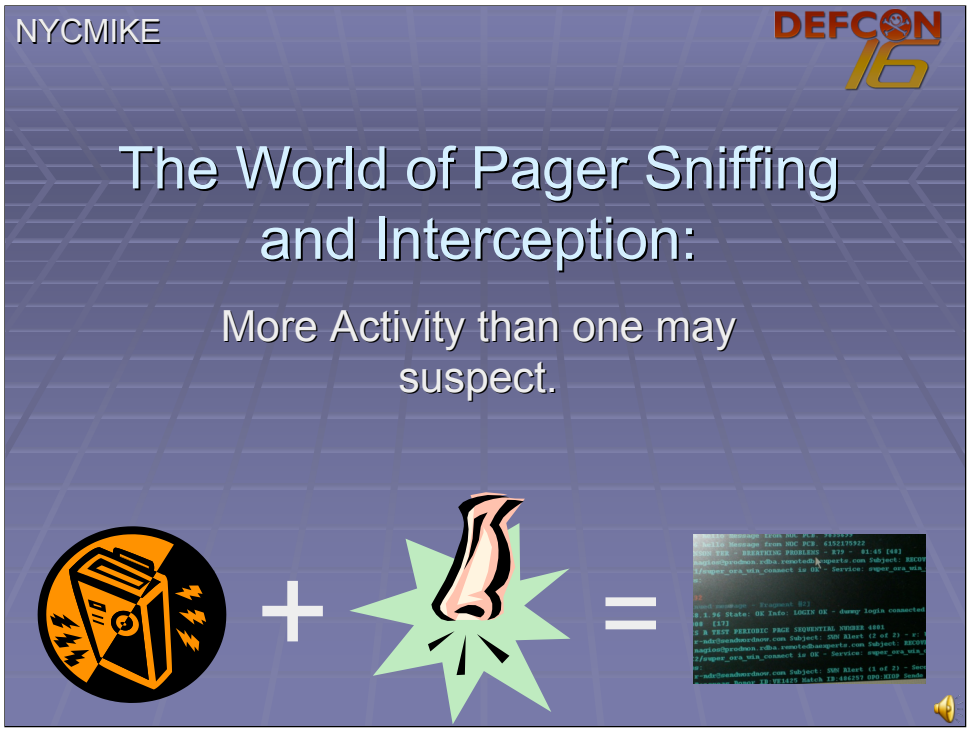


Music: The Cools Kids – Gold and a Pager

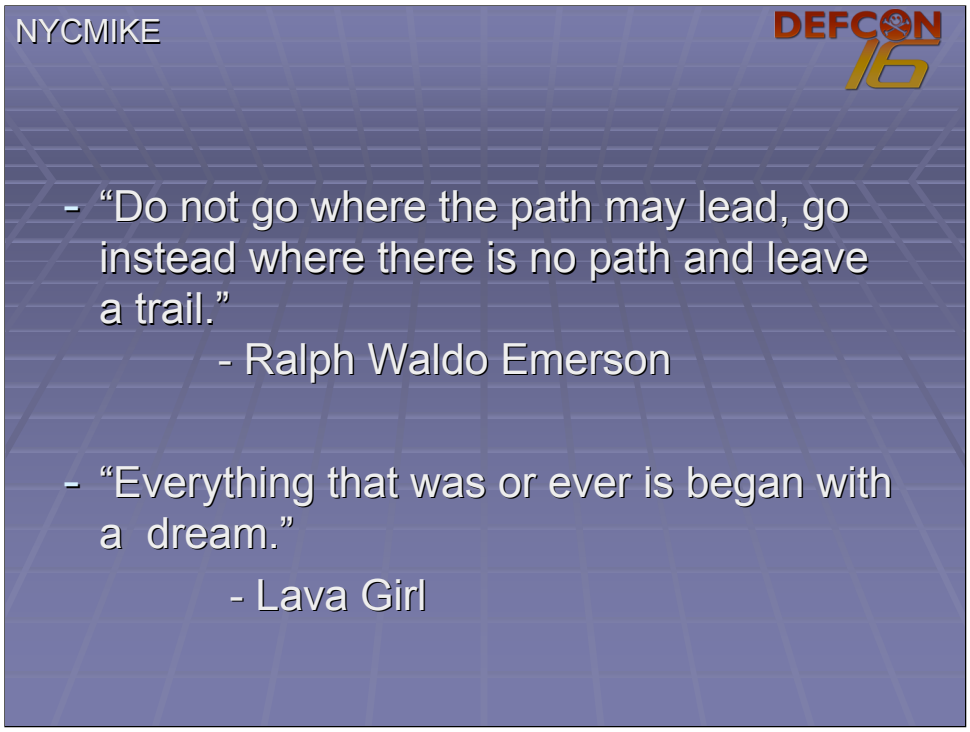
The idea is the let the music play while folks enter the room then move on to the next slide.

(Point out the obvious) Pager interception was once well documented and "wildly" done within certain groups. Therefore I'm no trailblazer or am I? Old tech is not bad tech, its dated,

Its documented, but still useable and interesting. The idea is to re-introduced the activity with some ideas that may of not been available in the early to mid 90's.

I want to stress again that OLD TECH IS NOT BAD TECH…if anything its tried and tested.

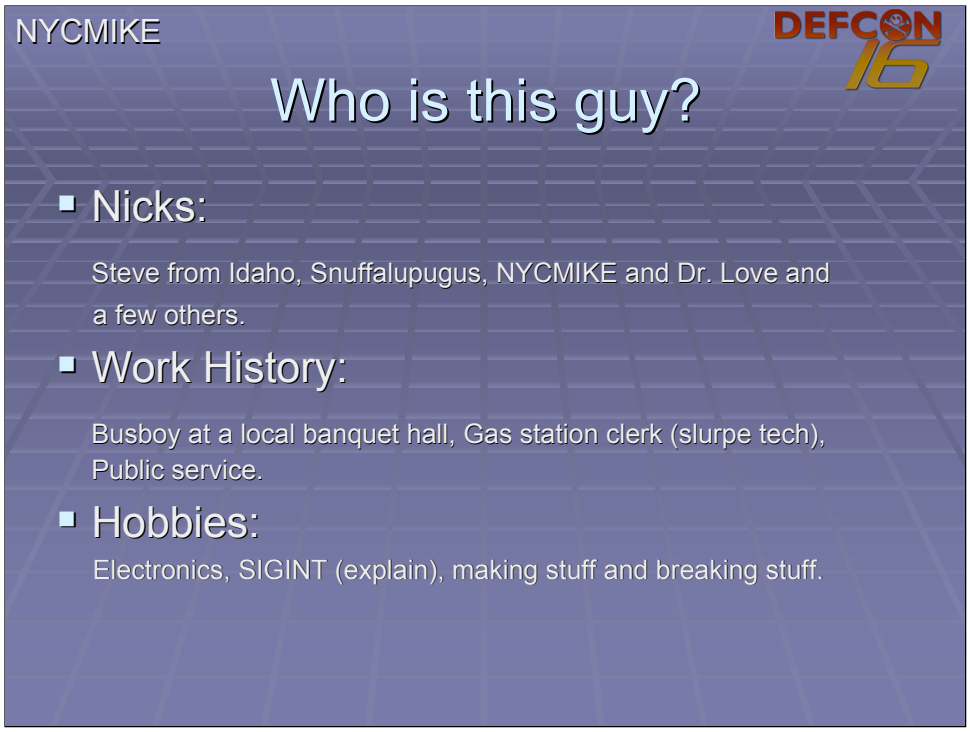
note I probably should of removed or just covered up the text in that screen capture… What do you see when you read it.



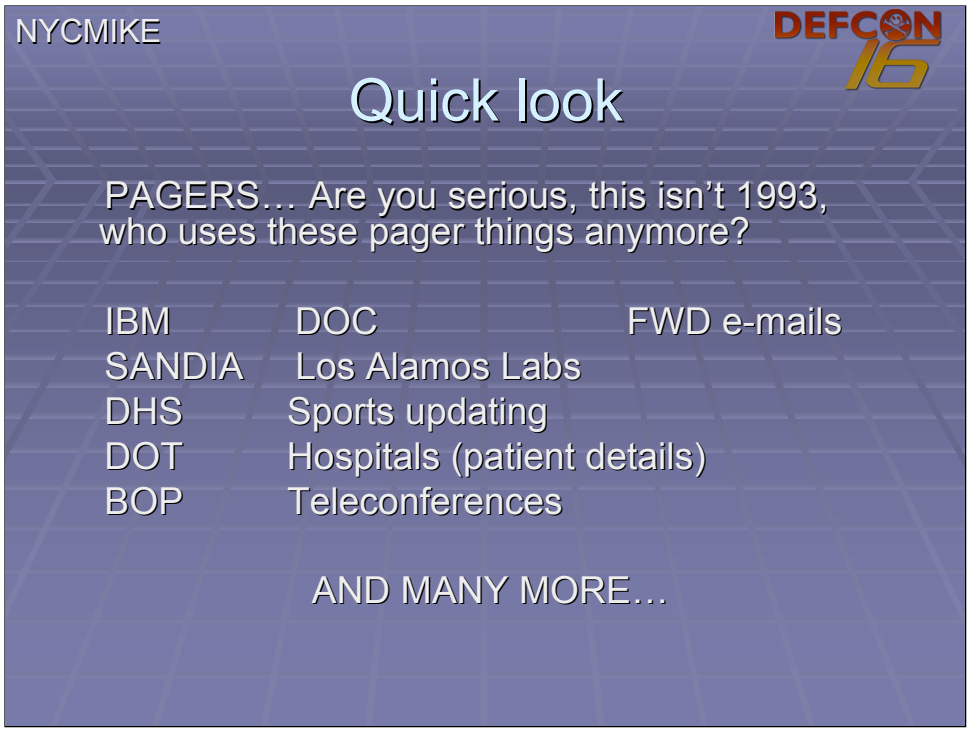
Quote (1) : Pager interception has been done, therefore the path has been made so how does this relate? Things evolve over time this is no exception so I encourage all to find the

new path. The challenge to reinvent, rethink, and retool is open to all… amateur SIGINT (radio monitoring) is a blast (expensive) join the ranks and help the hobby.

Quote (2) : Don't be afraid to think outside of the box. Try your concepts sometime things just work.



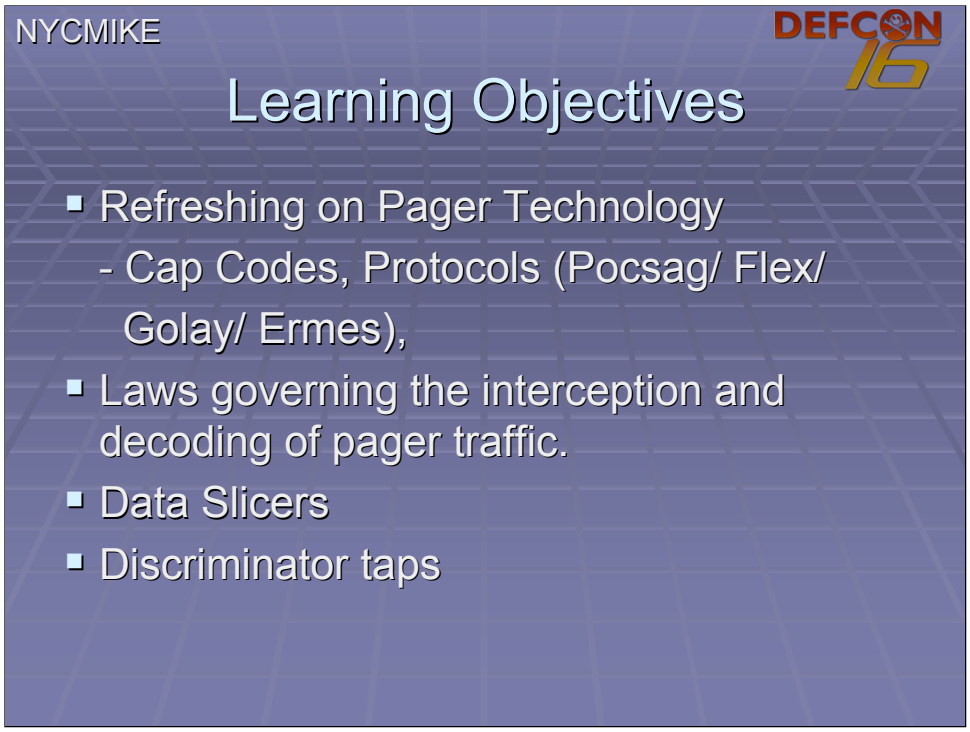
I'm just a guy in love with radio. If you want to drop me some knowledge in this field please do so at one of the following places: irc (irc.2600.net #telephreak/#radio/#make/#ca2600) or the Telephreak voice bridge (www.telephreak.org). Chances are I will not be there under the name NYCMIKE so just ask the question in #telephreak.



Okay off the bat lets agree that with the exception of niche markets pager technology has been replaced. Cost used to be the factor that favored the pager, that is no longer the case. An advantage the pager will have as long as its network is active, is signal penetration and strength. The signal is offset so that gaps or "shadows" are filled. Once you get the setup configured and going you'll have hours of entertainment (For me this is the case).

There is traffic and it can be juicy; e.g. several companies hold telephone conference calls (which means they page the conf number and pass code, which COULD lead to a non invited party to lurk on the line), SANDIA sends msg similar to "Call Ralph at XYZ corp and here is his number", DHS could be sending out SA updates, DOT….., BOP offers the happenings of correctional institutes (lock down or hey we found dope in a glassine bag buried in inmate JOHN DOE's anal cavity), Sporting events (numbers and lines), the hospital data is disturbing due to the amount of info given out (patients name and complaints, not to mention lab results), The phone conferences are just asking to be recorded…

The thing to note is that this mode of communications is still in use and still very much visible. Keep in mind that at face value some data may not seem useful and it may not be to some, BUT the fact is this sort of information is what can be useable in SE operations.



Q: How do pagers work?

A: RF, A intends to send a msg to B, A's msg enters the network…. sat, transmitters on cell phone towers

Common protocols are pocsag and flex in the US…

These are the two I hear the most, therefore this is what I'll cover.

Q: CapCodes?

A: unique ID's, unit will only activate when it hears its ID/CAPCODE over the air

Q:Data Slicers?

A: Converts analog and digital (FSK)

Q: Discriminator tap?

A: Base band audio

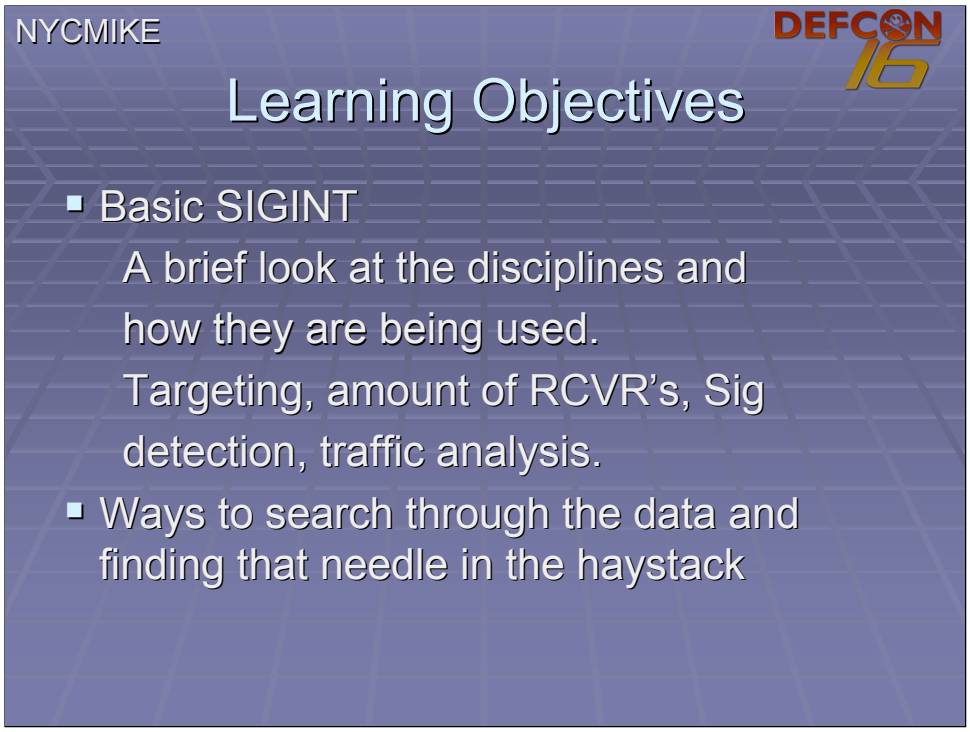
Q: illegal?

A: Not always

Note I've added golay/ermes BECAUSE when listening to online scanners its online thus not limited to US

POCSAG: Post Office Code Standardization Advisory Group

ERMES (European Radio Messaging System)



Basic SIGINT? (I call it SIGINT cause it sounds cool but by definition these techniques are used.)

SIGnals **INT**elligence

Disciplines:

Targeting: Pager networks need for multiple.

Coordinated rcvrs: (This ideology is explored in the concepts segment of this talk). By deploying "deployable" units or "linking" up with other operations. Not all subscribers

have nationwide service, therefore having multi rcvrs would broaden collections.

Signal detection: Know the freq range then use the SA/Band Scope to search for poss. Signal

Traffic Analysis: Again knowing capcodes is important, by doing this you begin to "map" the network, which enhances the

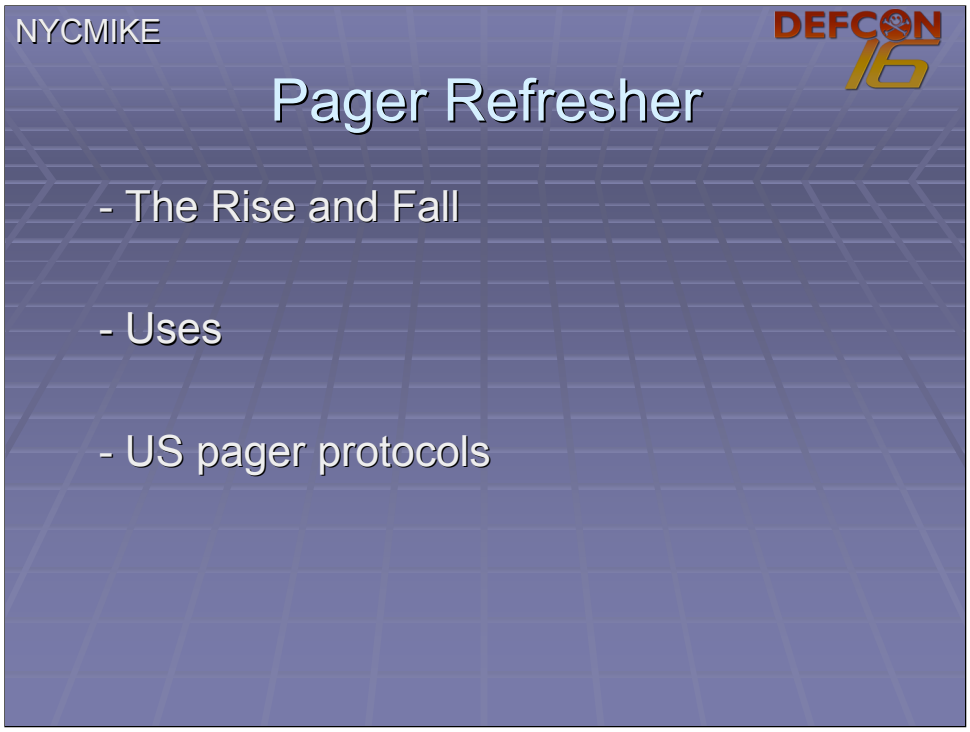
entertainment value.

Q: The responsibility of knowledge?

A: You may see things that could be damaging but then again to share would be illegal… BE SMART with what you find.

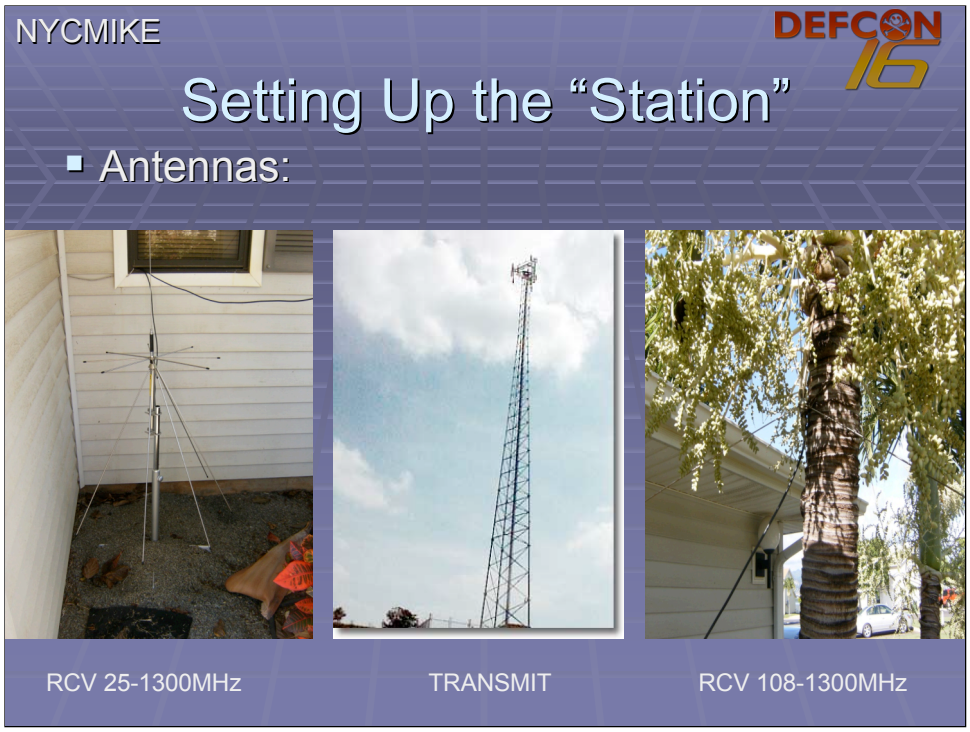
Q: What is good, what is crap, what may be useful down the line?

A: Research, I think this is the what makes the whole hobby worth wild for me…



Rise/Fall	Uses	US Protocols
Cost of Cell phones and Capabilities have pushed Use down	Professional Personal	POCSAG, FLEX

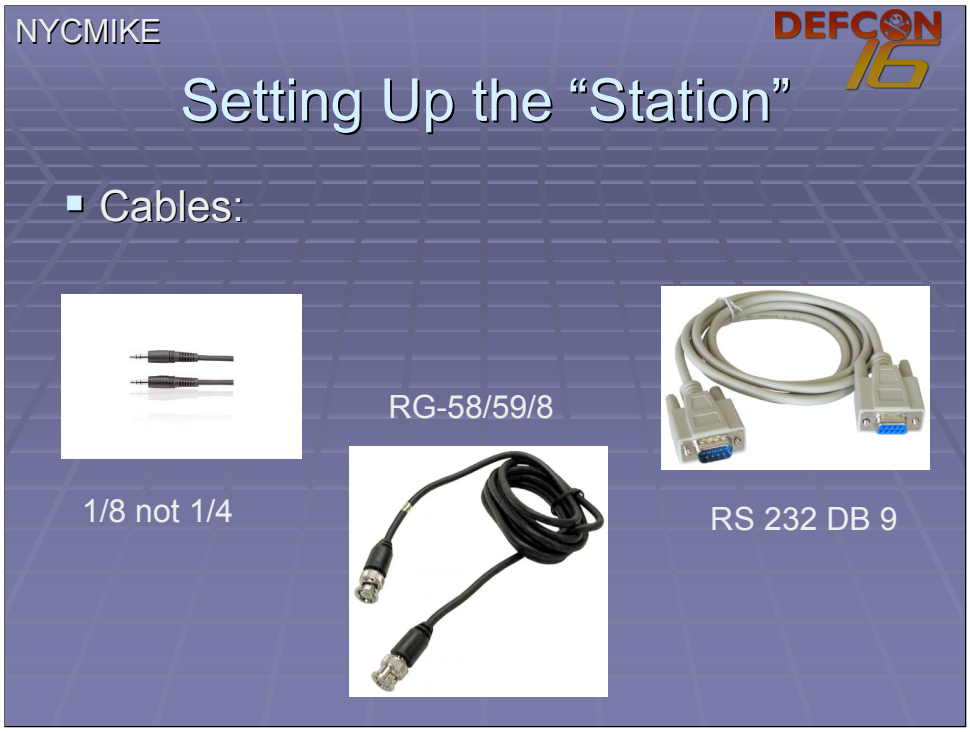
This will be extremely general assuming that most of this is common knowledge. If the audience shows interest (I will ask), I'll mention the cost verse function factor. The main point is to stress that old tech doesn't mean it's bad tech.



VHF and UHF signals that have high signal strength, with that said the stock antenna should work fine.

Pre amp, if one where to be used it needs to be located outside at the antenna. For pager signals it is not needed, but it wouldn't be a bad idea if you're trying to go after other signal types.

The antennas shown should be higher but due to the community I live in putting them higher is not an option.



Get the right RCA

Explain the difference in coax (50 ohm/75 ohm)

DB 9 adapters will not work with PDW

I get my cables from www.allelectronics.com

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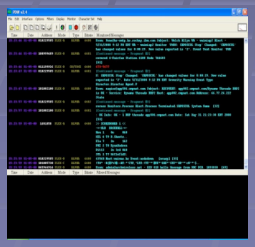
DEFCON 16

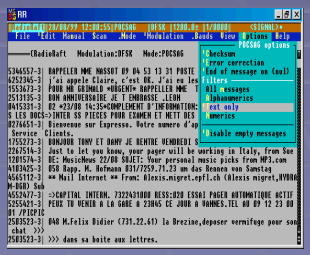
Setting Up the “Station”

- Decoding Software:

Windows Linux DOS



multimon



http://www.pervisell.com/ham/shot_en.htm

Multimon decodes using sound card (Also AX.25 – packet radio BBS, DTMF) - linux

PDW decodes using sound card (Also Flex, ACARS, MOBITEX & ERMES) – widows

POC32…

Radioraft…

I strictly use PDW… but that doesn’t mean you should. Sample different apps and find out what works for you.

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Setting Up the "Station"

- Radios:



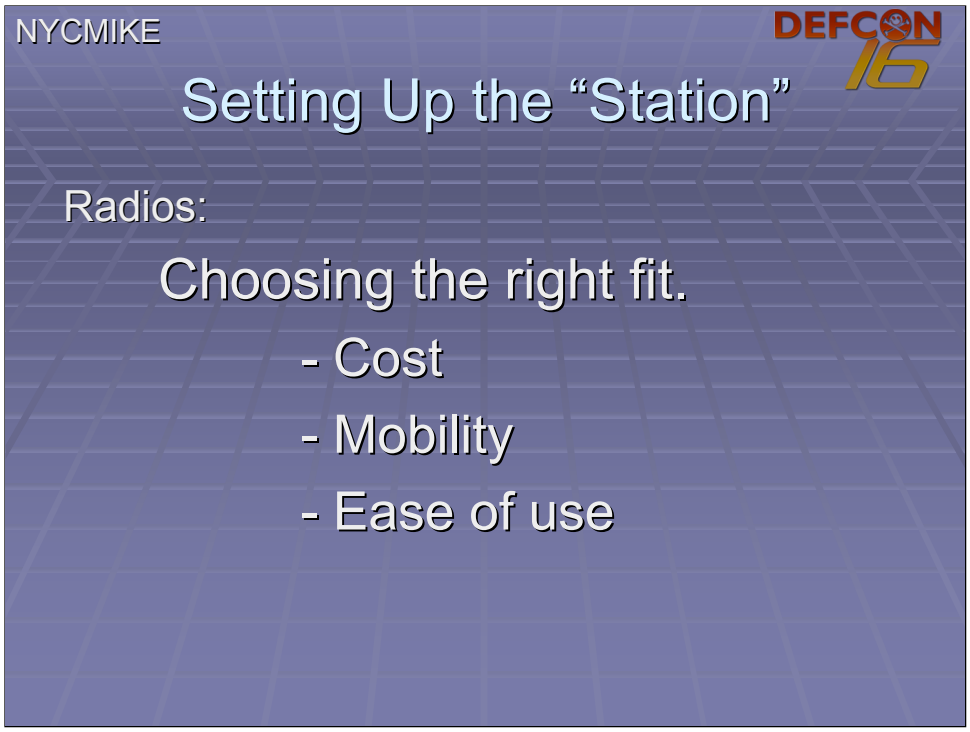
PC Controlled



NON PC Controlled

PC controlled allows the radio to become remote…

NON PC allows the operation to be lower cost…



Cost: How much you plan to spend is up to you , but why go overboard when you can buy a mobile within the

Needed freq range for so much cheaper (pro-84) or a desktop (bd 855 xlt)

Mobility: This may be a concern for me it is not.

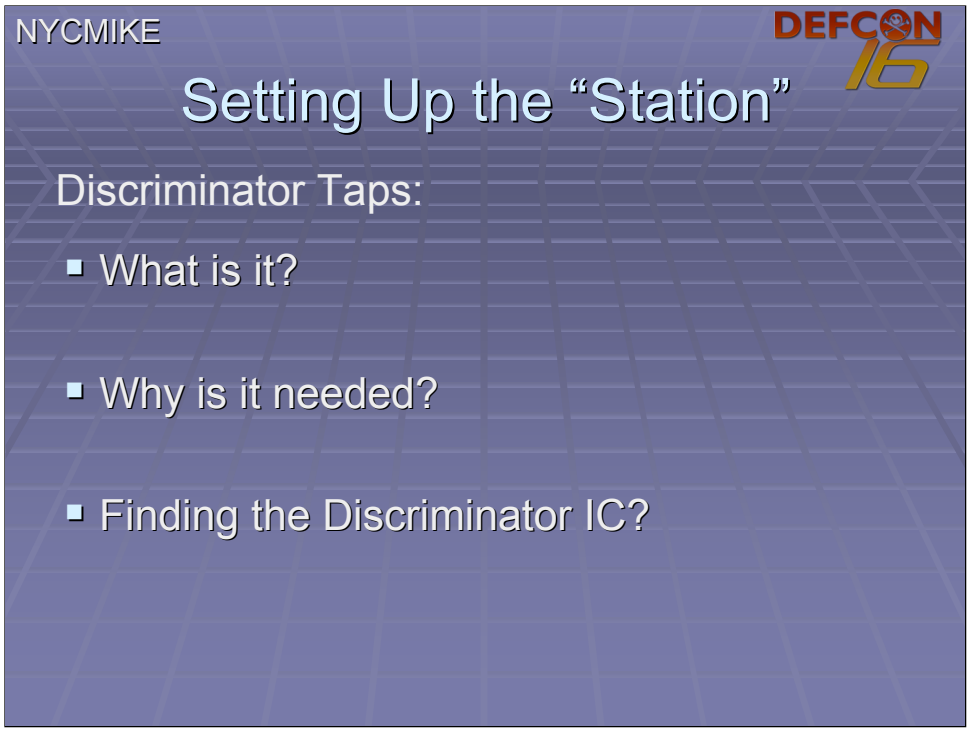
Ease of use: The Plug and Play (PNP) concept doesn’t always work. In radio there are all sorts of models and

not every operator is as skilled as the as next.



This field has been well documented… Thanks to the late Bill Cheek

Either pin 9 or 11 in most cases where you need to tap off of.



What is it:

A physical connection from a pin off the discriminator IC/circuit (the pin varies depending on the chip), this connection

allows access to the raw audio so that the rcvd signal can be decoded.

Why is it needed:

In order to decode digital mods the raw signal is needed, raw meaning before it has reached the "audio stage" this is known as "baseband audio".

Finding the chip:

A large amount of documentation regarding current and pass scanners exist… (go into more detail)

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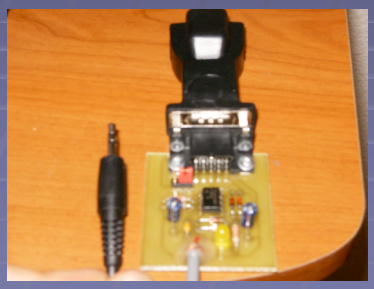
Setting Up the "Station"

- Data Slicers



Level 2



Level 4

Not very expensive to either make or buy… both slicers can be bought for lvl2 ($16) and lvl4 ($24) w/ power adapter, both prices may have changed. (check ebay)

What exactly the data slicer does… kinda like a modem and it decodes FSK…

Note:

Lvl 2 is also known as a hamcomm

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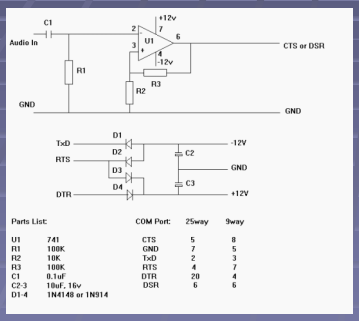
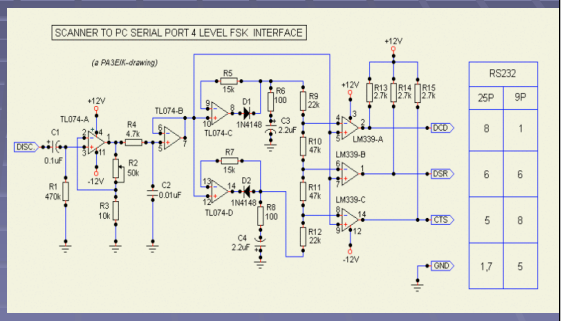
Setting Up the “Station”

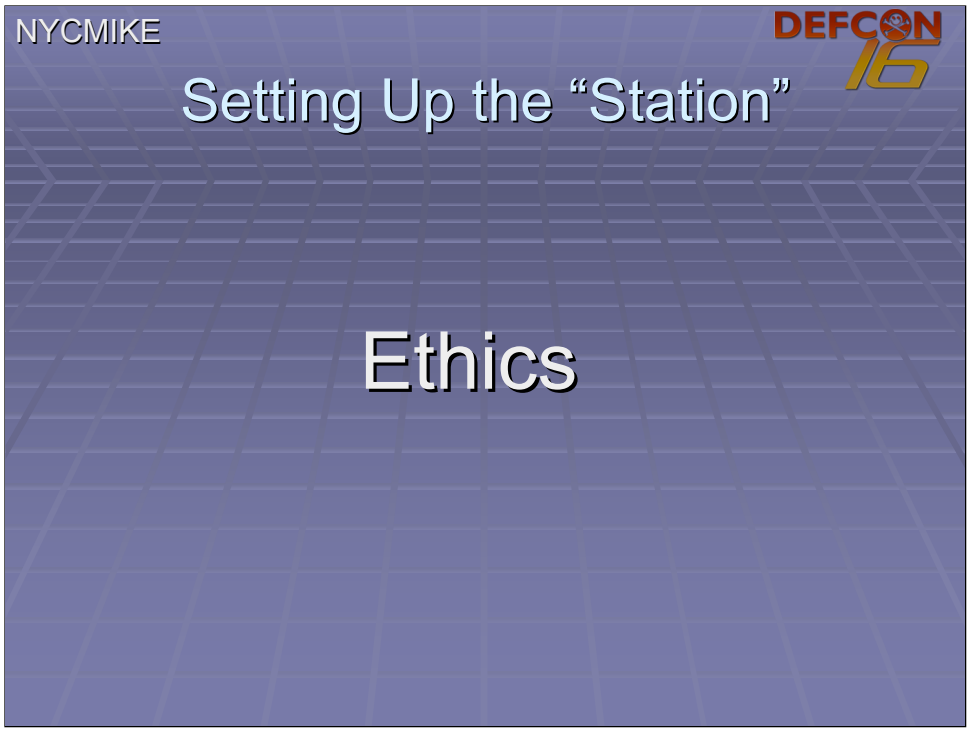


Level 2

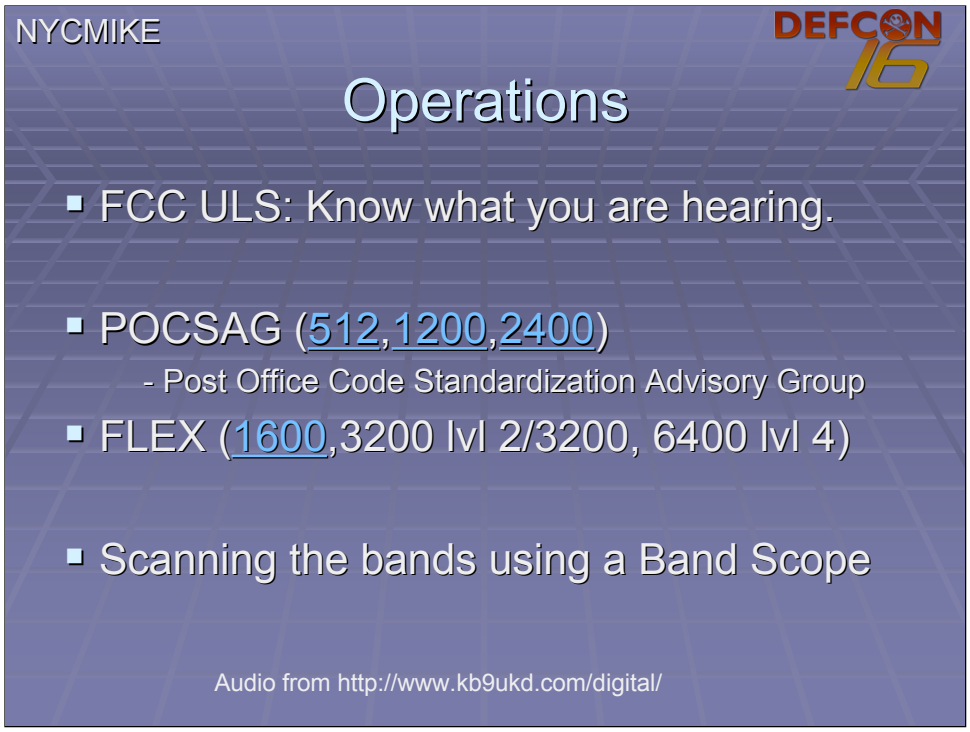


Level 4

http://wiki.radioreference.com/index.php/Data_Slicers



More or less don’t be a dumb ass.



The ULS DB is grand but its only for the initial search.

Get to know the signals by ear its best when your looking for a solid signal.

The Band Scope will show you activity near the freq you are on.

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Operations

Walk thru of the ULS database



Main page

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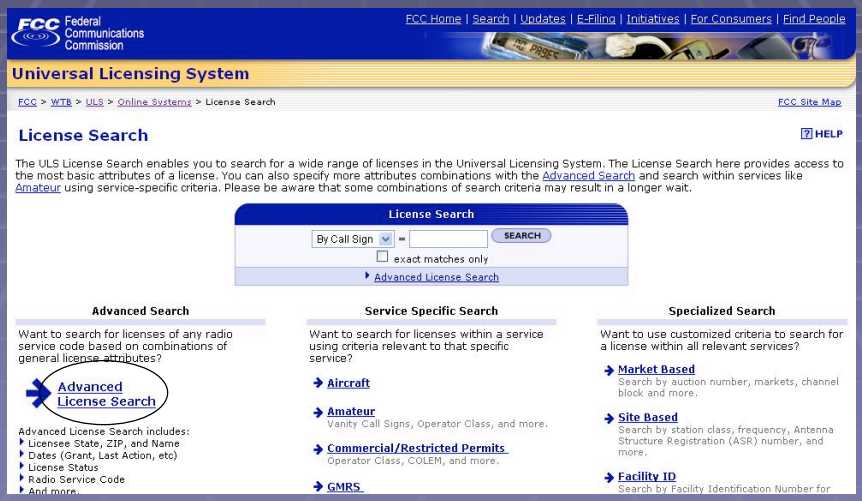
Operations



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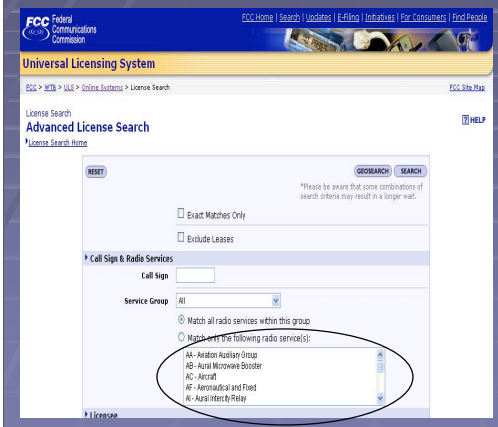
Operations



- CD - Paging and Radiotelephone
- CP - Part 22 VHF/UHF Paging (excluding 931MHz)

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Operations



	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	KDS377	Ryder, Velma I	0016791477	CD	Active	04/01/2009
2	KDS757	ELDY GLENN CLARK DBA: CLARK'S ELECTRONICS	0003873957	CD	Active	04/01/2009
3	KFL886	ALBION TELEPHONE COMPANY INC	0001623388	CD	Canceled	07/01/2008
4	KFQ922	MOUNTIAN COMMUNICATIONS, INC.	0001633171	CD	Active	04/01/2009
5	KKB553	TEL-CAR INC.	0004537643	CD	Terminated	04/01/2009
6	KLF466	White Cloud Communications	0007011331	CD	Active	07/01/2018
7	KLF490	TEL-CAR INC.	0004537643	CD	Terminated	04/01/2009
8	KLF549	AIRGROUND OF IDAHO, INC.	0006419402	CD	Active	04/01/2009

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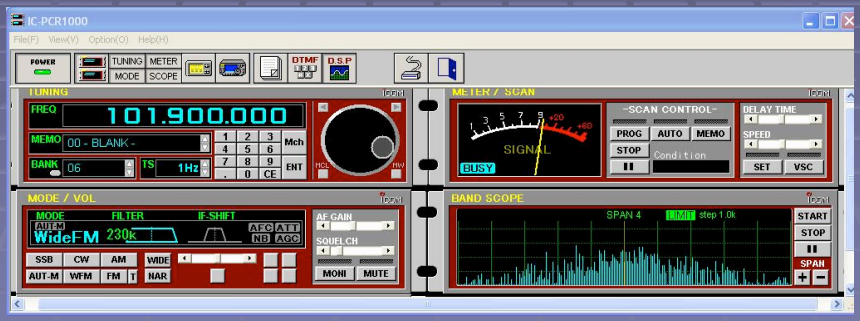
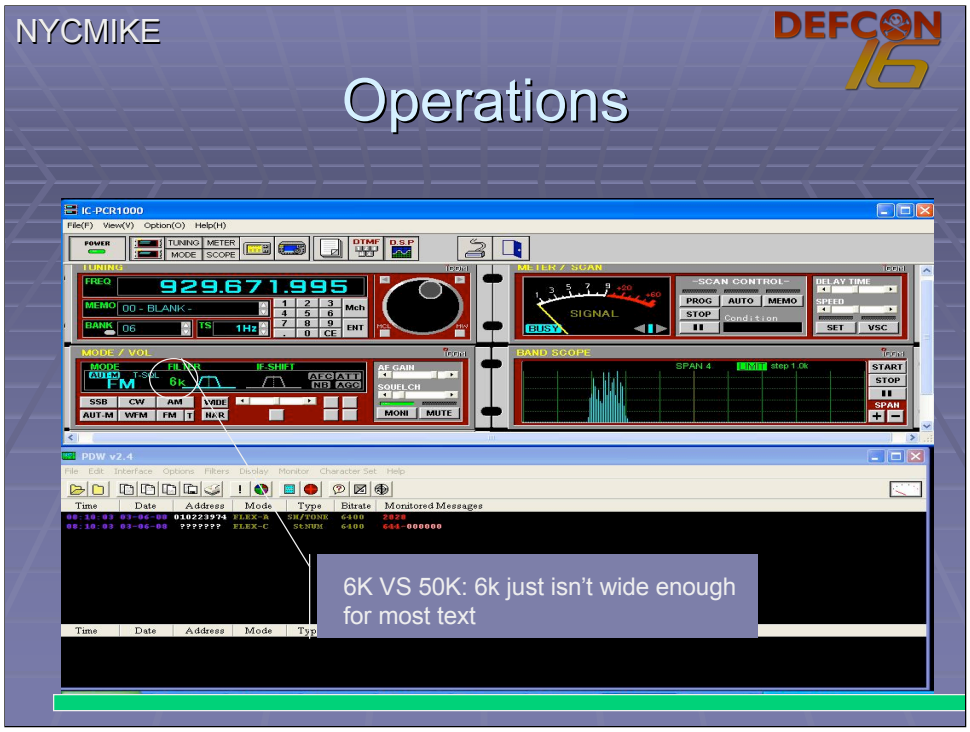
Operations

- Radio Sexy



Getting to know an interface (PCR-1000).



Once I have the freq that I will be monitoring I'll switch the bandwidth from 15k to 50k on NFM.

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Operations

- Example of an off freq capture or wrong bandwidth setting…



If the bandwidth isn't correct or if the signal isn't clear enough you'll end up with garbled data.

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Operations

- Laws:

  Communications Act of 1934

  ECPA of 1986

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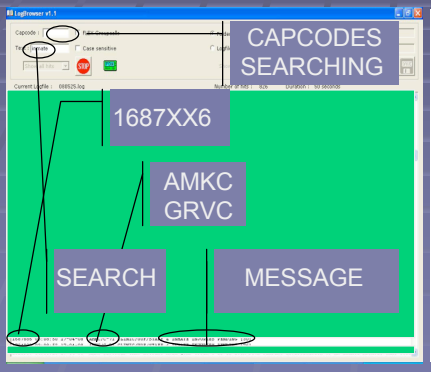
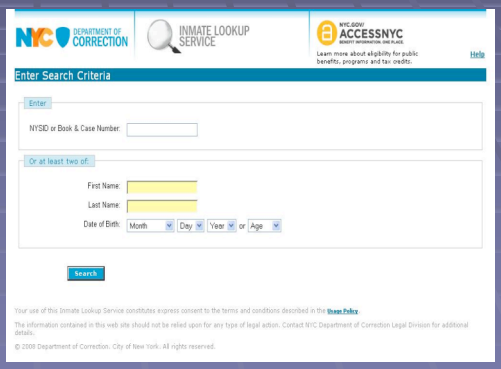
Analyze

Collection Collection and did I mention Collection?.





The idea is gather data to get actionable information or information of interest. As with any sort of collection

there needs to be strong set of ethics lad down first. This data is in the clear but none the less it shouldn't be

abused that's not the point or is it?

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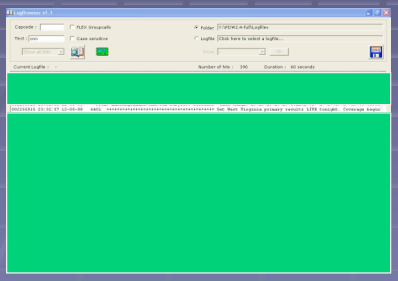
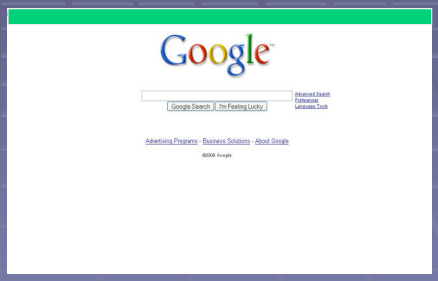
Analyze

"Get to know the Capcodes"

"Get to know the abbreviations"





Example : Looking more into this "AMKC"

After establishing a history of traffic "get to know the capcodes"

Create an archive then go through the logs and disseminate the data e.g.. AMKC/GRVC, then run them through an internet resource.

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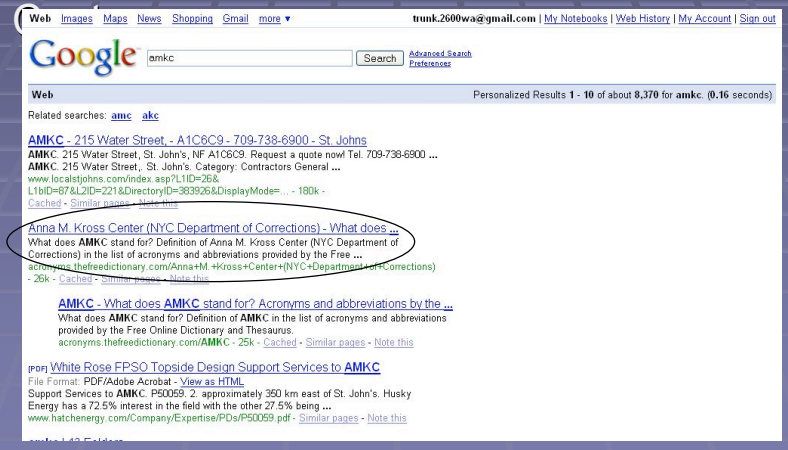
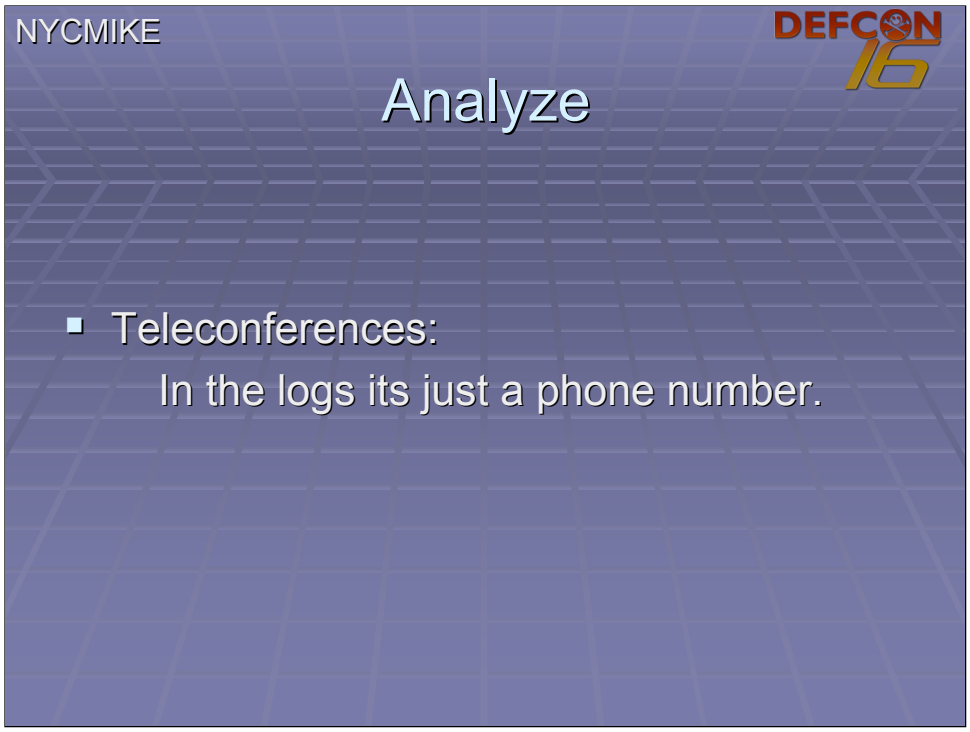
Analyze

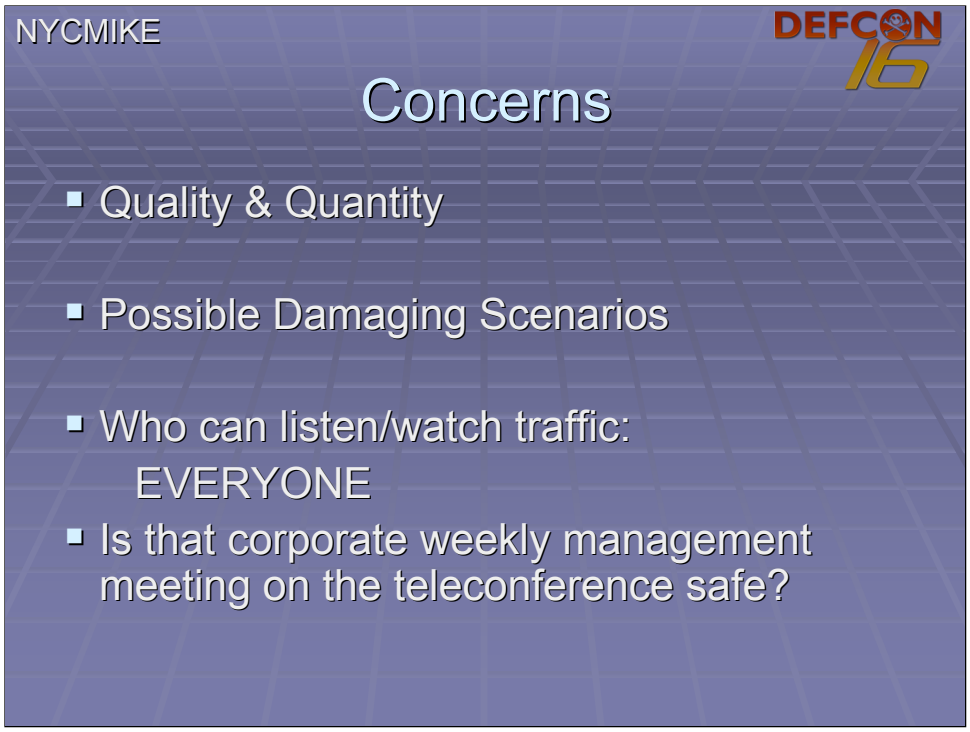
- AMKC equates to Anne M. Kross



BAM… we found it, now you may want to go one step further and look for a inmate support forum (Spouses, girl friends, boy friends of inmates at Rikers Island have a forum).



The conf bridges seem to be semi-trusted environments. Persons in the room have no real qualms sharing information, why would they, you need a temp login… sure why not you're suppose to be here remember.



We are only as strong as our weakest link.

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Concepts

- Mobile Units:

Mobile leech aka Ghetto beeper buster



$ 7 thrift store briefcase

OR

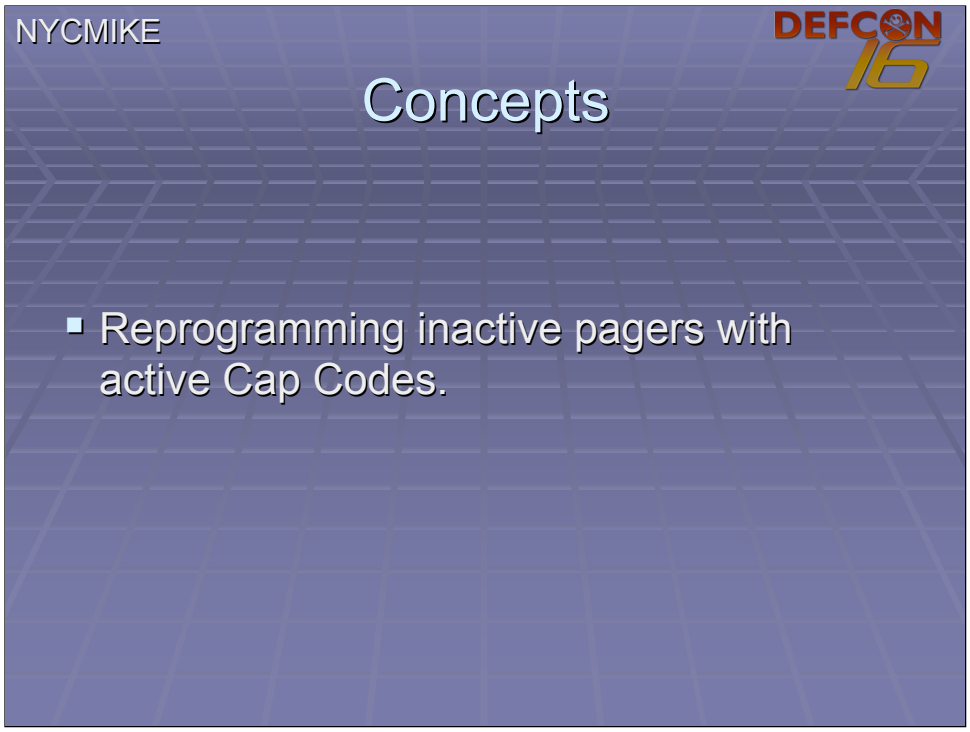
A mail able unit ?



FREE flat rate box

IED??? That is obviously a real concern, but the step doesn't have to include the table top scanner… I just think it looks sexier.

PCR-1000 with serial interface to a palm pilot



Swapping out the crystals

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Concepts

- Utilizing online radio sharing communities
- How does it work?

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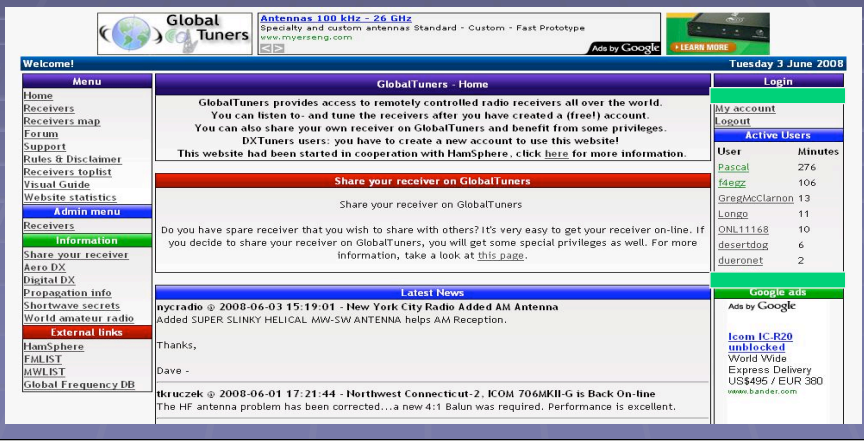
Concepts

- Decoding digital signals off of online communities like: www.globaltuners.com



Used to be dxtuners.com



Most if not all use the line out off the radio in this community, therefore without the base band I'm going no where BUT it should be do able if setup correctly (on the pcr 1000 it has a "packet radio" jack which happens to be a discriminator tap. The site also offers different sound qualities:

Low quality: 16kbit CBR mono 11.025kHz
Medium quality: 32kbit CBR mono 22.050kHz
High quality: 32-128kbit VBR mono 44.100kHz

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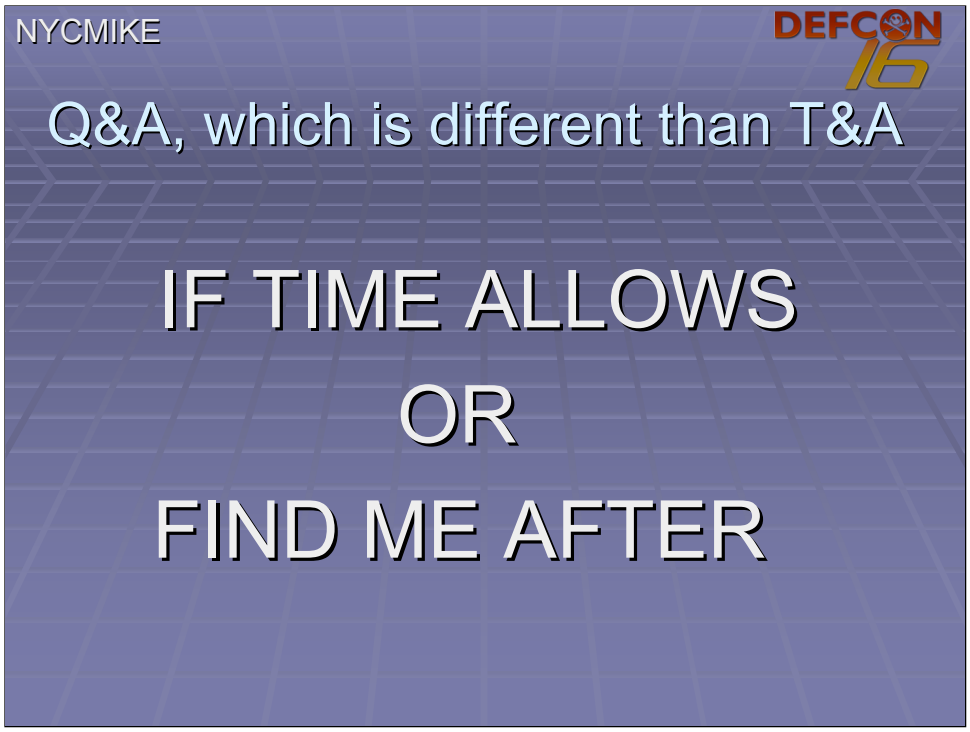
Wrapping Up

- Garbage in will result in garbage out BUT if the radio on the far end it setup correctly the idea can and will work…



Thank you for looking at the slides.