

In this month's edition of the Elmers Corner I thought I would take a break from strictly amateur radio operations, to cover an interesting area of the radio hobby which can be enjoyed either on HF or on VHF/UHF radios. There are plenty of folks who make a full-time hobby out of military aviation monitoring, and still more who focus just on civilian monitoring. For me aviation monitoring is a pleasant diversion/alternative to amateur radio operation, but it can really make us better operators along the way!

Make no mistake, both civilian and military aviation monitoring takes some getting used to, but by learning to follow aviation transmissions you will be able to hear weak, noisy, or extremely fast transmissions, something which can come in real handy in amateur radio operation. Just try and capture some of those lightning fast call signs on our local nets!

Why Military Aviation Monitoring?

Milcom monitoring is perhaps one of the most extensive and expansive areas of monitoring communication on the airwaves today. Between developing various forms of communication for themselves, the military has also adopted civilian protocols and adapted them for their own use. There are voice, data, CW and SatCom (Satellite Communication) modes, all of which may be found across the entire RF spectrum at one time or another.

While most of the SatCom signals are encrypted, as are a number of other communications, there is a surprising amount of communication which is "in the clear." Even some of the messages which are transmitted in "code" such as the Emergency Action Message (EAM) can be heard – the numbers just will not mean anything to the civilian monitoring these frequencies.

Close-in and Long Distance

Much like civilian aircraft communications, military aircraft communications require local and long distance capabilities, meaning they operate on both VHF/UHF (V/U) and HF frequencies. HF frequencies are shared by many different countries and services, and so there are a good number of fairly established frequencies for various services so as to avoid overlap.

It is not uncommon for military aircraft to also use civil air frequencies both for convenience and for coordinating with local airports. For example, at Lunken airport (LUK) there is a common military tower which uses a military frequency of 257.800 AM for navigation purposes. At CVG there are shared civilian frequencies as well as monitoring of milcom bands, and the local

Indianapolis ARTCC (Air Route Traffic Control Center) often handles milcom traffic as part of their normal routing.

Primary V/U frequencies in the U.S. are from 225-399 MHz, but there may be some occasional VHF-low usage between 30-75 MHz. There is also some activity between 138 - 144 MHz., 148 - 150.70 MHz. using mostly AM and some FM modes (for satellite comms).

Like all VHF/UHF communications, local milcom is basically line of sight on these upper bands, but the greater elevation of these planes allows them to be heard many miles away, particularly for pilot to ground communications and air-to-air comms.

VHF/UHF Monitoring

There are a number of places where frequency lists may be found, some of which I will note below. A lot of milcom monitoring involves scanning ranges of frequencies regularly to find patterns of flights or operations. A great place to look for airports both civilian and military is <http://www.worldaerodata.com/>.

Many amateur radios now cover some portions of the aviation bands, but for military monitoring you will want to make sure your radio or scanner includes frequencies in the 200-400 MHz, since this is where a lot of military traffic happens.

However, scanning the ranges between 225 and 398 MHz can be quite slow just going one frequency at a time. One trick is to use multiple scanner bands to assign smaller ranges of frequencies so the scanning goes more quickly. Another trick is to set the scan frequency interval to 25 kHz since this matches the spacing of the channelized communications, which in turn allows for faster scanning.

HF Monitoring

HF monitoring is in some ways similar to monitoring the upper bands, as many of the same agencies use HF frequencies as well as VHF/UHF. One of the more basic but significant differences however is in the scanning methods—if HF radios are set to quiet the squelch and only open on strong signals, one is likely to miss a lot of traffic. With HF frequencies it is usually better to have frequencies programmed into memory if more than one frequency is to be monitored, as the general noise of the bands makes it almost impossible to scan as effectively as with AM or FM modulation in the higher bands.

Fortunately there are a number of common frequencies which can be programmed in which will ensure hearing a lot of traffic, but keep in mind this is not like scanning for local Police/Fire/Emergency Services close to home from a repeater. HF is used precisely because it does not act like V/U bands, and because there is a need for signals to travel great distances and still be heard. In addition to static and atmospheric noise, propagation shifts will greatly affect what is heard, and fading similar to shortwave broadcast stations will occur to these much weaker aeronautical signals.

Some places to start monitoring include these bands (using 3 kHz spacing)

- 3025.0 – 3155.0 kHz
- 3800.0 – 3950.0 kHz
- 4700.0 – 4750.0 kHz
- 4750.0 – 4850.0 kHz
- 5450.0 – 5480.0 kHz
- 5680.0 – 5730.0 kHz
- 6685.0 – 6765.0 kHz
- 8965.0 – 9040.0 kHz
- 11175.0 – 11275.0 kHz
- 13200.0 – 13260.0 kHz
- 15010.0 – 15100.0 kHz
- 17970.0 – 18030.0 kHz
- 23200.0 – 23350.0 kHz

While strictly not aeronautical monitoring, the Armed forces Network has a lot of interesting programming on HF:

Diego Garcia	Upper Sideband	12,759 KHz	4,319 KHz
Guam	Upper Sideband	13,362 KHz	5,765 KHz

USAF GLOBAL COMMAND & CONTROL SYSTEM (GCCS) (EX-GHFS)

The High Frequency Global Communications System is a worldwide network of 13 high-powered, high frequency radio stations providing command and control communications between ground agencies and U.S. military aircraft and ships. HFGCS supports a number of missions including voice and data communications for the president and other senior leaders while in flight.

An HFGCS station consists of 3 sites: Transmitter, Receiver, and Control including station infrastructure of antennas and feedlines, and inter-site communications, as well as other support systems.

FREQUENCIES

4724 Nighttime backup

6739 Nighttime backup

8992 Primary 24 hrs

11175 Primary 24 hrs
13200 Daytime backup
15016 Daytime backup
17976

Digital Modes

The military utilizes numerous digital modes, some of which can be decoded by software available to civilians. One of these digital modes is ALE (Automatic Link Establishment, sometimes written as MIL STD 188-144A) which can easily be decoded with commercial or freeware software. This software is used to test the radio path between two stations, and on occasion, pass simple messages. It is in essence a propagation check for the stations. ALE provides HF radios the ability to automatically link using the best frequency based on reception data given by the results of link testing.

USAF Scope Command ALE frequencies (kHz)

2805.0 3059.0 3137.0 4721.0 5708.0
6715.0 6721.0 7632.0 8965.0 9025.0
9057.0 11226.0 11250.0 13215.0 15043.0
18003.0 20631.0 23337.0 27870.0

There is a wealth of information, including call signs, at:
the [MILCOM Monitoring Post](#)

Wrap-up

While this barely scratches the surface of all the military aviation monitoring which can be done on HF and VHF/UHF, I hope this will serve as a good starting point. There are always things to explore day or night, regardless of the propagation! 73, Robert AK3Q