

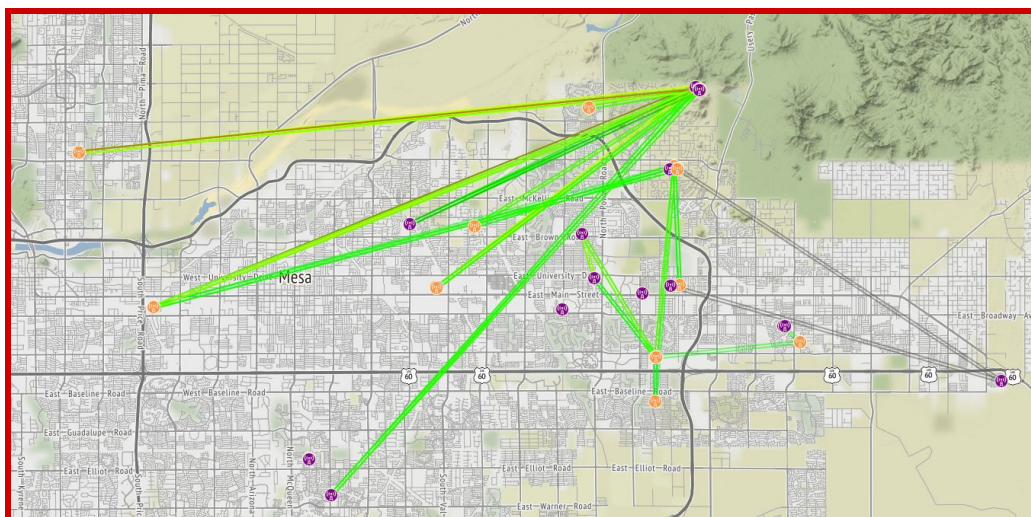
Practice Exercise Introduction for the Central Arizona Mesh Group (CAMG)

One of the joys of AREDN® mesh networking is being able to experiment with radios, antennas, and establishing RF links for data traffic. Once the radios and links are in place, however, it is also important to use the network by becoming familiar with various applications or programs that pass data across the links.

The purpose of the CAMG mesh practice exercises is to give amateur radio operators the opportunity to practice using their mesh nodes and network links. There are several types of exercises that will be made available for any interested amateur operator. *Desktop* exercises can be completed without having to leave your ham shack, while *Field* exercises may require you to deploy a portable node in the field. *Solo* exercises can be completed on your own, while *Team* exercises require you to work with one or more other operators to complete the tasks.

	Desktop	Field
Solo	✓	✓
Team	✓	✓

These exercises may require some initial preparation, planning, or setup. Once the pieces have been put in place by a team leader or admin, any interested amateur operator with access to the CAMG mesh network should be able to participate.



Title: “How Healthy is My Mesh Node?”

Exercise Type:	Solo - Desktop
Estimated duration:	30 minutes
Prerequisites:	One working AREDN® node that is connected to the mesh network (either by RF or tunnel)
Objective:	To investigate and assess the overall health of your AREDN® node and its links to the wider mesh network.

Scenario:

This exercise helps you to investigate the overall health of your node and its links to other neighbors. Log into the web interface for your node.

- What is the make/model of my radio hardware?
(for example: Ubiquiti Bullet M2, 32mb memory, single polarity)
-

Node Status Page:

- Which version of AREDN® firmware is installed on my node?

- How long has this node been continuously running? (uptime)

- How much free flash storage is currently available? _____
(Anything more than 512 KB should be adequate, but anything less may indicate a problem.)
- If your node has an RF connection to one or more nodes, what is the average signal-to-noise ratio shown on the *Node Status* page? _____ dB

Signal Charts Page:

- If your node has an RF connection to one or more nodes, click the *Charts* button to review signal quality. If you are using a tunnel rather than RF, skip this section.

In the *Selected Device* dropdown list, review the signal charts for each of your neighbors in order to answer the following questions:

- Which neighbor node shows the best average signal quality?
Node: _____ Signal: _____
- Which neighbor node shows the worst average signal quality?
(SNR of 15 dB or greater is good; 10 to 15 is usually adequate; below 10 is marginal)
Node: _____ Signal: _____
- Which neighbor node shows the most variation in signal quality over time?
Node: _____ Range: _____
- Is the noise floor consistent? Noise value: _____
(View the noise values by hovering over the chart to see the instantaneous values list. Normally the value is around -94 dBm, so a noise value higher than that may indicate a problem.)

Mesh Status Page:

- In the *Current Neighbors* list, which nodes can my node hear best? (Highest to Lowest)
- Node: _____ LQ: _____
Node: _____ LQ: _____
Node: _____ LQ: _____
Node: _____ LQ: _____
Node: _____ LQ: _____
- Which neighbor nodes can hear my node best? (Highest to Lowest)
- Node: _____ NLQ: _____
Node: _____ NLQ: _____
Node: _____ NLQ: _____
Node: _____ NLQ: _____
Node: _____ NLQ: _____
- Which *Current Neighbors* have the highest TxMbps values? (Highest to Lowest)
- Node: _____ TxMbps: _____
Node: _____ TxMbps: _____
Node: _____ TxMbps: _____
Node: _____ TxMbps: _____
Node: _____ TxMbps: _____
- Overall, which *Current Neighbor* would you rank as the best node for communication?
Node: _____
What factors do you think might make this node the best?

- In the *Remote Nodes* list, which nodes with an ETX of 7.00 or less have services which you may want to use?

Node: _____ Service: _____

Node: _____ Service: _____

Node: _____ Service: _____

Node: _____ Service: _____

Node: _____ Service: _____

- Are you able to access services on nodes with an ETX greater than 7.00 and, if so, how long does it take to access them?

- At what ETX value would you estimate that remote services become almost unusable from your node?

Setup Pages:

- Take screenshots of your *Setup* pages to capture your node's configuration and save them on your computer for future reference.
- On the *Basic Setup* page, verify that neither of the "Advanced WAN Access" checkboxes are checked. These are only for special cases and should remain unchecked for normal nodes.

Optional Activities:

- If you have a standalone node which others do not depend upon, you may want to experiment with changing the *TX Power* and/or *Distance to Farthest Neighbor* setting(s), saving your changes, rebooting your node, and then looking at the *Signal Charts* to see how each changes affect your RF link quality.
- Click *Setup > Administration > Download Support Data* to see the kind of information that is included in the resulting support archive file.

Title: “Doctor, We Need That Scan”

Exercise Type:	Desktop - Solo
Estimated duration:	30 minutes
Prerequisites:	One working AREDN® node that is connected to the mesh network (either by RF or tunnel)
Objective:	To assist emergency medical personnel by obtaining and forwarding an important CT Scan image to them.

Scenario:

There has been a widespread power outage which has made normal communication channels unusable in your area. As an emergency communicator, you have been deployed to a local shelter in their medical triage section. You have access to a battery powered portable AREDN® node with a laptop on the mesh network. Your tactical identifier is **TRIAGE-2**

One of the triage center patients was injured in a fall during the blackout. His family reports that his medical history indicates previous head trauma with several important diagnostic tests on file at the regional hospital. He is currently showing symptoms of acute trauma and the medical triage team needs to have the CT Scan image in order to proceed with proper treatment.

The regional hospital is running on generator power, and there is another emergency communicator deployed there with access to the AREDN® mesh network. The tactical identifier for the regional hospital is **BHC-1**. Your goal is to obtain the CT Scan image and forward it to the triage center staff.

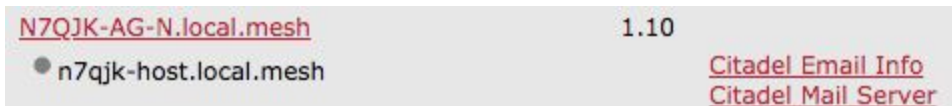
Locate the CT Scan Image:

- ❑ Assume that you previously logged onto the SARCChat service and sent a request to **BHC-1** for them to identify the correct CT Scan image. **BHC-1** has located the image and sent you a SARCChat message in the following channel: “CAMG Mesh Exercises”
- ❑ Now, using your FCC amateur radio callsign, log onto one of the available SARCChat services on your mesh network.

- ❑ In the *Messages* section, change the channel to “CAMG Mesh Exercises” and/or search for **TRIAGE-2** in the search field. Locate the message sent by **BHC-1** to **TRIAGE-2** which gives the CT Scan filename.
- ❑ In SARCCChat navigate to the *FILES* area and locate the filename which was provided to you by **BHC-1**.

Retrieve and Forward the CT Scan Image:

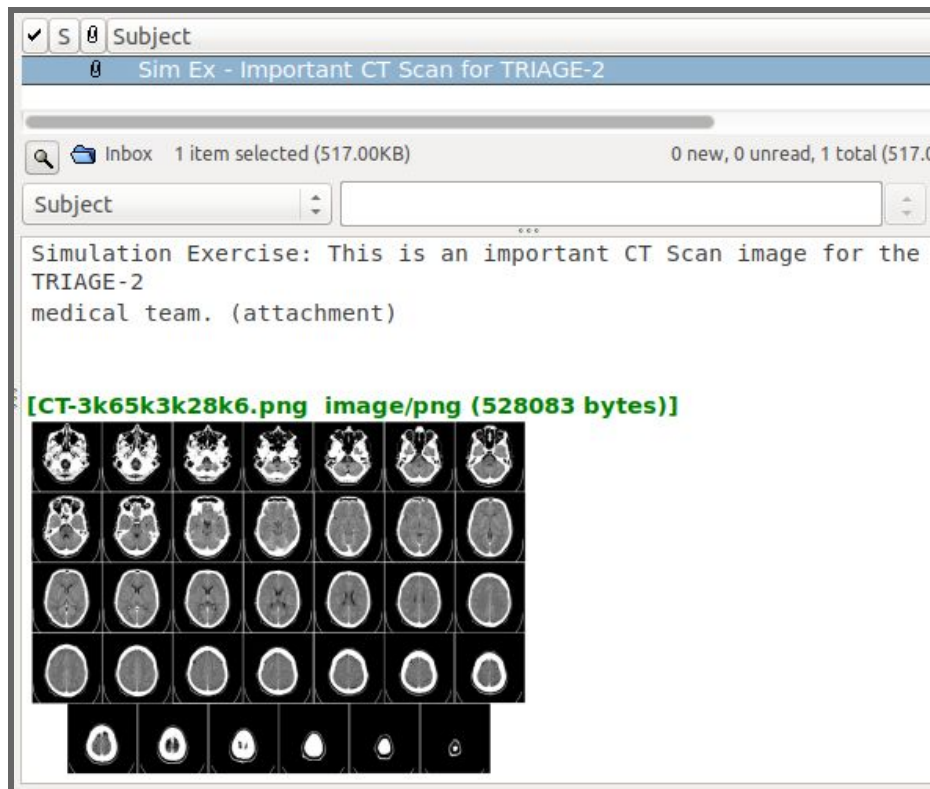
- ❑ When you locate the CT Scan file, click the filename link to save the image to your workstation. By default the file will be saved in the location specified for your web browser. You can right-click the link and choose *Save Link As* to select a different location. Record the location of the downloaded file for future reference.
- ❑ The medical triage team requested that the CT Scan image be sent to their group email inbox on the **camg.mesh** email server as soon as possible. You will be sending the image to them as an email attachment.
- ❑ The **camg.mesh** email server is a service provided by N7QJK. You will find this service as a link under the **N7QJK-AG-N** mesh node (*Citadel Email Server*) or by navigating directly to the following web URL on the mesh network:
n7qjk-host:8080



- ❑ If you do not already have a **camg.mesh** email username, then you should register by clicking the “*New User? Register Now*” button. You must provide your callsign and enter any password you choose. Record your username/password for future reference.
If you already have a **camg.mesh** email account, log into the email service with your callsign and password.
- ❑ On the Citadel dashboard, click the *Mail* button in the left menu bar. You need to send a new email, so click the *Write Mail* button in the top menu bar.
- ❑ The *from* field is prepopulated with your camg.mesh email user id. In the *To* field, enter **TRIAGE-2@camg.mesh** and complete the *Subject* field.
- ❑ Click into the message body area and enter the message text you desire.

- ❑ Next you must attach the CT Scan image to the email message. Click the *Attachments* button in the top menu bar, then click the *Attach File* button. Navigate to the location where you saved the CT Scan image and select it for attachment. Once the file has been attached, click *Close Window* to return to your email. In the top menu bar you should now see *Attachments: 1*
- ❑ Click the *Send Message* button in the top menu bar to send your email to the **TRIAGE-2** inbox.
- ❑ You can verify that the message has been sent by navigating to your *Sent Items* folder. To do this, click the *Rooms* button in the left navigation bar. Select *Sent Items* and you will see the sent email in the message list. If you click the row for your sent message, the message text will appear in the bottom pane.

NOTE: you may not be able to view/download the attachment due to an issue in the Citadel image viewer, but standalone email clients can successfully display the image as shown below.



- ❑ At this point you have completed the exercise and can logout of both the Citadel email server and the SARCCChat messaging service.