible loose connection.

Our next step is to get to the top of the tower and do a visual check on the antenna and its connections.

We're also thinking of putting a single band 2- meter repeater antenna in its place - then further monitoring of the repeater will resume before installing it in its permanent home on Spruce Mountain. Many thanks Jeff, for your assistance.



Connecticut ARES Region 5 conducts a weekly net each Wednesday at 7:30 p.m.

New Milford: 146.730 MHz -600 kHz PL 192.8 Hz  
NARA analog repeaters for this net:

Washington: 441.850 MHz +5 MHz PL 77 Hz  
Woodbury: 444.800 +5 MHz PL 192.8 Hz  
Warren: 53.970 MHz -1 MHz PL 110.9 Hz  
Please check in – All are welcome.



## Connecticut Phone Net – CPN

Meets daily: M-F 6:00 p.m. 3.973 MHz.  
Sunday: 10:00 a.m. 3.965 MHz.  
CARA Contributions:  
Wednesday Net control: Harlan, W1QH  
Net Manager: Tom, WX1T



## Weekly Sunday CARA NETS:

**CARA 10M “Rag Chew Net”:**  
28.490 MHz. 7:00 p.m.

**CARA 2M NET:**  
W1QI Repeater – 7:30 pm

## Upcoming Contests and Hamfests:

April 8: Georgia QSO Party  
April 8: Windsor Hamfest at the Vintage and Antique radio museum  
April 15: Michigan QSO Party  
April 17: 2M Spring Sprint  
April 21-23: Eastern VHF/UHF conference

Use this link for more details:

<http://www.newsvhf.com/vhfconf.html>

April 22: Gales Ferry RASON Auction  
April 23: Framingham, MA Hamfest  
April 25: 222 MHz. Spring Sprint  
April 27: May CARA Capers input deadline  
April 29-30: Florida QSO Party  
April 30: Middletown, NY Hamfest

## New England and other local hamfests:

<http://web.mit.edu/w1gsl/Public/ne-fleas>

The Central States VHF Society is proud to sponsor and announce the 2017 VHF and up Spring Sprints:

**144 MHz:** Monday, 4/17/17 from 7 - 11 PM local,  
Exchange: 4 char grid

**222 MHz:** Tuesday, 4/25/17 from 7 - 11 PM local,  
Exchange: 4 char grid

**432 MHz:** Wednesday, 5/3/17 from 7 - 11 PM  
local, Exchange: 4 char grid

**Microwave, 902 MHz and up:** Saturday, 5/6/17  
from 8 AM - 2 PM local,  
Exchange: 6 char grid

**50 MHz:** Saturday, 5/13/17 from 2300Z until  
0300Z Sunday, 5/14/17, Exchange: 4 char grid  
More information and rules are posted at:

<https://sites.google.com/site/springvhfupsprints/home>

## Complete Contest calendar at:

<http://www.hornucopia.com/contestcal/contestcal.html>

## Skywarn Spotter Training Class Announced:

PEARL Amateur Radio Club is hosting a SKYWARN Spotter Training class this May 23rd at 7:00 PM at the Putnam County EOC in Carmel, New York.

This is info from club page:

<http://www.pearlk2put.org/calendar/skywarn-spotter-training-may-23rd-2017>

registration had not open for this yet but can be put on your calendar if interested in it. I believe one should update their skywarn training every two years I think is recommended if I remember correctly. If not sure what skywarn is see here:

<http://www.nws.noaa.gov/skywarn/>

73's

WA8UNS, Thomas Kimball, Ridgefield, CT

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**CARA to operate New England QSO Party at W1AW – Sunday, May 7**  
**de NG1R**



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It has been a long-standing tradition for CARA to operate W1AW for the Sunday of the New England QSO Party (NEQP). We have the station reserved from 9:00 to 4:00 for our operation on Sunday, May 7, 2017. We will be operating as a multi single - that is a multi-operator, single transmitter station for the NEQP. Other stations will be available for operation during the time you are not on the QSO Party station. To find out more about the NEQP you may refer to this web site: [New England QSO Party - Rules](#)

We will probably carpool up leaving at about 8:00 Sunday morning. If you would like to go, please contact Roger Mitchell, NG1R, at [roger.mitchell@snet.net](mailto:roger.mitchell@snet.net) to sign up

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**CT Section Manager's Message:**

April, 2017

No CT SM message available.

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**CARA Western CT Hamfest:**  
**de W1JGM**

To: All Amateur Radio Enthusiasts, Commercial, and Related Vendors

The Candlewood Amateur Radio Association, Inc., is scheduling our annual Western Connecticut Hamfest on Sunday **August 27, 2017** this year. Please note this is a new date!

The venue and time will be the same, set up 6 to 8AM with doors opening at 8AM till 1:00PM at the Edmond Town Hall, Newtown, CT. 06470.

There is a large indoor display area with tables and chairs available, electricity can be available. A large outdoor area for displays and tailgating is available for those with outdoor displays requirements.

Refreshments will be available, inside with seating available to join your friends.

The Western Connecticut Hamfest is an approved ARRL Hamfest.

If you or your company can sponsor a door prize or a prize for our raffle, please let us know. We will also have space available for advertisement and handouts.

To insure your spot, register early.

For further information or to reserve your spot, please contact John Morelli (W1JGM) at (203) 417-0160 or [W1JGM@aol.com](mailto:W1JGM@aol.com)

Please feel free to forward this correspondence to anyone interested.

See you there!

John Morelli, W1JGM

Chairman – 2017 Western CT Hamfest

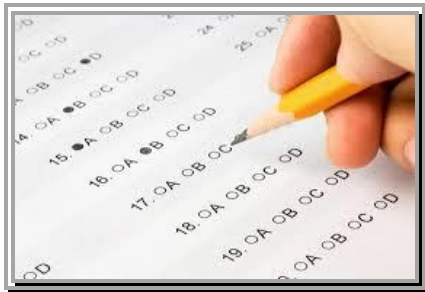
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**Member and Station News:**

*Your story could go here in the next Issue of CARA Capers!*

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**2017 CARA Ham Exam Schedule:**



2017 Amateur radio exams sponsored by CARA at the Stony Hill FD:  
June 10, September 9, December 2  
Saturdays - starting at 11:30 a.m.

Walk-ins are welcome, but it's helpful if candidates call or e-mail Frank Sileo, N1PE, at 203-438-0218, or send a message to frsileo @ att.net

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**Other upcoming VE exam sessions:**

Washington CT firehouse on Bee Brook Road at 9 AM Saturday morning on the following dates:

April 8, July 8, October 14

Please feel free to direct questions to w8zy@hotmail.com

Walk-ins are welcome and we will be testing for all classes.

**Sponsor:** Northwest Amt

**Location:** Litchfield Firehouse, Litchfield, CT

**Time:** 7:00 PM (Walk-ins allowed)

March 14, April 11, May 5

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**Worked All Connecticut Counties Award, WACC – Sponsored by CARA:**

<http://www.cararadioclub.org/activities>



**CW Ops CW Academy:**  
**Interested in learning CW or improving your skills?**

Check out [www.cwops.org](http://www.cwops.org)

“CW is an art of incremental improvements over a lifetime, getting ever closer to an ideal of perfection which is always moving and always presents a new horizon to strive for.” Carlo Consoli

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**The YCCC turns 40!**

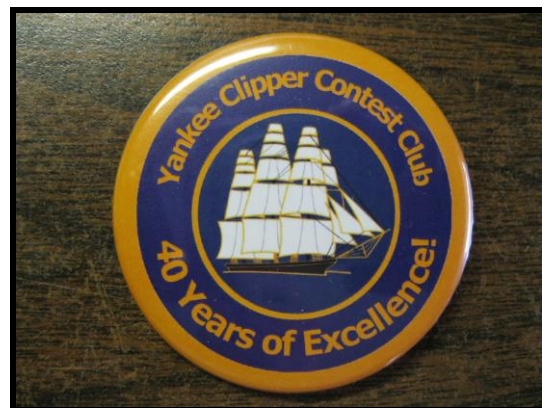
The 40<sup>th</sup> anniversary of the founding of the Yankee Clipper Contest Club was celebrated April 2 at the YCCC meeting in Sturbridge, MA. The special guest speaker was Jeff Briggs, K1ZM, one of YCCC's founding members and it's first president. Many of the founding members were also in attendance.

These commemorative pins were given out. Cake was served to all.

There's an on-the-air operating event planned in conjunction with this celebration.

Details to be announced.

Check out [www.yccc.org](http://www.yccc.org).



## Boomsets and Microphones de W1QK

The last two months of CARA Capers included some detailed information about CW keyers, the K1EL Winkeyer, and homebrew CW paddles. So – I imagine that some of you might be saying: “Alright already with all that CW stuff”.

So, in the spirit of “equal time” for the newsletter, I’ll briefly cover some details about boomsets and microphones for those of you who are avid phone operators.

I’ll refer you to the outstanding Heil website for some excellent technical information - and especially the set-up parameters for various types of HF radios, which will enable you to achieve your transmit audio objectives.

<http://www.heilsound.com/amateur/support/dsp-settings>



Some Heil Sound products for amateur radio

The most popular brand is probably the boomsets/headsets that are made by Heil Sound, who has captured the majority of this part of the ham radio market.



Bob Heil – K9EID

Some HF radios and most VHF/UHF radios sold today include a compatible hand microphone. You probably should use the hand mic that was included with your 2M or Dual-band VHF/UHF mobile radio – especially when operating in the car.

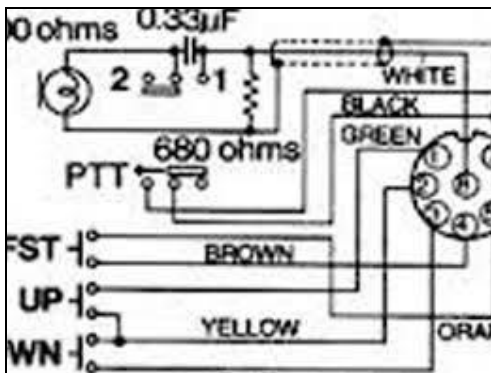


Typical hand-held microphone supplied with mobile VHF/UHF radio.

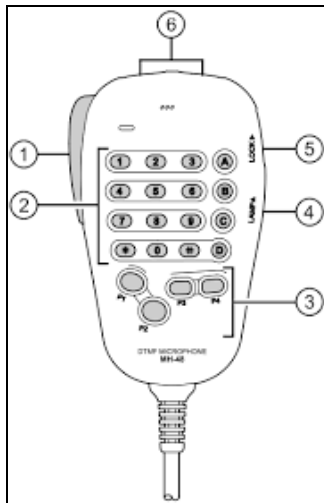




Typical “vintage” hand-held microphone with “round” 8 or 4 pin connector, but without other functions.



Some hand-held microphones offer up-down, and other internal switching capabilities.



Some hand-held microphones can only be used with a specific brand and model of radio. The extra buttons offer access to many functions that are now included in modern mobile radios.

However, for home station operation, you might want to consider using a boomset/headset, which combines the microphone and headphones together. If you’re planning to do any operating during an ARES deployment - either in your EOC or in a shelter, I’d suggest planning on using a boomset.

However, for operating contests, (including Field Day), a boomset is almost mandatory so both of your hands are free to enter call signs and exchange information using the keyboard, move the computer mouse, or tune the radio. I can’t imagine picking up, using, then putting down a hand microphone during a contest – or even using a desk microphone for this style of operating.

You can engage the VOX (Voice Operated Relay) of your HF rig to handle the job of actually switching your rig between receive and transmit. This usually works very well, except in noisy environments.



The Heil ProSet Boomset – a “Classic”



Heil "Traveler" boomset with dual headsets and in-line PTT and Up-Down switch

and is engineered to operate at a more comfortable angle for my taste. The FS-2 includes the provision to switch an amplifier, but I prefer to accomplish that with a separate cable between the radio and amplifier PTT input.

Plus - the FS-3 list price is \$27 compared to \$46 for the FS-2.



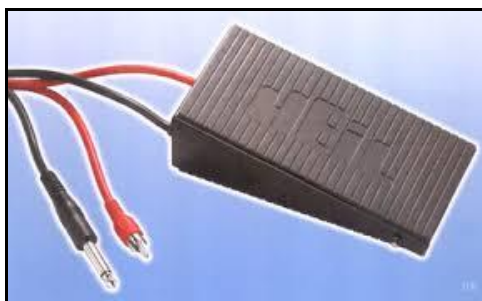
Heil "Traveler" boomset with single headset and in-line PTT and Up-Down switch



Heil FS-3 footswitch

My first Heil boomset was the BM-10, which I used for both HF and VHF contesting. I still have several of these, and they still work just fine. The only problem is that the blue foam pads deteriorate over time and replacements are relatively pricey at \$6 for a pair. Also, when in a noisy environment, they don't block out amplifier blower noise too well.

A far superior method in my opinion, is to use a separate footswitch, which handles the T/R switching.



Heil FS-2 footswitch



Heil BM-10 Boomset

I've used both the Heil FS-2 and FS-3 and other brands of footswitches. I recommend the Heil FS-3 footswitch because it requires less force to activate,

Some Heil boomsets have an audio phasing switch, while other models offer noise-cancelling features.

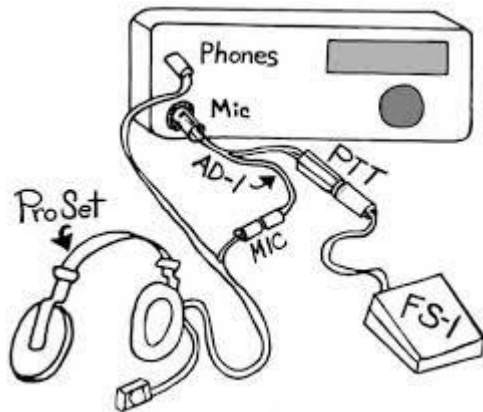


Heil boomset adapter for 8-pin round microphone connection



Some have 8-pin or 6-pin RJ-45 cables and others use the more traditional 8-pin or 4-pin round connector.

In general, the Heil products come with a 3mm mono plug for the microphone, and a ¼ inch stereo phono plug for the headphone connections.



Heil boomset adapter for RJ-45 microphone connections, with- or without blocking capacitor. (explained later)

Heil even offers a choice of microphone elements for your boomset, depending upon if you're a casual "rag chewer" or a serious DX'er or contester. Yes, you can tailor your transmitted audio as well to help bust those pile-ups! All the settings information can be found on the Heil website.

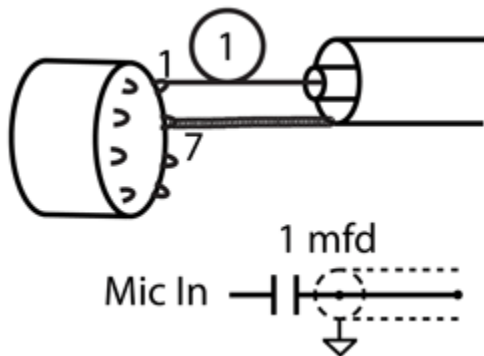
You can obtain the proper adapter that will enable connection to either the traditional 8 or 4 pin round connector, or to the RJ-45 connector. The Heil website has all these details.



Heil HC-5 and HC-4 elements

In general, most ICOM HF radios require a "bias voltage" to operate the Heil "IC" electret microphone elements, while Kenwood, Yaesu, and Elecraft don't have this requirement, so a capacitor is used at the connector to "block" the DC voltage. Heil Boomsets are designated with the letters "IC" to indicate that they're intended to be used with ICOM radios.

### DC De-coupling on Icom Rigs



DC blocking capacitor for dynamic mic elements used with ICOM radios.

All ICOM transceivers utilize "phantom power" on their microphone inputs. Borrowing technology from the recording studios, DC power is applied via the mic line to energize the electret elements used in stock Icom microphones. At the same time, DC flows DOWN the mic cable while the mic audio is fed UP the same wire. Of course, the voice signal is AC, so DC flows one direction while AC flows the other direction - all on the same cable. This is cool until you start having RFI problems, which means that you may have shielding or station grounding problems to deal with.

The BIG problem with this is when you try using a REAL (dynamic) microphone. Connecting a dynamic into your mic input will provide a nice short of the +8V DC power straight to ground. SMOKE CITY!!!

To use any dynamic element on these phantom powered inputs (which should NEVER be applied to a mic input of a radio transmitter), the input must be decoupled so the mic audio AC signal can pass through to the mic preamp, while simultaneously blocking the DC voltage from reaching that mic element.

Simply install a 1  $\mu$ F non-polarized tantalum capacitor in series with mic lead. You may get by with a .68 F or a .47 F, but anything less (.01  $\mu$ F, .005  $\mu$ F, etc.) will not pass any speech audio worth listening to). The cap MUST be a non-polarized type. This will keep the DC factor into the mic preamp circuitry.

All Heil microphones have a 1  $\mu$ F capacitor inside. All AD-1 boomset adapters have the decoupling capacitor installed in the 8 pin Foster connector.

The coupling capacitor is NOT installed in our new high-impedance GM "VINTAGE" microphone, as this model should never be used with ICOM low impedance inputs.

Source:  
<http://www.heilsound.com/amateur/support/dsp-settings/all-things-icom>

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 For those who want the "broadcast microphone experience", Heil offers a boom that can be fastened to your shack wall, table or shelf, and special "shock mounts" for a separate microphone. In these applications, use the VOX on your radio, or you'll need an FS-3/FS-2 footswitch to handle the T/R switching.



Heil mic boom system components



Heil microphone boom



Mr. Heil Sound - Bob Heil, K9EID, in his shack



Here's a website that sells repair/replacement parts for Heil products:

[http://www.dxstore.com/heil\\_parts.html](http://www.dxstore.com/heil_parts.html)

Visit this web site to learn more about Bob Heil, his fascinating career, and his significant influence on Rock and Roll history:

<http://www.fohonline.com/current-issue/78-milestones/14059-bob-heil-50-years-of-innovation.html>

## Some Phone Facts:

Mayday! Mayday! Mayday! It's the call that no airplane pilot or ship's captain ever wants to have to make. Why? Because it means trouble. Big trouble!

Mayday is the word used around the world to make a distress call via radio communications. Mayday signals a life-threatening emergency, usually on a ship or a plane, although it may be used in a variety of other situations.

Procedure calls for the mayday distress signal to be said three times in a row —

Mayday! Mayday! Mayday! — so that it won't be mistaken for another word or phrase that sounds similar under noisy conditions. A typical distress call will start with mayday repeated three times, followed by all the relevant information that potential rescuers would need, including type and identity of craft involved, nature of the emergency, location or last known location, current weather, fuel remaining, what type of help is needed and number of people in danger.

Mayday got its start as an international distress call in 1923. It was made official in 1948. It was the idea of Frederick Mockford, who was a senior radio officer at Croydon Airport in London. He came up with the idea for "mayday" because it sounded like the French word m'aider, which means "help me."

Sometimes a mayday distress call is sent by one vessel on behalf of another vessel in danger. This is known as a mayday relay. A mayday relay is

sometimes necessary if the vessel in danger loses radio communications. If a mayday call is repeated and not acknowledged, another vessel hearing the call may attempt to relay it again and again until help is reached.

A mayday call is not something to be taken lightly. In the United States, it's illegal to make a fake distress call. Doing so can land you in jail for up to six years and subject you to a \$250,000 fine!

For situations that are less than life-threatening, one of several other urgent messages can be conveyed. For example, "Pan-Pan" — from the French word panne, which means "breakdown" — can be used to signal an urgent situation involving a mechanical or medical issue.

Another signal is "Securite"—from the French word sécurité, which means "safety." Securite is often used to convey a message about safety, such as bad weather or navigation hazards. Like mayday, these phrases are usually repeated three times to avoid confusion.

Source:

<http://wonderopolis.org/wonder/what-does-mayday-mean/>

Take the Wonder Word Challenge at this website.

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## Elon Musk's SpaceX on brink of 'Wright Brothers moment' with reused rocket

Originally published March 26, 2017 at 5:00 pm  
Updated March 27, 2017 at 12:53 pm



*A SpaceX rocket originally flew in April 2016 before landing successfully on an unmanned drone ship bobbing in the Atlantic Ocean. The Falcon 9 rocket is scheduled to fly again on Wednesday. (SPACEX/EPA)*

**The Falcon 9 rocket slated to take off Wednesday from Cape Canaveral has flown before, marking the first time SpaceX will again fly one of the 14-story-tall boosters it recovered from past missions.**

**Share story**

By

[Dana Hull](#)

*Bloomberg News*

If the rocket that Elon Musk's SpaceX expects to launch this week looks familiar, that's because it is.

The Falcon 9 rocket scheduled to take off from Kennedy Space Center in Cape Canaveral, Florida, has flown before, marking the first time Space Exploration Technologies will reuse one of the 14-story-tall boosters it recovered from past missions. **The reused rocket will ferry a communications satellite into orbit for Luxembourg-based SES, SpaceX's first commercial customer,** and signals a leap forward in Musk's 15-year-quest to drive down launch costs and eventually create a human colony on Mars.

"This is a Wright Brothers moment for space," said Phil Larson, a former space-policy adviser to President Barack Obama who

worked for SpaceX and is now at the University of Colorado. "It's as important as the first plane taking off and landing and taking off again."

The rocket originally flew in April 2016 before landing successfully on an unmanned drone ship bobbing in the Atlantic Ocean. SpaceX has now recovered eight rockets in total: three by land and five by sea. The first rocket that was recovered is a huge source of pride and is now installed in front of the company's headquarters in Hawthorne, California.

"The satellite industry needs more launch vehicles, and we need more access to space," SES's Chief Technology Officer Martin Halliwell said in an interview. "Rockets that can be flown, recovered and relaunched again help enormously. This is a hugely important milestone."

Once derided as a crazy idea, rocket reusability is now seen as key to making space travel affordable.

Blue Origin, the space-exploration company founded by Amazon Chief Executive Officer Jeff Bezos, is working on New Glenn, a rocket with a reusable first stage that's targeting its first flight in 2020. Parts of the Space Shuttle boosters were refurbishable, but no company has pulled off the "rapid reusability" that SpaceX is targeting to lower launch costs, said Larson, the former Obama adviser.

Recovering and refurbishing the used rocket booster that's scheduled to fly again on Wednesday took SpaceX roughly four months, President Gwynne Shotwell said on a panel at an industry conference in Washington, D.C., earlier this month. Eventually, that turnaround time will drop to a single day as the company aims to reuse rockets much in the way airplanes operate today.

"I think Elon's given us 24 hours, maybe, to get done what we need to get done, and it's not a million people around a rocket scurrying

like a beehive or an anthill,” said Shotwell. “That vehicle needs to be designed to be reflown right away.”

The cost of a Falcon 9 launch is roughly \$62 million, according to SpaceX’s website, with modest discounts available for contractually committed, multilaunch purchases. SES, which has flown with SpaceX twice before, was the first commercial satellite operator to launch with the company back in 2013.

The SES satellite taking flight this week will enhance coverage for Latin America. The company has contracted with SpaceX for four additional missions, according to Halliwell. “We won’t discuss the exact price, but we got a certain discount for being the first in line,” he said.

SpaceX, founded by CEO Musk in 2002, builds the Falcon 9 as well as the rocket’s Merlin engines in-house, taking a Silicon Valley approach to constant improvements and a tight collaboration between design and manufacturing. Musk has brought in executives from other industries to promote innovation. Andy Lambert, SpaceX’s vice president of production, previously spent more than a decade at BMW.

SpaceX has a \$1.6 billion contract with the National Aeronautics and Space Administration to resupply the International Space Station and a second pact valued at as much as \$2.6 billion to transport crews to the orbiting lab. The company was recently awarded its second contract to fly missions for the U.S. Air Force and plans to send two private citizens on a trip around the moon late next year.

The reused rocket was first flown in April with the CRS-8 mission, a cargo resupply mission to the space station.

If Wednesday’s launch goes off without a hitch — and the rocket booster is once again recovered on the drone ship — SES will get its own piece of spaceflight history as a memento.

“Gwynne has promised us parts of the rocket,” Halliwell said. “We want them for the SES board room.”

**Dana Hull**



*SpaceX/Flickr*

## ***Here's Why the SpaceX Launch Means We've Entered a New Era of Spaceflight*** ***Space has never been so close.***

**PETER DOCKRILL**

**3 APR 2017**

SpaceX made history last week, launching a pre-flown booster into space for the first time ever – arguably the strongest milestone yet in the company's bid to make economical, reusable rockets.

The achievement – which SpaceX chief Elon Musk hailed as a "revolution" – could come to be seen as the beginning of a new chapter in human exploration, in which rocket launches become dramatically cheaper and space becomes more accessible.

"I think it's an amazing day for space," Musk said after the launch in a video message. "It means you can fly and re-fly an orbit-class booster, which is the most expensive part of the rocket. This is going to be, hopefully, a huge revolution in spaceflight."

Reusability has long been a central component of SpaceX's vision, with the company describing the principle as "the key to making human life multi-planetary", by



virtue of its ability to cut the costs associated with rocket launches.

Of course, the first step in making rockets reusable is getting them to land after they've flown – something which SpaceX appears to have gotten the hang of both on land and on floating sea platforms – although it took some highly publicized failures to perfect the technique.

Now, with last Thursday's success, one of the company's pre-flown and landed Falcon 9 booster rockets launched off for a second mission from Kennedy Space Centre in Florida.

After deploying a telecommunications satellite into orbit, it then returned to Earth and made a successful landing on a drone platform floating in the Atlantic Ocean – a convincing demonstration that the end-to-end reusable rocket cycle is actually possible.

"It did this mission perfectly," Musk said. "It dropped off the second stage, came back and landed on the drone ship. Right in the bulls-eye."

Before this modern era of reusable rockets as demonstrated by SpaceX and Jeff Bezos' Blue Origin, all previous rocket launches were one-off affairs, resulting in the destruction of the rocket's booster.

Given a Falcon 9 is said to cost more than \$61 million to build, the financial advantages of reusing the machinery quickly start to add up. And when you consider that Musk has said the rockets might ultimately be re-deployed hundreds of times – potentially re-launching within 24 hours of having landed – it starts to make sense that we could be looking at a whole new kind of spaceflight here.

Not only in terms of SpaceX, either – but potentially the whole spaceflight industry. As Musk explained at a news conference after the launch and landing:

"I think, hopefully, this will inform the decisions of other space organizations. Reusability has been put forth as really too

hard, or not really feasible. Now, in order to be competitive in launch costs, I think it's going to be necessary for other companies to do the same thing.

Imagine if we were an aircraft company selling aircraft that could be flown many times, and everyone else was selling aircraft that could be flown once, I mean, you know, that's not a very competitive position to be in." In that sense, the greater significance of a moment like this isn't just that we now know reusable rockets are technologically feasible – but that they become the new norm, much like the introduction of the modern commercial airliner in the 1950s and '60s.

"I think that 50 years from now we'll look back on this day and that's say where commercial space travel began," aerospace engineer and former NASA chief technologist Bobby Braun told Eric Berger at Ars Technica.

Beyond lowering the cost and format of rocket flights across the board, the era of proven reusable, relaunchable boosters also means that, in the future, we'll be able to take off from places we've landed.

In the context of travel to other planets – with Mars as the first destination – the significance of that can't be understated for humanity's pioneering astronauts.

"No one has ever done anything like this before," SpaceX CEO Gwynne Shotwell said in a video broadcast before the launch.

"We're not [a] one-way trip to Mars, people. We want to make sure that whoever we take can come back."

## **NOTICE TO CAPERS READERS**

**CAPERS** is an important aspect of our club. It's time for **more participation** with this publication.

**CAPERS** is looking for ANY and ALL input.

Don't be shy, just send a few words, a picture, link, or short message to Jay Albano, or Dan Fegley, your Co-Editors, and we'll include it.  
**jjalbano@aol.com, w1qk@snet.net**

**CAPERS** deadline for input:  
LAST Friday of the Month preceding the meeting.

**CAPERS** will be released:  
Monday before the scheduled Friday monthly meeting – or earlier if possible.

73- Jay, N1NRP Dan, W1QK