



ENABLING NIICD EQUIPMENT GPS MESSAGING

Laptop Configuration:

1. Install the BK USB driver to the laptop. This is needed to connect the laptop to the BK handheld radio via USB.
Download the driver and follow the instructions provided in the download
https://www.bktechnologies.com/service-portal/products/BK_KAA073
2. Download "**pkgcot.exe**" from the NIICD website. This program allows the BK radio to process and receive GPS messages for viewing locally on google earth pro, and forwards the messages to Wildland Fire Team Awareness Kit (**WFTAK**) and the Enterprise Geospatial Portal (**EGP**).
WFTAK: <https://wftak.wildfire.gov/>
EGP: <https://egp.wildfire.gov/sa/>
3. Download and install Google Earth Pro for Desktop. <https://www.google.com/earth/about/versions/#earth-pro>

Note: NIICD recommends a Safe Source laptop be used for the base station laptop, since it will stay with the incident and is not tied to an individual.

BK Field Radio Configuration:

- **Warning!** For testing purposes only, keep the GPS enabled zone separate from the incident zone in order to prevent confusion.
- For example, if the incident zone is "**TestFire08_26**", make a copy of that zone in the radio and name it "**GPSTestFire08_26**".
- Using **RES**, make the following global and zone changes to the "**GPSTestFire08_26**" zone only.

RES TAB: Global----->Common

Mode Selection:
"ON" or "Selective"

Base Station Relay:
"Checked"

User Request:
"Checked"

Destination ID:
"Set to 2"

Base Radio UID Must Match

Use Main Channel:
"Checked"



ENABLING NIICD EQUIPMENT GPS MESSAGING CONTINUED

RES TAB: Zone----->Channel Settings

OTAR/Data Enable:
"Checked"

RX Mode:
"Set to Mixed"

RX NAC:
"Match CTCSS/NAC"

TX Mode:
"Set to Mixed"

TX CxCSS/NAC:
"Match CTCSS/NAC"

	Alias	System
1	Tac 1	Conv System ...
2	Tac 2	Conv System ...
3	Tac 3	Conv System ...
4	Tac 4	Conv System ...
5	Tac 5	Conv System ...
6	Tac 6	Conv System ...
7	CMD 7	Conv System ...
8	CMD 8	Conv System ...
9	CMD 9	Conv System ...
10	CMD 10	Conv System ...
11	CMD 11	Conv System ...
12	CMD 12	Conv System ...
13	A/G Primary	Conv System ...
14	A/G Secondary	Conv System ...
15	VMED 29	Conv System ...
16	AIR Guard	Conv System ...

Channel Settings

Identification
Alias: CMD 7
Voice Annunciation: None

Security
Encryption: Clear ☐ DES-CFB
Key: 1 ☐ Key Lock
☐ Proper Key Detect

Scan
Scan: Off ☐ Auto Scan
Vote Group: 1 ☒ Scan Penalization

Receive
Frequency (MHz): 170.97500
Mode: Mixed
CxCSS: 110.9
NAC (Hex): 455
Squelch Adj.: 9 ☐ Invert DCS
Squelch Op: Normal ☐ Receive Only
CxCSS Index: None
NAC Index: None

Transmit
Frequency (MHz): 168.70000
Mode: Mixed
CxCSS: 110.9
NAC (Hex): 455
Busy Cond.: Off ☐ Invert DCS
Tx Power: High
CxCSS Index: None
NAC Index: None

Data
Mode: FNE
☒ OTAR/Data Enable

Note: See attached reference list on the CTCSS/NAC National Standard Fire tones

Base Station Radio Configuration:

1. Set the "Unit ID" of the base station radio to match the destination ID configured in the field radios.

Note: For this example the destination ID in the field radio was set to "2", so the base station radio destination ID also needs to be set to "2". The "Unit ID" can be set via RES:

RES TAB: System----->Conventional System

P25 ID (DEC):
"Set to 2"

Global System Zone

+CS +TS -S

System	ID
1 Conventional	2

Conventional System

IDs
P25 ID (DEC): 2

Priority 1
☒ Disabled ☐ Tx Pri 1
☐ Use Main Channel
Zone: (16) GPSTestFire08-26
Channel: (9) CMD 9

Note: The "Unit ID" can also be changed via the Keypad through FPP of the base station radio to match the destination ID configured in the field radios.

- > Menu
- > Keypad Prog
- > Password (If enabled)
- > System
- > P25 Unit ID



ENABLING NIICD EQUIPMENT GPS MESSAGING CONTINUED

Deploy Base Station Radio and Laptop:

1. Use a mag mount antenna to provide good signal to the base station radio.
2. Set the base station radio the appropriate command channel to receive GPS messages over the repeater system or set it to a Tac channel to receive messages directly from a field radio over a Tac channel.
3. Connect the base station radio to the base station laptop via the BK USB programming cable and the interface dongle.
4. Ensure the base station laptop has internet connectivity in order to relay GPS messages to WFTAK and EGP.

Note: In order to relay reviewed messages to the computer from the Base Station Radio, the radio has to have GPS enabled.

Run and Configure "pkgcot.exe":

1. Execute the "pkgcot.exe" by double clicking the file.
2. The first time the program runs it will create a directory named "tmp" in the same directory as the "pkgcot.exe" file.
3. Open the "tmp" folder and edit the "config.ini" file.
 - > Edit the "config.ini" file by clicking on the file to open it.
 - > Set the "unit_id_prefix" to = the "Incident Name" or "Incident Number"
 - > Save and close the "config.ini" file.The "unit_id_prefix" will be combined with the unit id of the receiver GPS messages and sent to WFTAK and EGP to prevent duplicate "unit_ids" from different incidents.
 - > Close and restart "pkgcot.exe" file for changes to take effect.

```
[config]

;tak prefix (prefix inserted before unit id before sending to tak and egp)
;should be incident number or name
unit_id_prefix = BEAR_CREEK

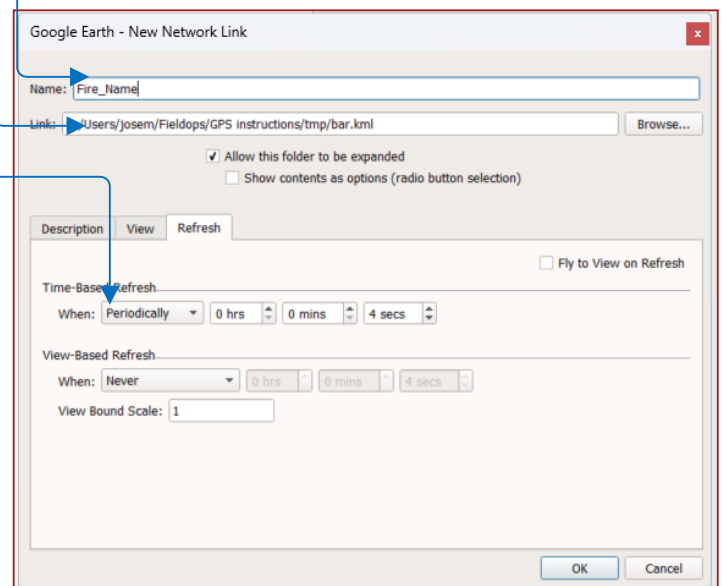
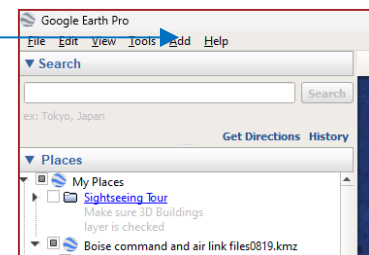
;ethernet interface
kng_ethernet_ip = 192.168.0.100
kng_ethernet_port = 65535

;wftak address
tak_server_ip = ops.wftak.wildfire.gov
tak_server_port = 8089

;wintak address
wintak_ip = localhost
wintak_port = 4242
```

Configure Google Earth Pro:

1. Open Google Earth Pro to add a network link.
2. Click on "Add" in the top task bar and select "Network Link"
3. In the "Name" field enter the "Incident Name" or "Project Number"
4. Select a link file by clicking browse and selecting the "bar.KM" file located in the "tmp" folder.
5. Set the "Time-Based Refresh" to "Periodically" and "4 secs"
6. Select "OK"





ENABLING NIICD EQUIPMENT GPS MESSAGING CONTINUED

Send and Receive GPS Messages:

1. Set the field radio to the appropriate command or tac channel that the base station radio is listening on.
2. Enable GPS on the field radio and wait for the GPS lock indicated by a steady satellite icon.
Note: If the satellite icon is flashing, there is no GPS lock and you cannot send GPS messages.
3. Listen for periods of no radio traffic before sending a GPS message so as to not step on any other traffic.
4. Send a GPS by selecting "**Menu**"--->"**GPS**"--->"**Transmit Request**"--->"**Default Unit ID**"
The radio will say "**Location Information Sent to UID**"
5. The received GPS message will show on google earth and be sent to "**wftak**" and "**EGP**".
Note: In order to see locations on those platforms user's must make "wftak" and "EGP" accounts.
In order to relay reviewed messages to the computer from the Base Station Radio, the radio has to have GPS enabled.

Operate "pkgcot.exe":

Note: By default "pkgcot.exe" shows the latests gps message from all teh unit ids on google earth.

1. To show all GPS messages from a single Unit ID in the "**pkgcot**"
command line type "**show 222**".
Note: This will show all GPS messages from Unit ID 222 in google earth.
2. To return to default of showing all UIDs GPS messages type "**show all**"
in the "**pkgcot**" command line.

Note: GPS messaging is available for testing and evaluation only.

For more information on Radio GPS messages please contact NIICD at the following contacts:

Bill Forsyth
NIICD Engineering and Development
208-387-5720
william.forsyth@usda.gov



ENABLING NIICD EQUIPMENT GPS MESSAGING CONTINUED

NATIONAL STANDARD TONES/NACS

Continuous Tone Coded Squelch System (CTCSS) is known by a number of different names such as Private Line (PL), Code Guard, Channel Guard (CG) or just Tone.

CTCSS is the use of sub-audible tone that is transmitted along with the speech portion of the transmission to unlock or open a receiver. CTCSS are commonly used on wildfire incidents mostly to access repeater systems and tactical channels. Enabling CTCSS allows multiple users to communicate on the same frequency/channel without receiving radio traffic from each other, and is employed to improve radio operation in high Radio Frequency (RF) noise environments, interference and congested areas. This allows agencies to reuse the limited amount of available frequency resources to support wildland fire incidents.

The operation of a receiver without CTCSS enabled is known as "**open carrier squelch**" or simply "**carrier squelch**". Operating a receiver in open-carrier mode allows the radio operator to monitor and receive any traffic on that particular frequency/channel.

Network Access Code (NAC) is a feature of P25 digital radios similar to CTCSS for analog radios. A NAC is a digital code that is transmitted along with the speech portion of the digital transmission to unlock or open a digital system. Since a NAC is a 3 digit hexadecimal number it allows for 4096 possible codes for programming which far exceeds the available analog CTCSS tones.

NIICD recommends all NIICD VHF/UHF repeaters and tactical frequencies used on wildland incidents to be toned on both RX/TX. Some incidents will utilize local frequencies along with NIICD frequencies. Please verify the use of tone or NACs with the incidents communications plan (ICS205).

Note: For all NIICD equipment the CDO or COMC will assign and appropriate Tone or NAC for each incident. Contact the CDO or COMC if unsure of proper incident tone.

Below is a chart of the standard tones/NACs used in the wildland fire agencies.

STANDARD NATIONAL TONES/NACS						
TONE #	CTCSS (Hz)	NAC (HEX)		TONE #	CTCSS (Hz)	NAC (HEX)
1	110.9	\$455		17	67.0	\$29E
2	123.0	\$4CE		18	71.9	\$2CF
3	131.8	\$526		19	74.4	\$2E8
4	136.5	\$555		20	77.0	\$302
5	146.2	\$5B6		21	79.7	\$31D
6	156.7	\$61F		22	82.5	\$339
7	167.9	\$68F		23	85.4	\$356
8	103.5	\$40B		24	88.5	\$375
9	100.0	\$3EB		25	91.5	\$393
10	107.2	\$430		26	94.8	\$3B4
11	114.8	\$47C		27	97.4	\$3CE
12	127.3	\$4F9		28	118.8	\$4A4
13	141.3	\$585		29	173.8	\$6CA
14	151.4	\$5EA		30	179.9	\$707
15	162.2	\$656		31	186.2	\$746
16	192.8	\$788		32	203.5	\$7F3