

Team #1: RAPTR

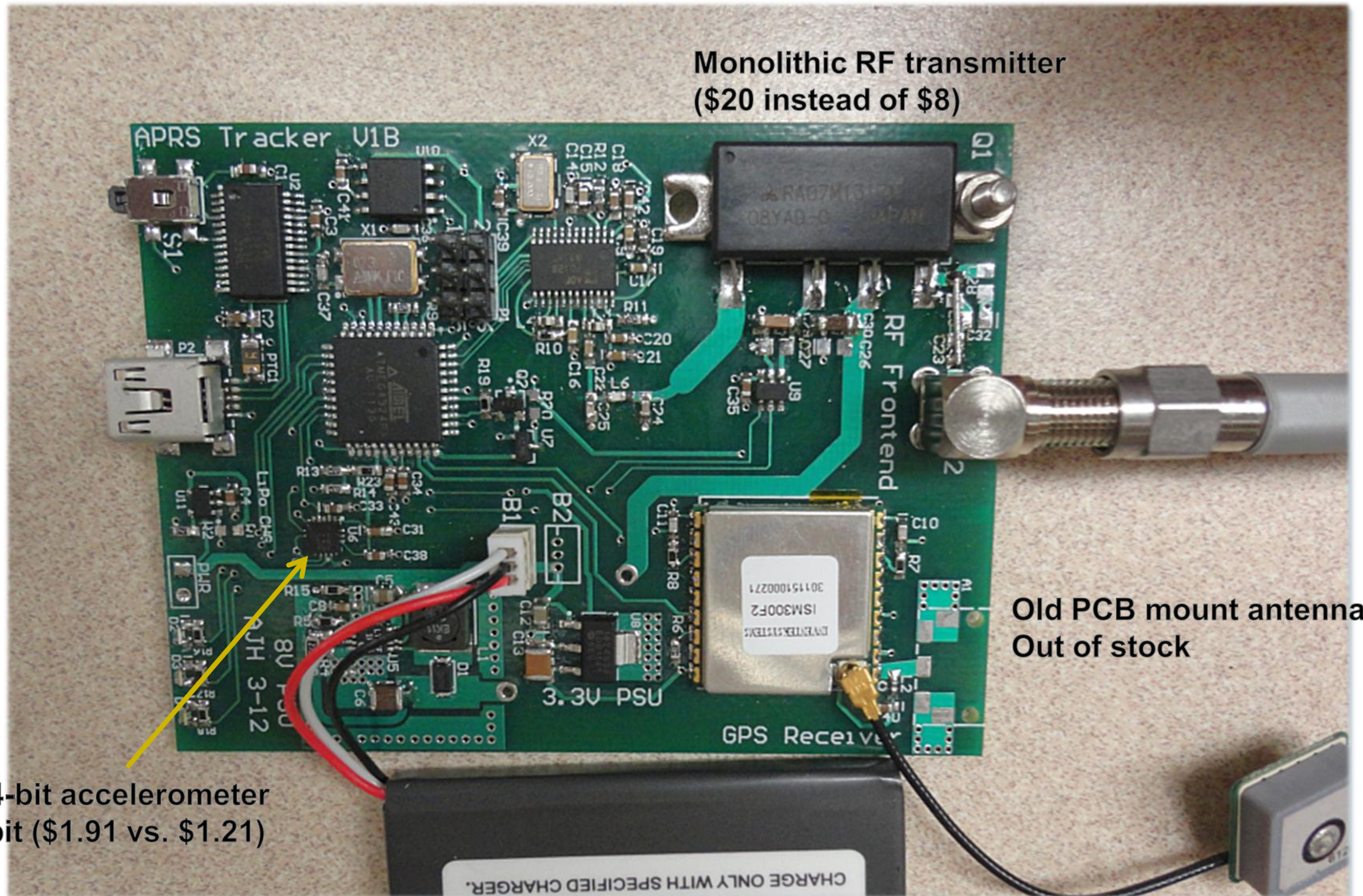
(Remote Asset and Person Tracking Reporter)

Presenters: Allan Wang, Chris Perrone

Derek Kozel, Andrew Hillenius

4/13/2012

Board Revision 2



Monolithic RF transmitter
(\$20 instead of \$8)

Old PCB mount antenna
Out of stock

New: 14-bit accelerometer
Old: 6-bit (\$1.91 vs. \$1.21)

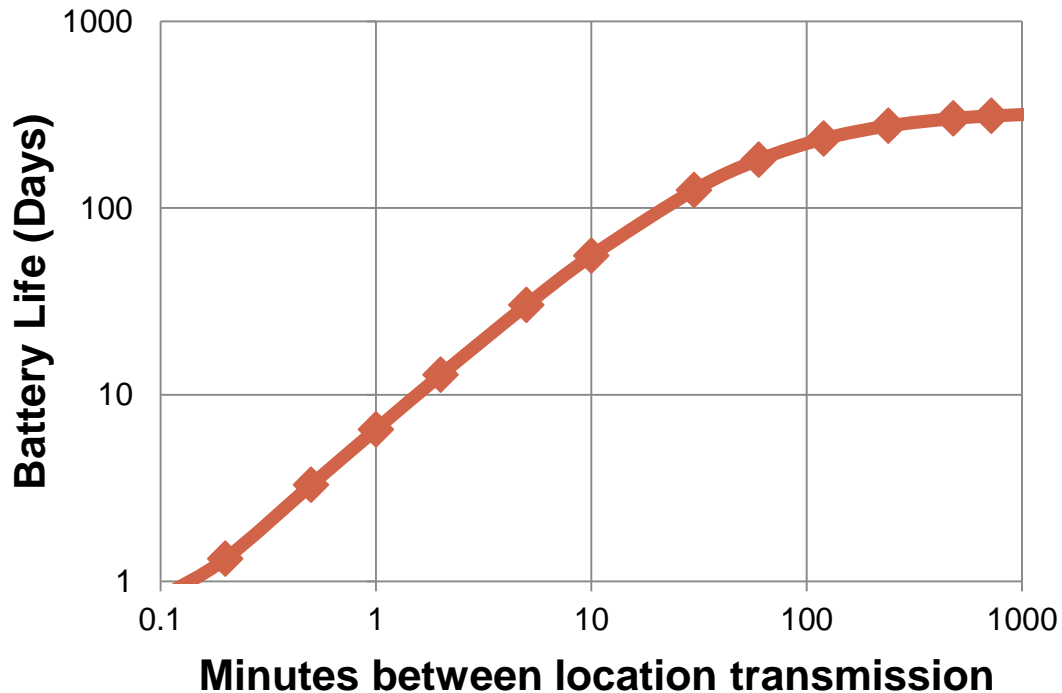
Power consumption

- **Standby: 0.35mA**
 - 80uA – Amplifier
 - 150uA – Regulator
 - 40uA – Accelerometer
- **Active, GPS tracking: ~50mA**
 - GPS – 42mA
 - AVR Micro – 3mA
- **Active, location transmitting: 850mA**
Transmits for 650ms.

Battery Life

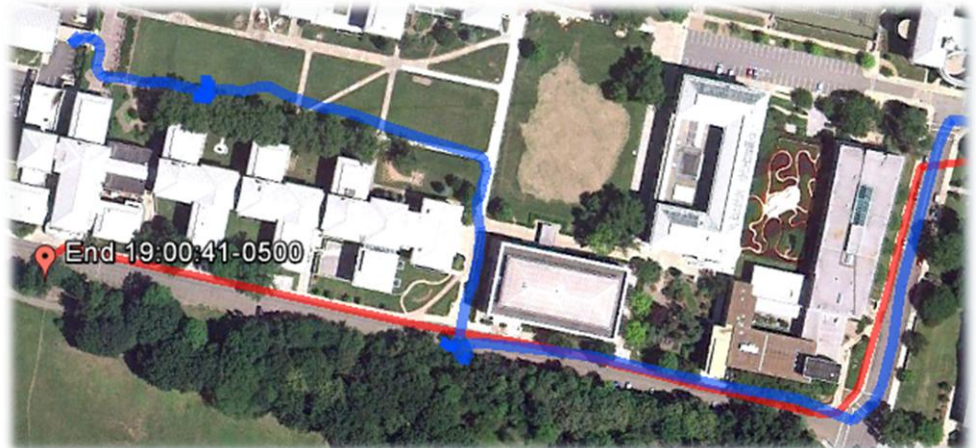
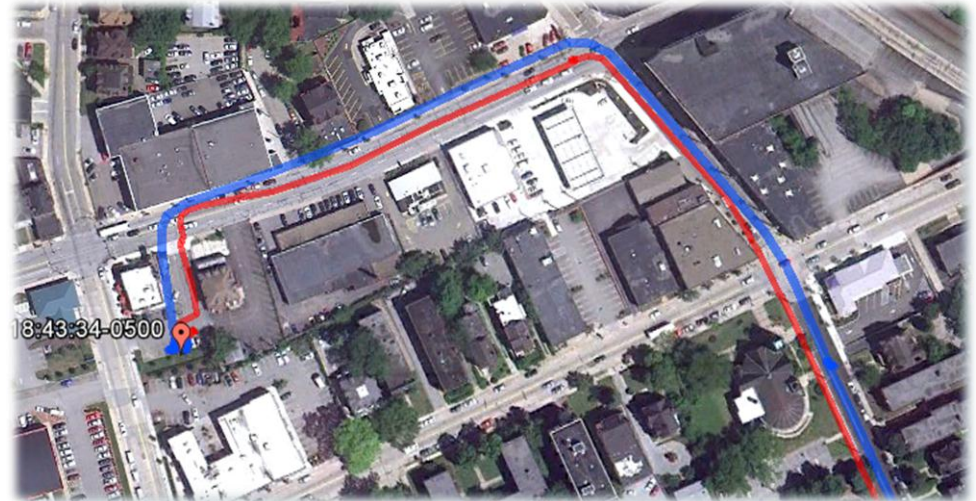
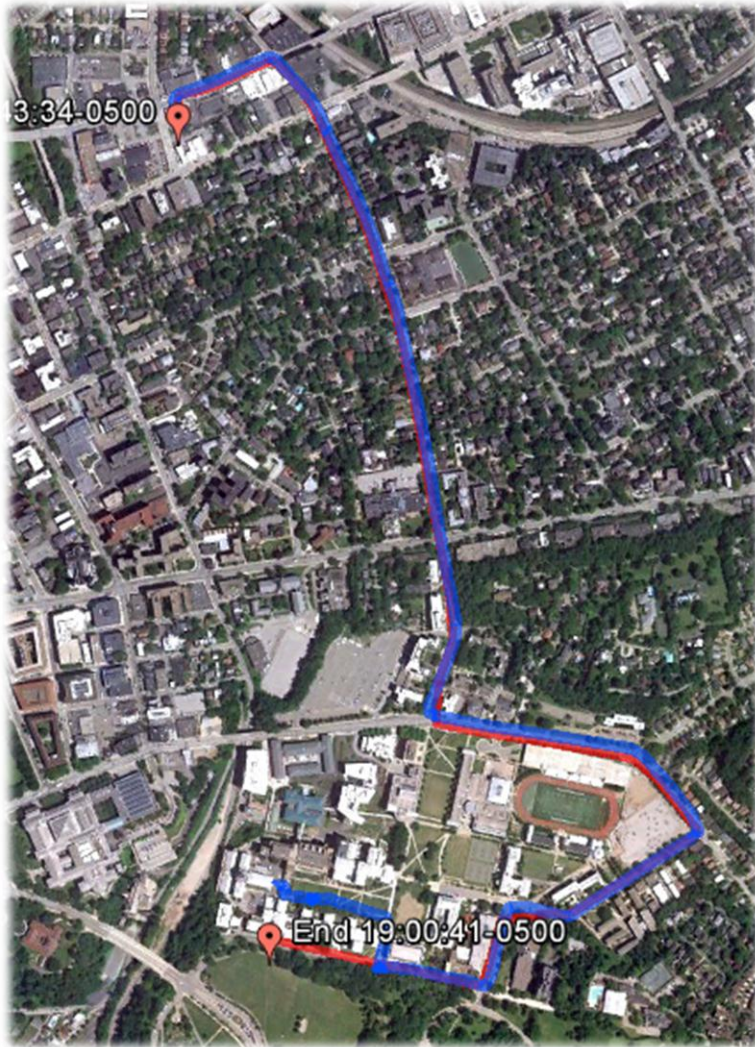
- Assumptions:
 - 2600 mAh battery (fits in case)
 - GPS hot fix time: 10 seconds
 - Transmission length: 650ms (measured)

Battery life (days)



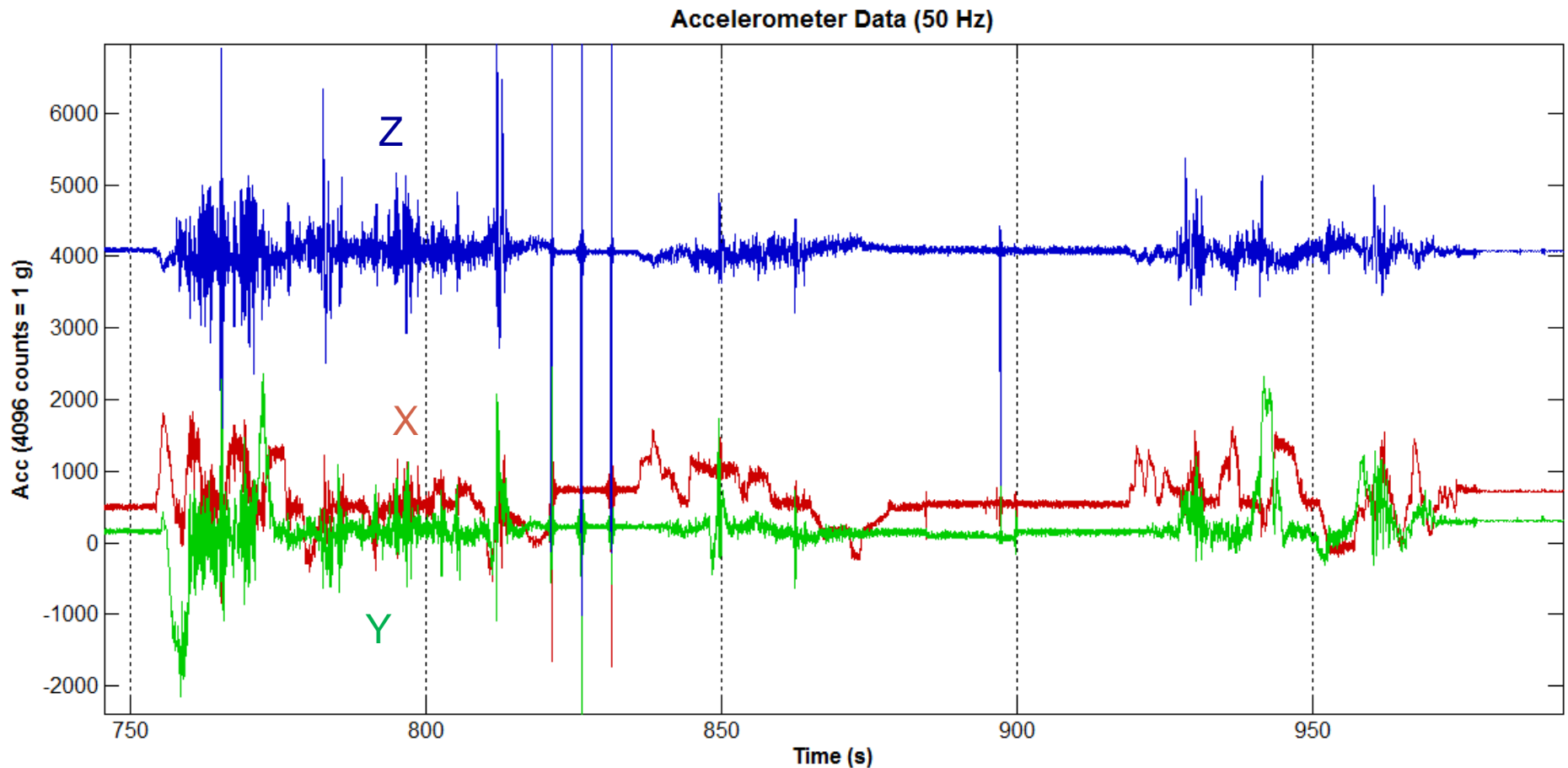
Transmission Interval	Battery Life
20 seconds	2 days
2 minutes	2 weeks
10 minutes	2 months
1 hour	6 months

GPS Data



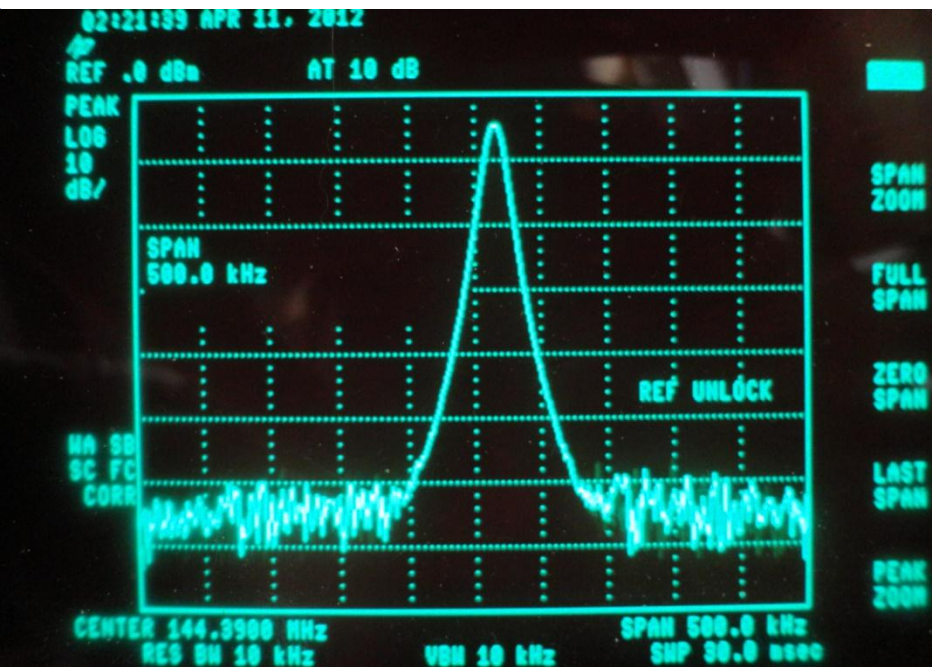
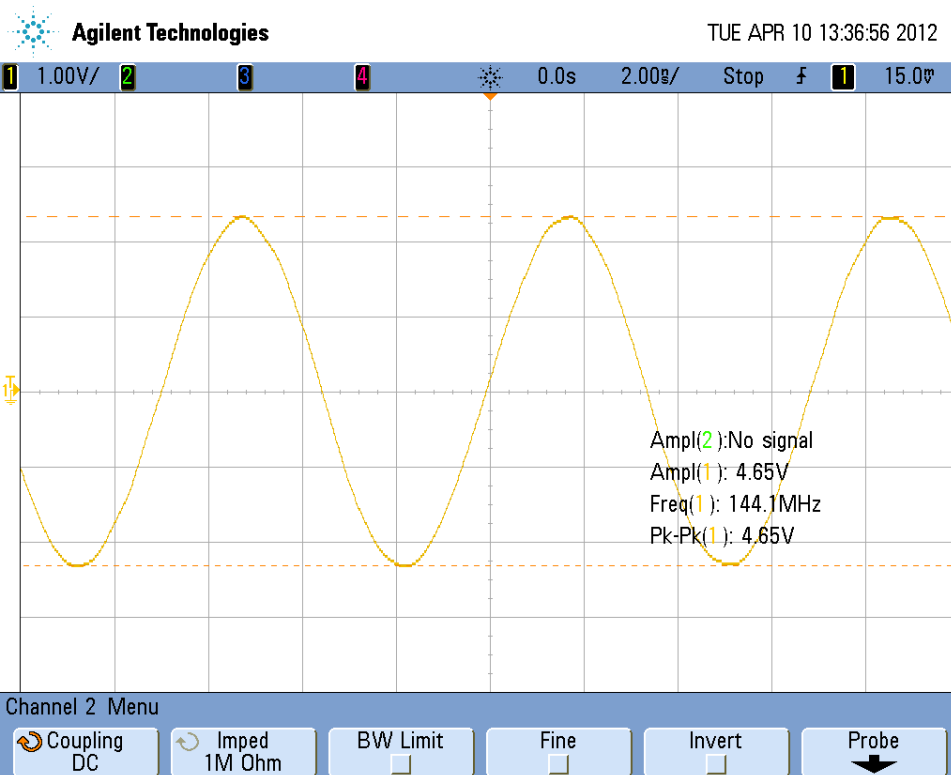
Accelerometer Data

- Car ride
- Pothole detection?



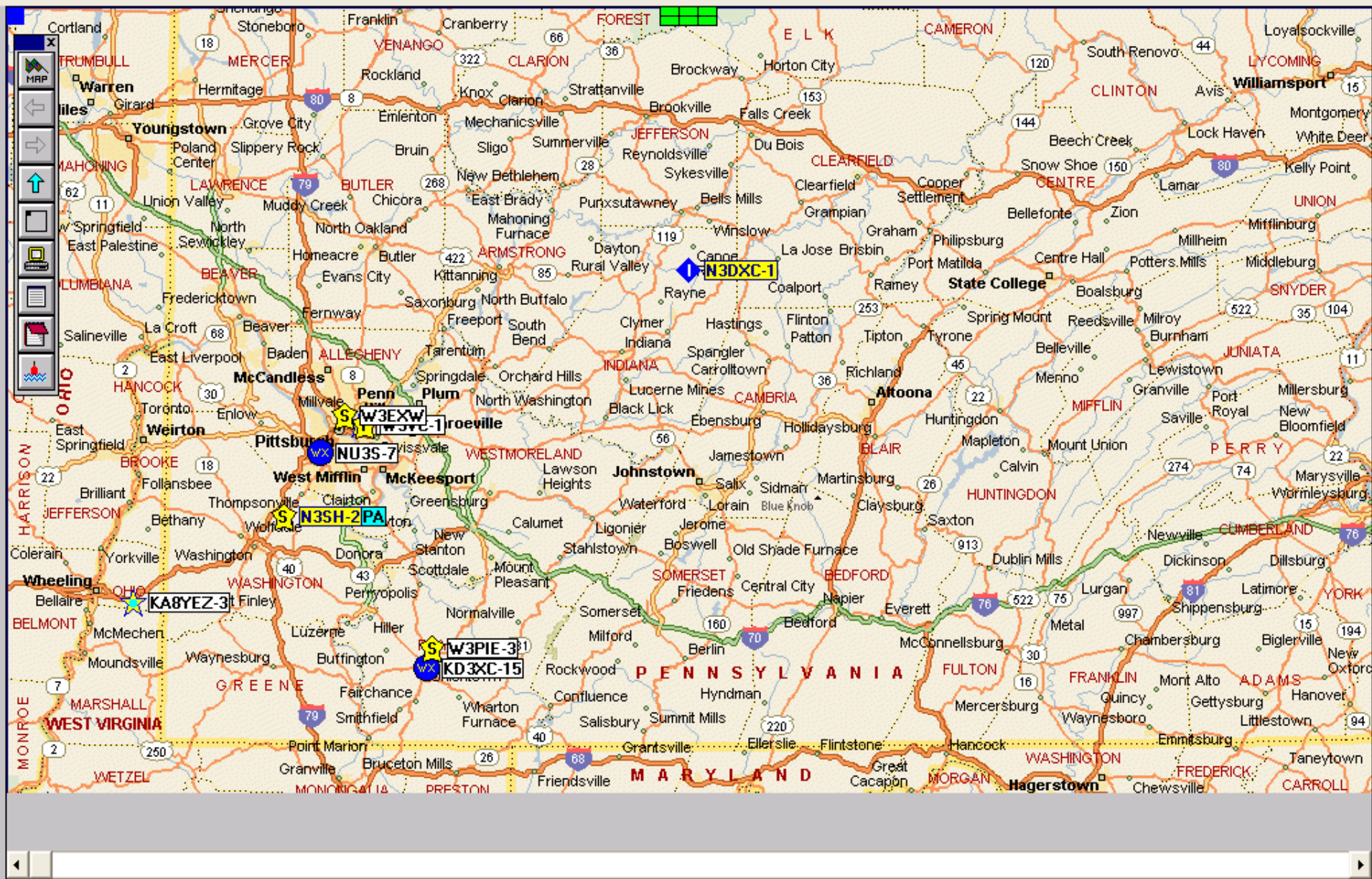
RF Transmitter Performance

- 2.5Watt output power
- Free of transients and spurious signals



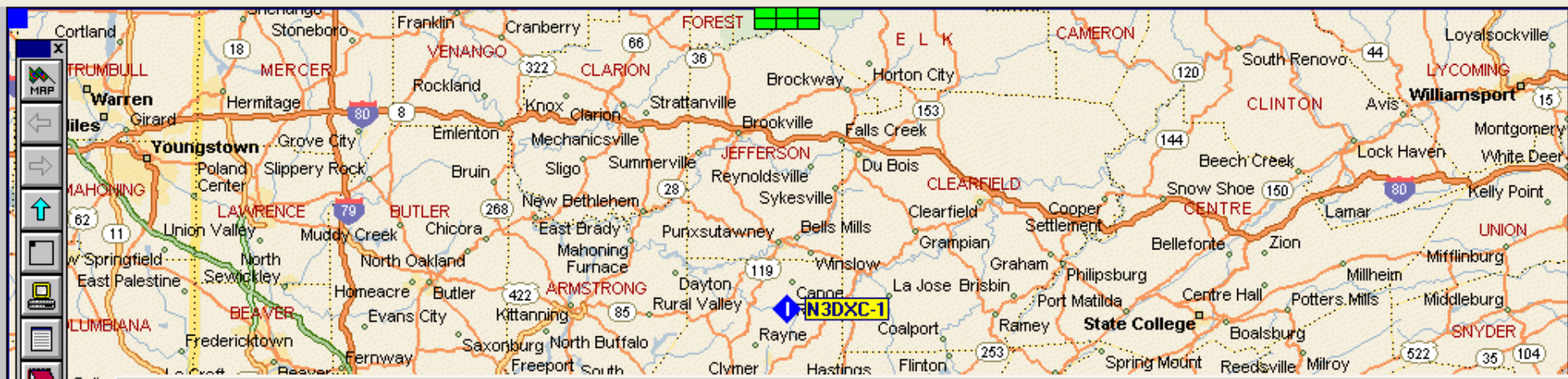
Software

- Configuration Tool
 - User configurable options of the device
 - Accompanies serial API
 - Both released as open source
- Tracking Server
 - Listens to transmissions made by devices
 - Decodes packets and stores beacons in database
 - Allows for easy interface for live tracking of position



FN01UE 03:25:22R KA8YEZ-3>TOPR2W,W3PIE-3*,W3EXW*,W3VC-1*,WIDE2* Port=1 <UI Len=26>:
 'B9I (#/"8-)>WHEELING, WV

▲ 41.10.35N
▼ 78.16.57W



Terminal [-] [x]

Clear Hide Save Options Help

```

APU25N,W3UC-1*,WIDE2* Port=1 <UI C Len=78>:
>KB3KBR-1>APW09,TCPIP,N3DXC-1*:KB3KBR-1 :EQNS.0,1,0,0,1,0,0,1,0,0,1,0,0,1,0
08:40:40R N3DXC-1>APU25N,W3UC-1*,WIDE2* Port=1 <UI C Len=80>:
>KB3KBR-1>APW09,TCPIP,N3DXC-1*:KB3KBR-1 :BITS.11111111,Battery State Tracking
08:41:58R N3WVN-9>4P1U3Q,N3SH-2*,W3UC-1*,WIDE2* Port=1 <UI R Len=33>:
`k:b1 [j/]`81}n3wvn@futuretek.cx
08:42:25R NU3S-7>T0RR7U,W3UC-1*,WIDE2* Port=1 <UI R Len=12>:
`1\11 _/_`=
08:42:32R N3DXC-1>APU25N,W3UC-1*,WIDE2* Port=1 <UI C Len=79>:
>UE2FET-1>APU25N,TCPIP,N3DXC-1*:K8SRR-1 :Grid:EN91uc,41.113605,-80.260163{12
08:42:51R N3WVN-9>4P1U3Q,N3SH-2*,W3UC-1*,WIDE2* Port=1 <UI R Len=15>:
`k:b1 [j/]`81}
08:44:17R N3TAV-7>T0RU7Y,W3EXW*,W3UC-1*,WIDE2* Port=1 <UI R Len=17>:
`k00n7U>/`7e}#
08:44:23R KD3XC-15>APTW01,W3PIE-3*,W3UC-1*,WIDE3* Port=1 <UI Len=35>:
!3953.35N/07945.66W_ULTIMETER 2100
08:45:03R N3DXC-1>APU25N,W3UC-1*,WIDE2* Port=1 <UI C Len=79>:
>UE2FET-1>APU25N,TCPIP,N3DXC-1*:K8SRR-1 :Grid:EN91uc,41.113605,-80.260163{12
08:45:35R NU3S-7>APK102,W3UC-1*,WIDE2* Port=1 <UI R Len=61>:
=4022.75N/08004.80W_318/000g000t045r p P000h b10243KU2k
08:45:40R N3DXC-1>APU25N,W3UC-1*,WIDE2* Port=1 <UI C Len=29>:
=4047.82NI07858.20W&PHG7360/
08:48:07R W3PIE-3>BEACON,W3UC-1*,WIDE2* Port=1 <UI Len=35>:
>147.045 NO PL Uniontown ARC W3PIE
08:48:22R N3DXC-1>APU25N,W3UC-1*,WIDE2* Port=1 <UI C Len=79>:
>UE2FET-1>APU25N,TCPIP,N3DXC-1*:K8SRR-1 :Grid:EN91uc,41.113605,-80.260163{12
    
```

FN10DX

Callsign	Received	Icon	Type	Latitude	Longitude	Comment
W3PIE-3	2012-04-13 02:44:21	S#	!	39° 55.96'	-79° 44.55'	PHG6760/W2,PAn Uniontown ARC W3PIE
N3DXC-1	2012-04-13 02:43:16	I&	=	40° 47.82'	-78° 58.20'	PHG7360/
NU3S-7	2012-04-13 02:42:47	/_	=	40° 22.75'	-80° 4.80'	000/000g000t041r p P000h b10210KU2k
W3VC-1	2012-04-13 02:39:47	I#	!	40° 26.54'	-79° 56.80'	Carnegie Tech Radio Club ar99+@andrew.cmu.edu
NU3S-7	2012-04-13 02:37:47	/_	=	40° 22.75'	-80° 4.80'	000/000g000t041r p P000h b10210KU2k
KD3XC-15	2012-04-13 02:35:35	/_	!	39° 53.35'	-79° 45.66'	ULTIMETER 2100
N3DXC-1	2012-04-13 02:33:20	I&	=	40° 47.82'	-78° 58.20'	PHG7360/
NU3S-7	2012-04-13 02:32:47	/_	=	40° 22.75'	-80° 4.80'	000/000g000t041r p P000h b10211KU2k
N3ETV-2	2012-04-13 02:31:51	/_	!	40° 56.75'	-80° 16.95'	308/000g000t036r000p009P000h..b.....TU2k
N3SH-2	2012-04-13 02:25:37	S#	=	40° 14.08'	-80° 11.29'	PHG5490/A=001414/N3SH.ORG 443.650+/r
N3DXC-1	2012-04-13 02:23:16	I&	=	40° 47.82'	-78° 58.20'	PHG7360/
NU3S-7	2012-04-13 02:22:46	/_	=	40° 22.75'	-80° 4.80'	000/000g000t041r p P000h b10211KU2k
W3VC-1	2012-04-13 02:20:46	I#	!	40° 26.54'	-79° 56.80'	CMU Radio Club http://www.andrew.cmu.edu/~ar99
NU3S-7	2012-04-13 02:17:46	/_	=	40° 22.75'	-80° 4.80'	000/000g000t041r p P000h b10212KU2k
W3EXW	2012-04-13 02:11:19	S#	!	40° 27.80'	-80° 0.30'	PHG7480 W2, PAn-N, North Hills ARC - Pittsburgh PA
W3VC-1	2012-04-13 02:01:46	I#	!	40° 26.54'	-79° 56.80'	Carnegie Mellon Univ igate -- Pittsburgh PA
N3DXC-1	2012-04-13 01:53:15	I&	=	40° 47.82'	-78° 58.20'	PHG7360/
KD3XC-15	2012-04-13 01:50:24	/_	!	39° 53.35'	-79° 45.66'	ULTIMETER 2100
N3DXC-1	2012-04-13 01:43:16	I&	=	40° 47.82'	-78° 58.20'	PHG7360/
W3VC-1	2012-04-13 01:42:46	I#	!	40° 26.54'	-79° 56.80'	Carnegie Tech Radio Club ar99+@andrew.cmu.edu
W3EXW	2012-04-13 01:41:18	S#	!	40° 27.80'	-80° 0.30'	PHG7480 W2, PAn-N, North Hills ARC - Pittsburgh PA
KD3XC-15	2012-04-13 01:35:22	/_	!	39° 53.35'	-79° 45.66'	ULTIMETER 2100
W3VC-1	2012-04-13 01:33:16	I#	!	40° 26.54'	-79° 56.80'	Carnegie Mellon Univ igate -- Pittsburgh PA
NU3S-7	2012-04-13 01:32:43	/_	=	40° 22.75'	-80° 4.80'	000/000g000t042r p P000h b10214KU2k
N3ETV-2	2012-04-13 01:31:56	/_	!	40° 56.75'	-80° 16.95'	308/000g000t037r000p009P000h..b.....TU2k
NU3S-7	2012-04-13 01:27:43	/_	=	40° 22.75'	-80° 4.80'	000/000g000t042r p P000h b10214KU2k
N3SH-2	2012-04-13 01:25:44	S#	=	40° 14.08'	-80° 11.29'	PHG5490/A=001414/N3SH.ORG 443.650+/r
N3DXC-1	2012-04-13 01:23:14	I&	=	40° 47.82'	-78° 58.20'	PHG7360/
NU3S-7	2012-04-13 01:22:43	/_	=	40° 22.75'	-80° 4.80'	000/000g000t041r p P000h b10215KU2k

