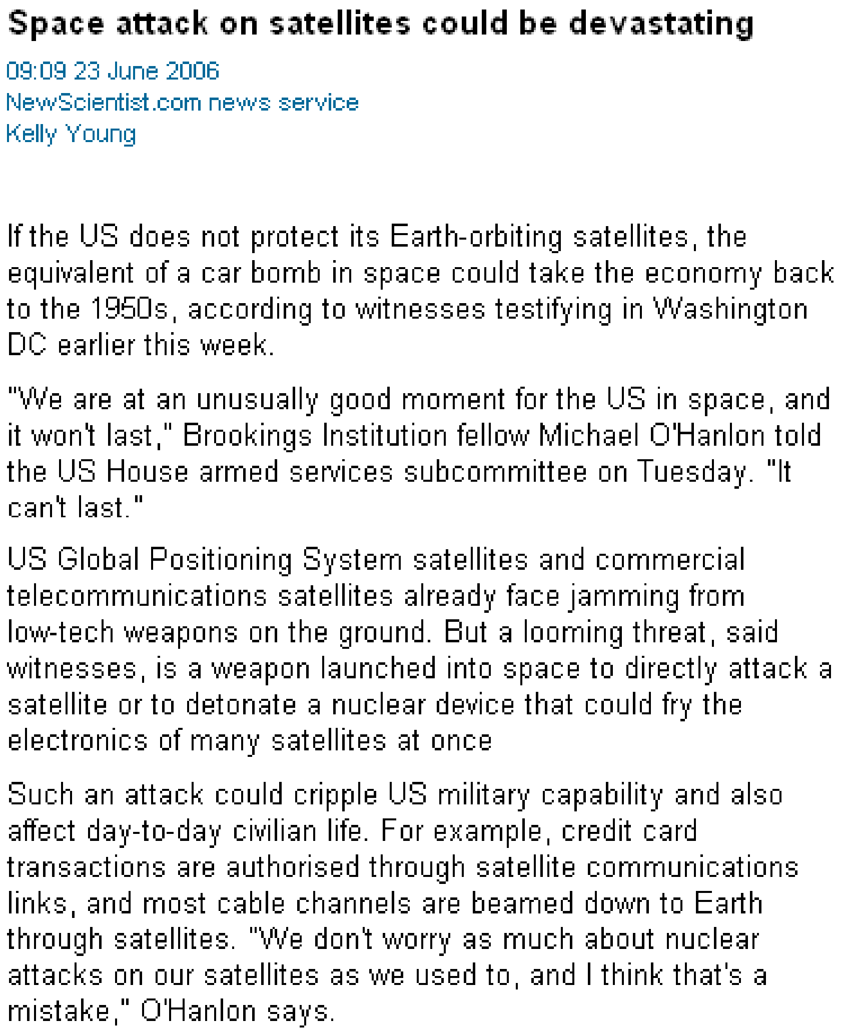
Ethical Hacking and Countermeasures

Version 6

Module LVI

Hacking Global Positioning System

News



Space attack on satellites could be devastating

09:09 23 June 2006
NewScientist.com news service
Kelly Young

If the US does not protect its Earth-orbiting satellites, the equivalent of a car bomb in space could take the economy back to the 1950s, according to witnesses testifying in Washington DC earlier this week.

"We are at an unusually good moment for the US in space, and it won't last," Brookings Institution fellow Michael O'Hanlon told the US House armed services subcommittee on Tuesday. "It can't last."

US Global Positioning System satellites and commercial telecommunications satellites already face jamming from low-tech weapons on the ground. But a looming threat, said witnesses, is a weapon launched into space to directly attack a satellite or to detonate a nuclear device that could fry the electronics of many satellites at once

Such an attack could cripple US military capability and also affect day-to-day civilian life. For example, credit card transactions are authorised through satellite communications links, and most cable channels are beamed down to Earth through satellites. "We don't worry as much about nuclear attacks on our satellites as we used to, and I think that's a mistake," O'Hanlon says.

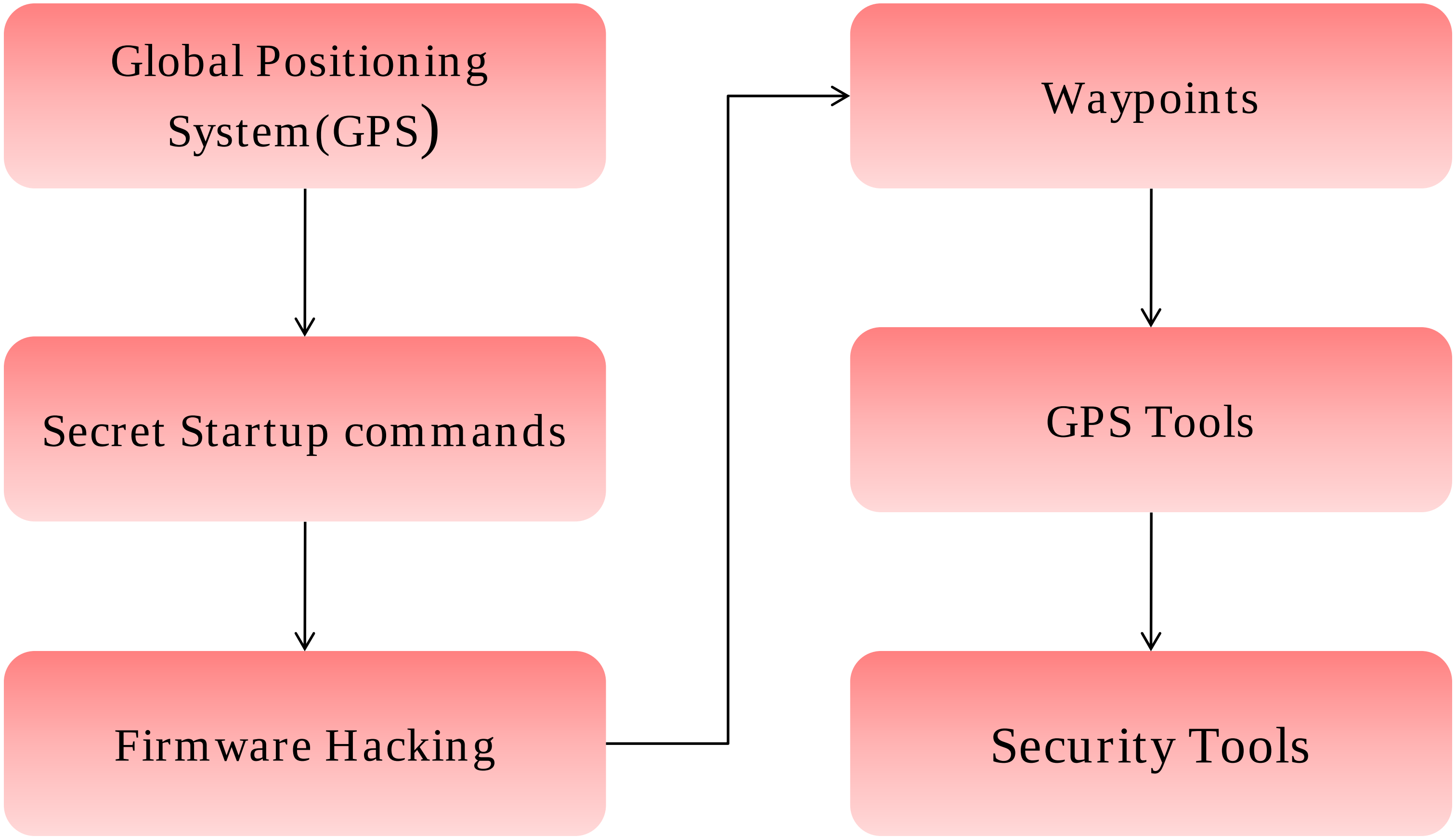
Source: *http://www.newscientist.com/*

Module Objective

This module will familiarize you with:

- Global Positioning System(GPS)
- Secret Startup commands
- Firmware Hacking
- Waypoints
- GPS Tools
- Security Tools

Module Flow



Global Positioning System(GPS)

Secret Startup commands

Firmware Hacking

Waypoints

GPS Tools

Security Tools

Global Positioning System (GPS)

The Global Positioning System (GPS) is a satellite-based navigation system that provides reliable positioning, navigation, and timing services

GPS shows the exact position on earth

GPS is a constellation of 24 satellites revolving 11,000 nautical miles above earth surface

A GPS receiver can detect signals transmitted by GPS satellite

Terminologies

Differential GPS (DGPS)

- DGPS is a method of improving the accuracy of yourreceiver by adding a local reference station to expand the information available from the satellites

Wide Area Augmentation System (WAAS)

- WAAS is intended to enable aircraft to rely on GPS for all phases of flight, including precision approaches to any airport within its coverage area

European Geostationary Navigation Overlay Service (EGNOS)

- It transmits signals containing information on reliability and accuracy of the positioning signals which are sent by GPS and Global Orbiting Navigation Satellite system(GLONASS)

Terminologies (cont'd)

Local Area Augmentation System (LAAS)

- Corrected data are transmitted from a local source, typically an airport or another location where accurate positioning is needed
- These correction data are typically useful for only about a thirty to fifty kilometer radius around the transmitter

Geometric Dilution of Precision (GDOP)

- The effects of the combined errors of four variables (latitude, longitude, altitude, and time) on the accuracy of a three-dimensional fix

Signal to Noise Ratio (SNR)

- The ratio of incoming signal strength to the amount of interfering noise as measured in decibels on a logarithmic scale

GPS Devices Manufacturers

- Garmin
- 3S Navigation
- Alpine
- Navtech
- Magellan
- Silva

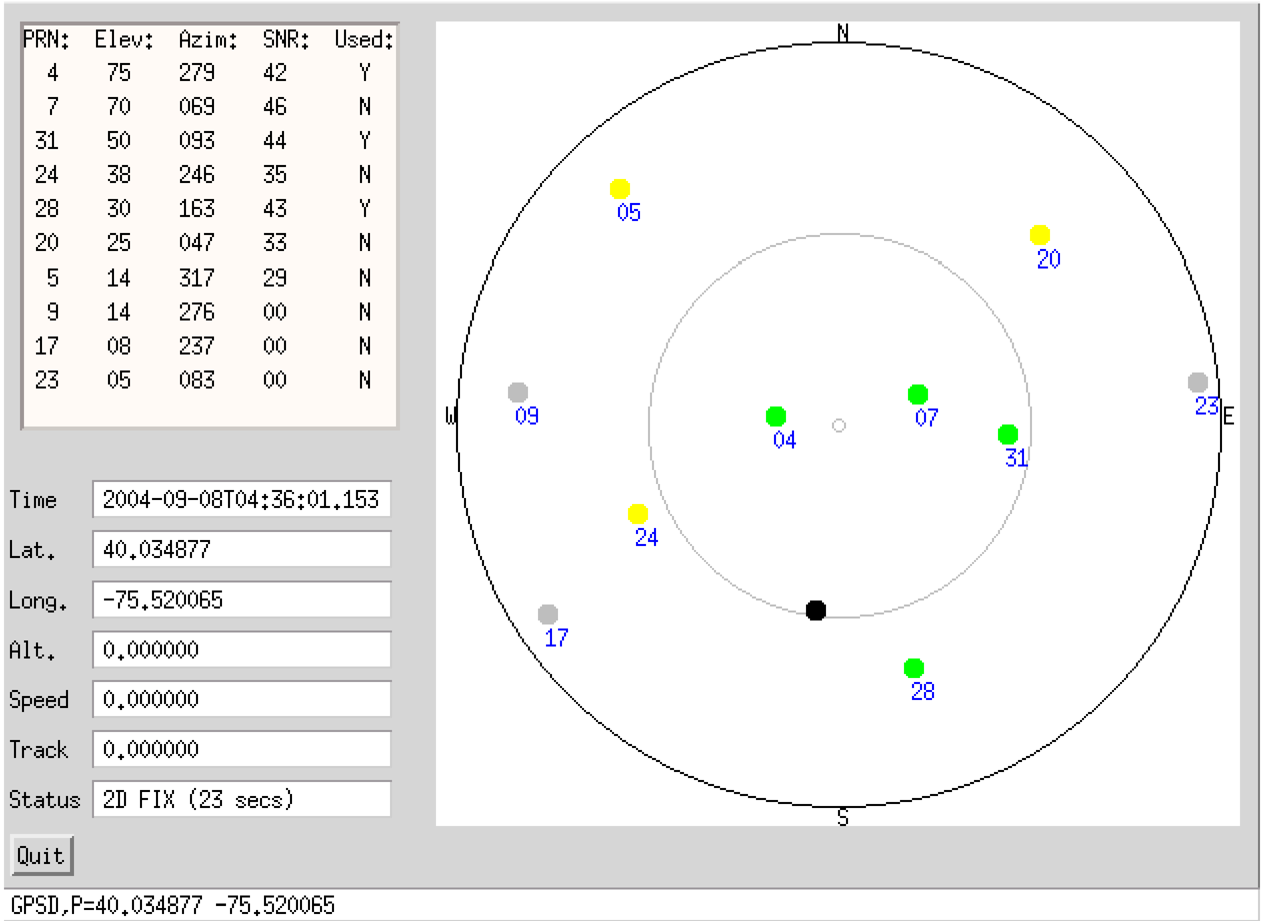
Gpsd-GPS Service Daemon

gpsd is a service daemon that monitors one or more GPSs attached to a host computer through serial or USB ports

It makes all data on the location/course/velocity of the sensors, available to be queried on TCP port 2947 of the host computer

With gpsd, multiple GPS client applications (such as navigational and wardriving software) can share access to GPSs without contention or loss of data

Gpsd-GPS Service Daemon: Screenshot



PRN:	Elev:	Azim:	SNR:	Used:
4	75	279	42	Y
7	70	069	46	N
31	50	093	44	Y
24	38	246	35	N
28	30	163	43	Y
20	25	047	33	N
5	14	317	29	N
9	14	276	00	N
17	08	237	00	N
23	05	083	00	N

Time 2004-09-08T04:36:01.153

Lat. 40.034877

Long. -75.520065

Alt. 0.000000

Speed 0.000000

Track 0.000000

Status 2D FIX (23 secs)

```
GPSD,P=40.034877 -75.520065
```

Source: *http://gpsd.berlios.de/gpsd2.png*

Sharing Waypoints

A waypoint is a spot on the surface of the Earth as defined by coordinates that are inputted into the GPS and stored, usually along with an icon, a descriptive name, and some text

There are variety of ways to store waypoints:

- Storing in External storage devices
- Distribute them on paper
- Make it available on Internet

Websites where waypoints can be stored:

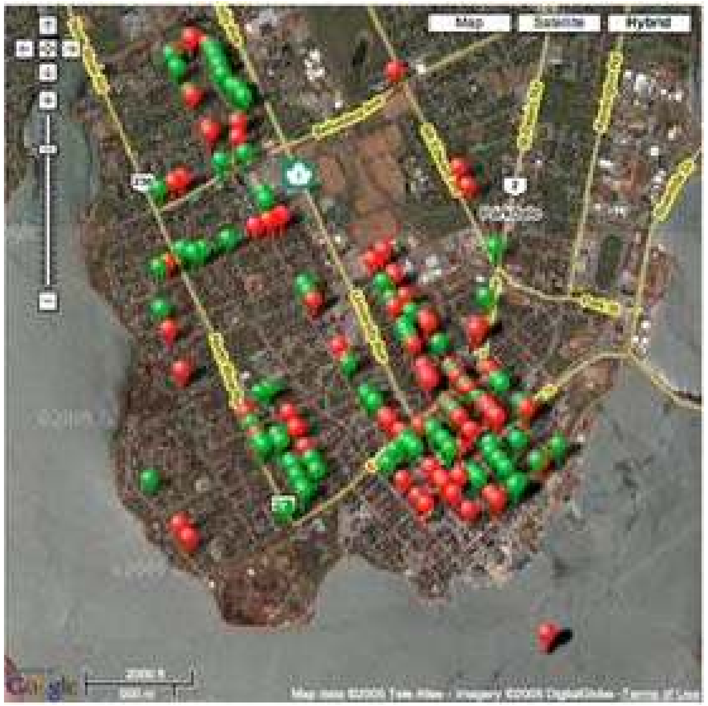
- www.waypoint.org
- www.swopnet.com/ waypoints
- www.travelbygps.com
- www.pickatrail.com

Wardriving

Wardriving is an activity by which WiFi networks, broadcasting signals are detected

With addition of GPS, pinpoint location of the discovered hotspot can be stored

Information regarding street names, building numbers, network spots, and logs by location are stored automatically



Areas of Concern

Use of precision weapons in which jamming can degrade the accuracy of weapon, results in:

- Unnecessarily increased weapons expenditures
- An increase in collateral damage

Interruption of GPS can deny warfighters with a common time and position coordinate, leading to:

- Delays in finding targets
- Increased exposure to threats
- Missed engagements

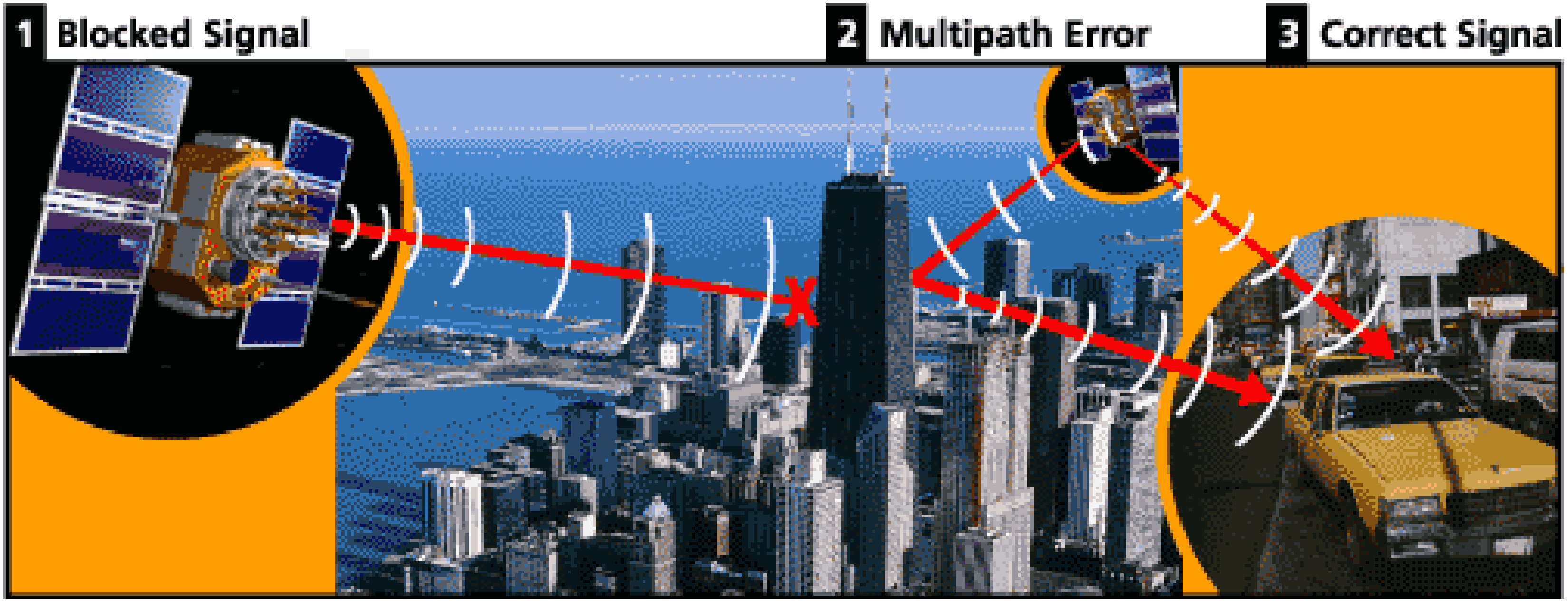
"Warfighter" is a term used by the United States Department of Defense to refer to any member of the US armed forces or a member of any armed forces under the US flag

Sources of GPS Signal Errors

Factors which reduce quality of GPS signal are:

- Ionosphere and troposphere delays
- Signal multipath
- Receiver clock errors
- Orbital errors
- Number of satellites visible
- Satellite geometry/ shading
- Intentional degradation of the satellite signal

Sources of GPS Signal Errors (cont’d)



Methods to Mitigate Signal Loss

Methods to mitigate GPS signal loss are:

1

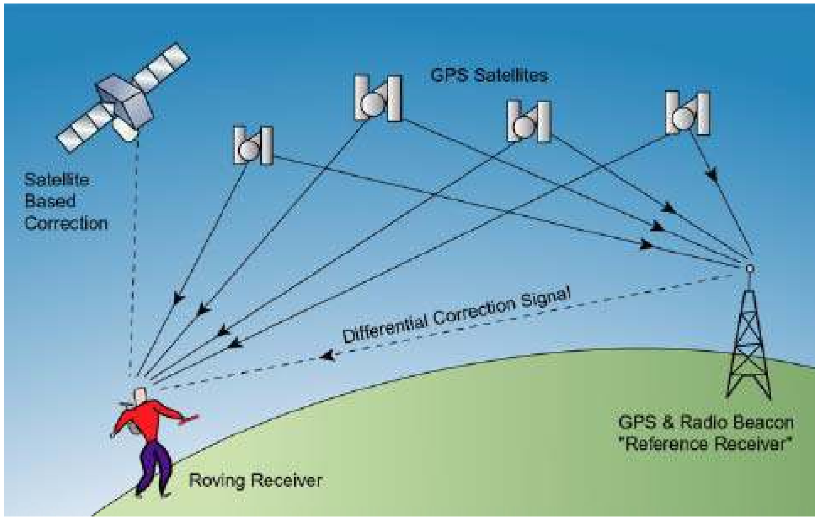
- Use precision oscillators as flywheel time/ frequency generators, as these oscillators "hold-over" the required specifications for some period of time until the GPS signal is recovered

2

- Jam-resistant antennas and receiver front-end add-ons helps to minimize the risk of GPS signal loss

3

- Use FAA civil Aviation (Wide Area Augmentation System) infrastructure; it is a differential ground-based system providing improved position accuracy, typically 1.5 m, for CAT III aircraft landing


GPS Satellites
Satellite
Based
Correction
Differential Correction Signal
GPS & Radio Beacon
"Reference Receiver"
Roving Receiver

GPS Secrets

CEH™ Certified Ethical Hacker

GPS Hidden Secrets

Electronic device have diagnostic screen or setup menus

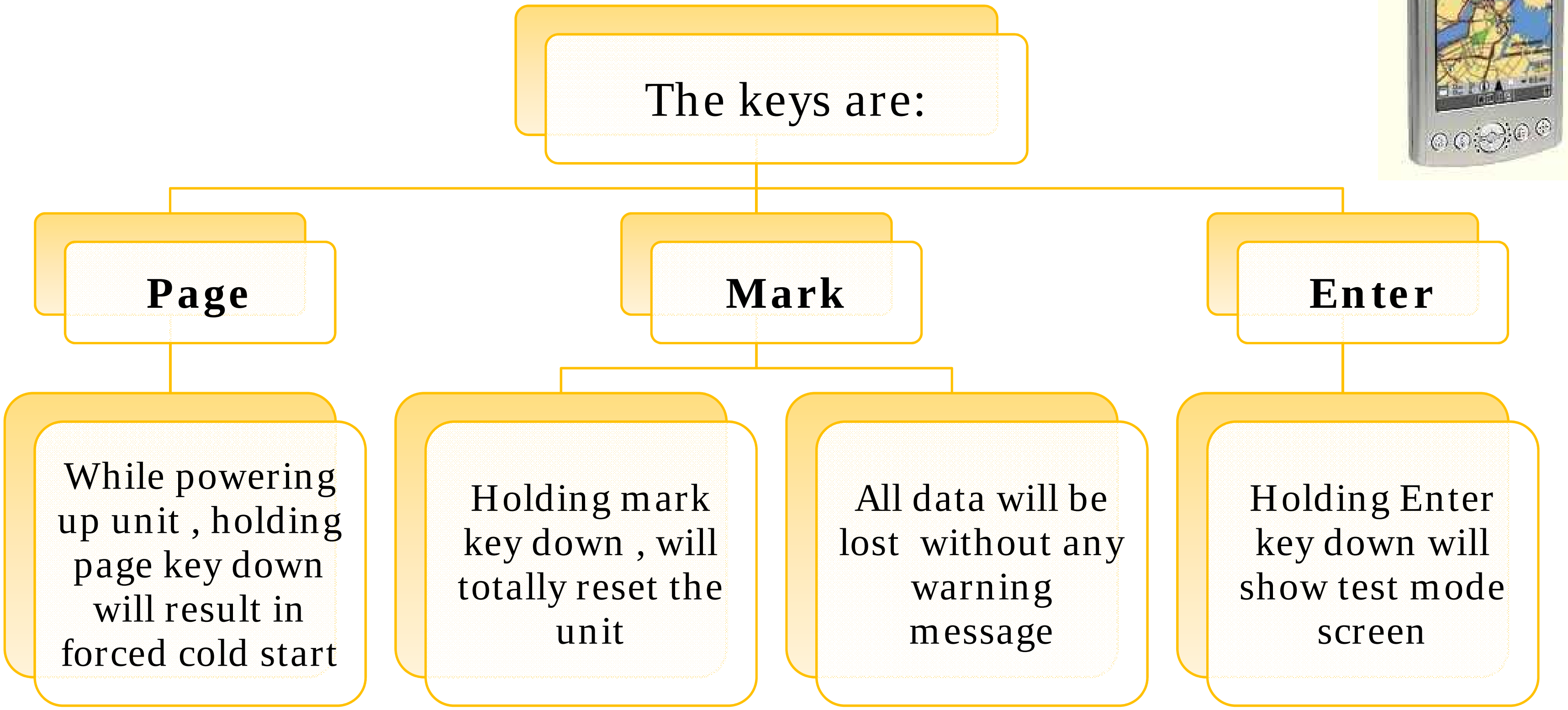
These screens used by manufacturers to diagnose fault and possible remedy

GPS devices also have the same but due to limited number of buttons, many complex keystrokes are necessary to open hidden menus

Source: *www.the-gadgeteer.com*

Secret Startup Commands in Garmin

Three keyboard keys are important while checking secret commands, if those held down while powering the unit



The keys are:

Page

While powering up unit , holding page key down will result in forced cold start

Mark

Holding mark key down , will totally reset the unit

All data will be lost without any warning message

Enter

Holding Enter key down will show test mode screen

Hard Reset/ Soft Reset

Hard reset

- It erases all data from GPS unit and restores it to factory default
- Hard reset is the last option when soft reset is not working

Soft Reset

- Soft reset erases all data from GPS memory and restarts the system
- Soft reset maintains the settings changed by the user but deletes all routes, waypoints, and other data

Firmware Hacking

Firmware

Firmware is software which controls the working of hardware and acts on the inputs

Firmware controls many key functions of GPS devices:

- Data processing
- Positional information decoding
- Data conversion
- Reception of satellite data
- External communication with devices
- Storing and managing route/ waypoint data
- Interpreting and displaying the information

Firmware: Screenshot

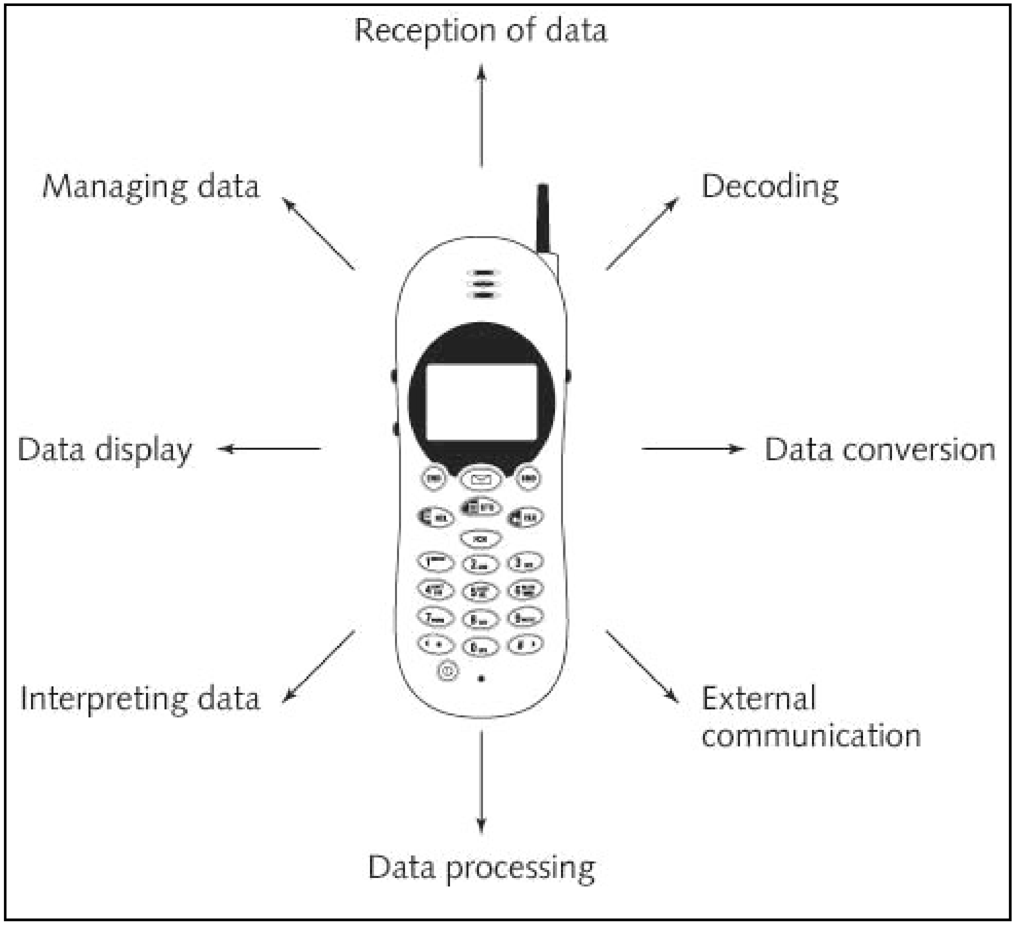
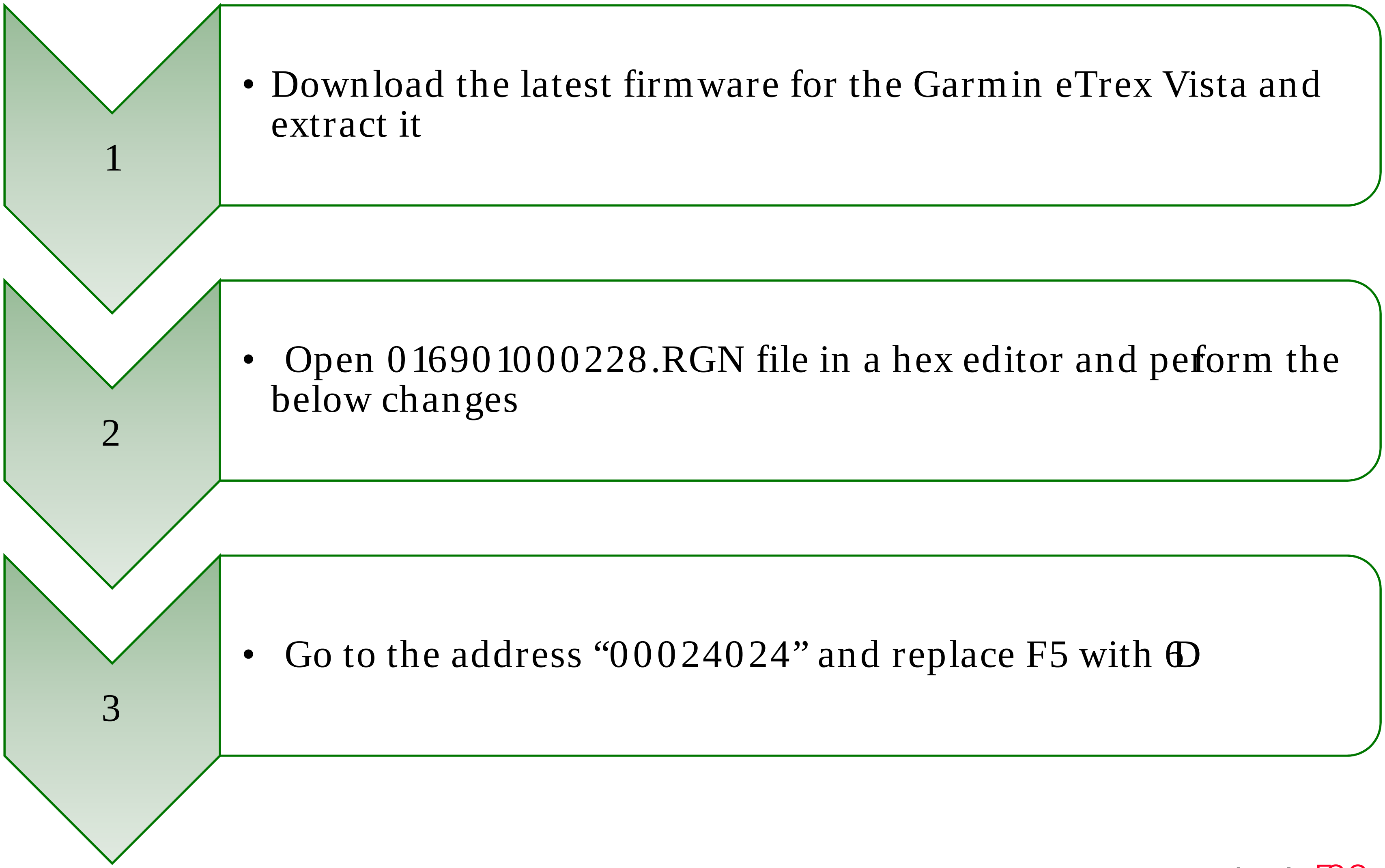


Figure: Basic Functions of Firmware

Hacking GPS Firmware: Bypassing the Garmin eTrex Vista Startup Screen



1

- Download the latest firmware for the Garmin eTrex Vista and extract it

2

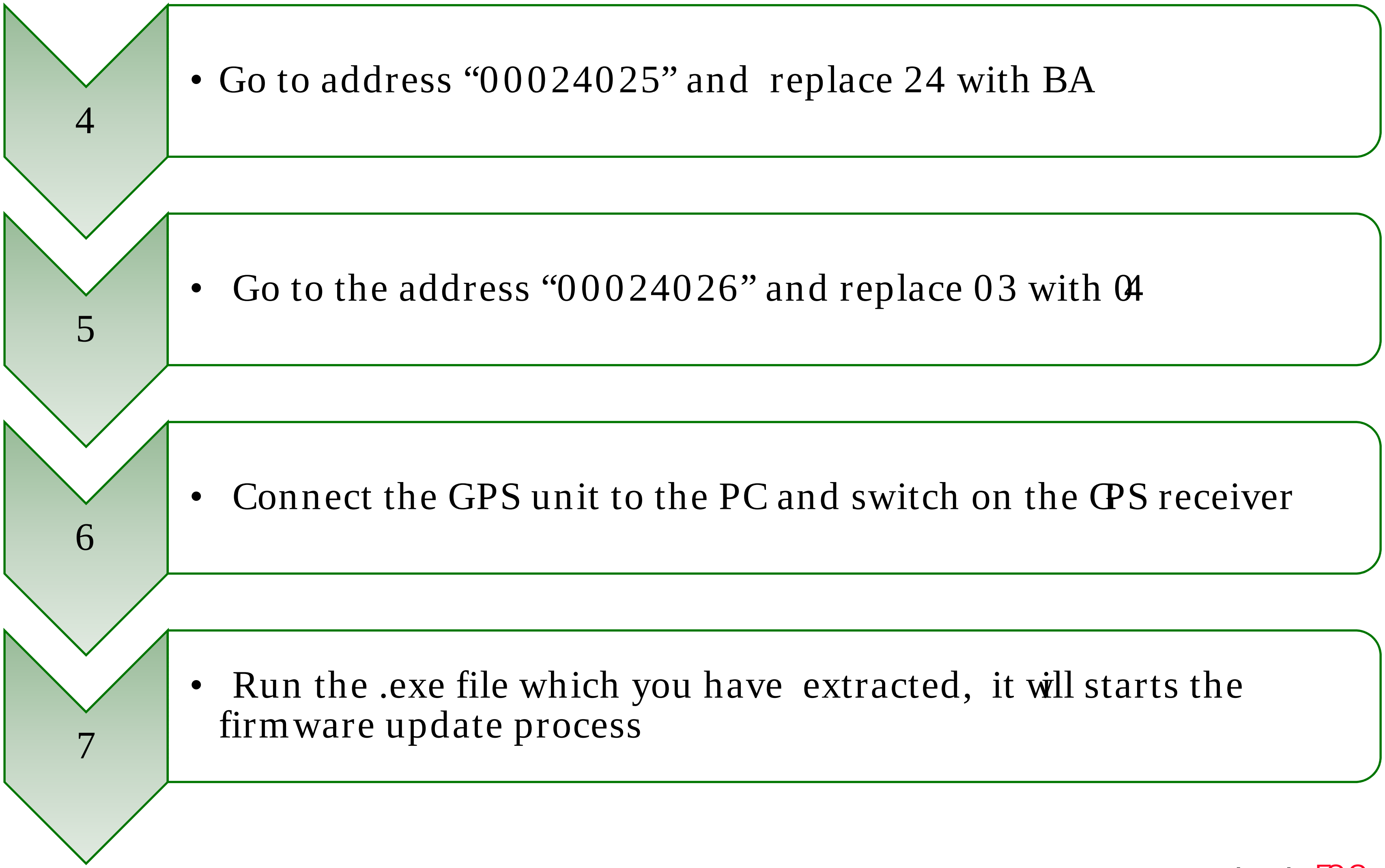
- Open 01690100228.RGN file in a hex editor and perform the below changes

3

- Go to the address “00024024” and replace F5 with 6D

EC-Council

Hacking GPS Firmware: Bypassing the Garmin eTrex Vista Startup Screen (cont’d)



4

- Go to address “00024025” and replace 24 with BA

5

- Go to the address “00024026” and replace 03 with 04

6

- Connect the GPS unit to the PC and switch on the GPS receiver

7

- Run the .exe file which you have extracted, it will starts the firmware update process

Hacking GPS Firmware: Bypassing the Garmin eTrex Legend Startup Screen

Use UltraEdit as the hex editor:

1

- Download the latest firmware from the Garmin website

2

- Download the latest version firmware for the Garmin eTrex Vista and extract it

3

- Open the file “017901000241.RGN” in a hex editor and perform the next changes

Hacking GPS Firmware: Bypassing the Garmin eTrex Legend Startup Screen (cont'd)

4

- Go to the address "000229DC" and replace 91 with 40

5

- Go to the address "000229DD" and replace DE with 30

6

- Go to the address "0011CB07" and replace 91 with 7E

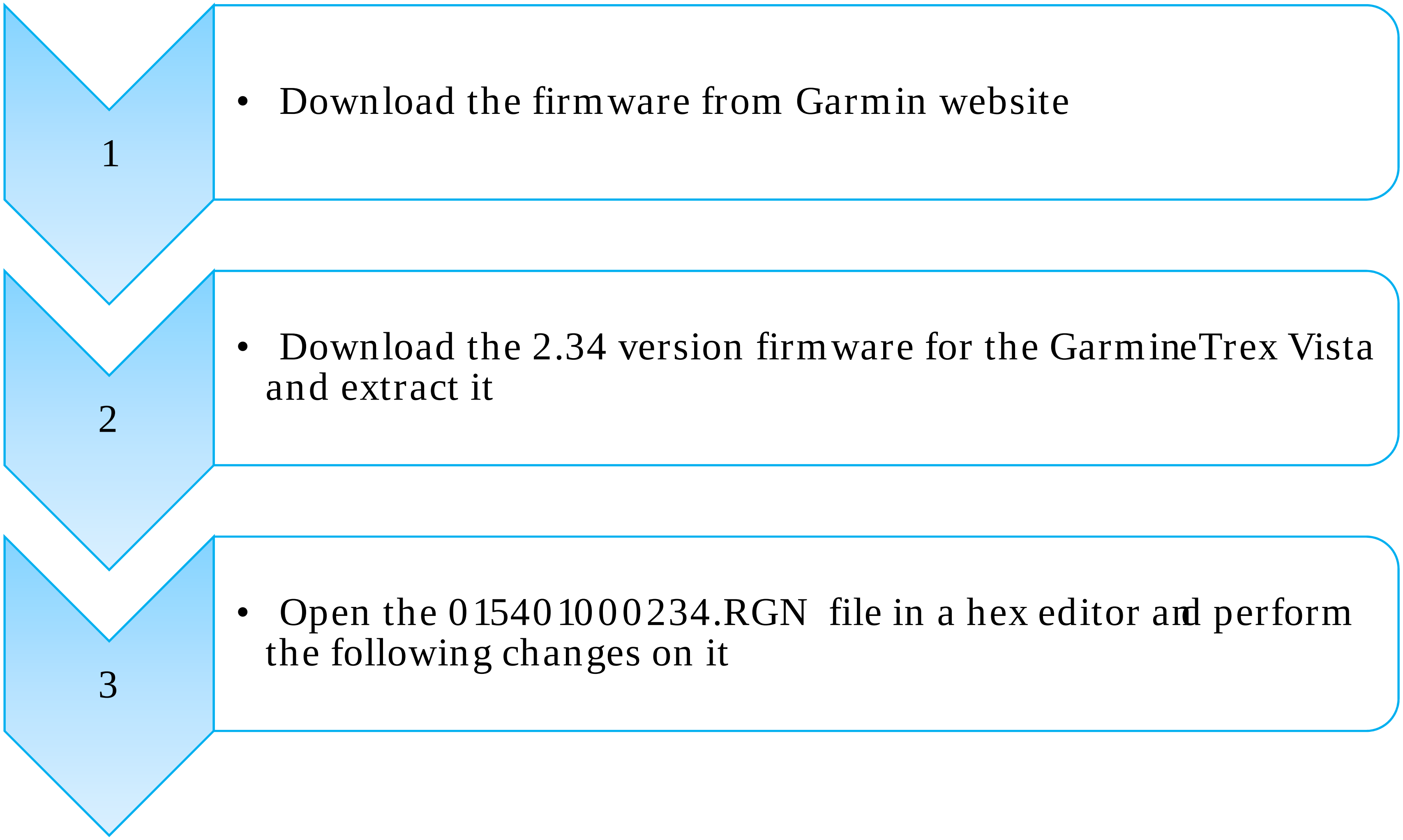
7

- Connect the GPS unit to the PC and switch on the GPS receiver

8

- Run the .exe file which you have extracted, it will begin the firmware update process

Hacking GPS Firmware: Bypassing the Garmin eTrex Venture Startup Screen



1

- Download the firmware from Garmin website

2

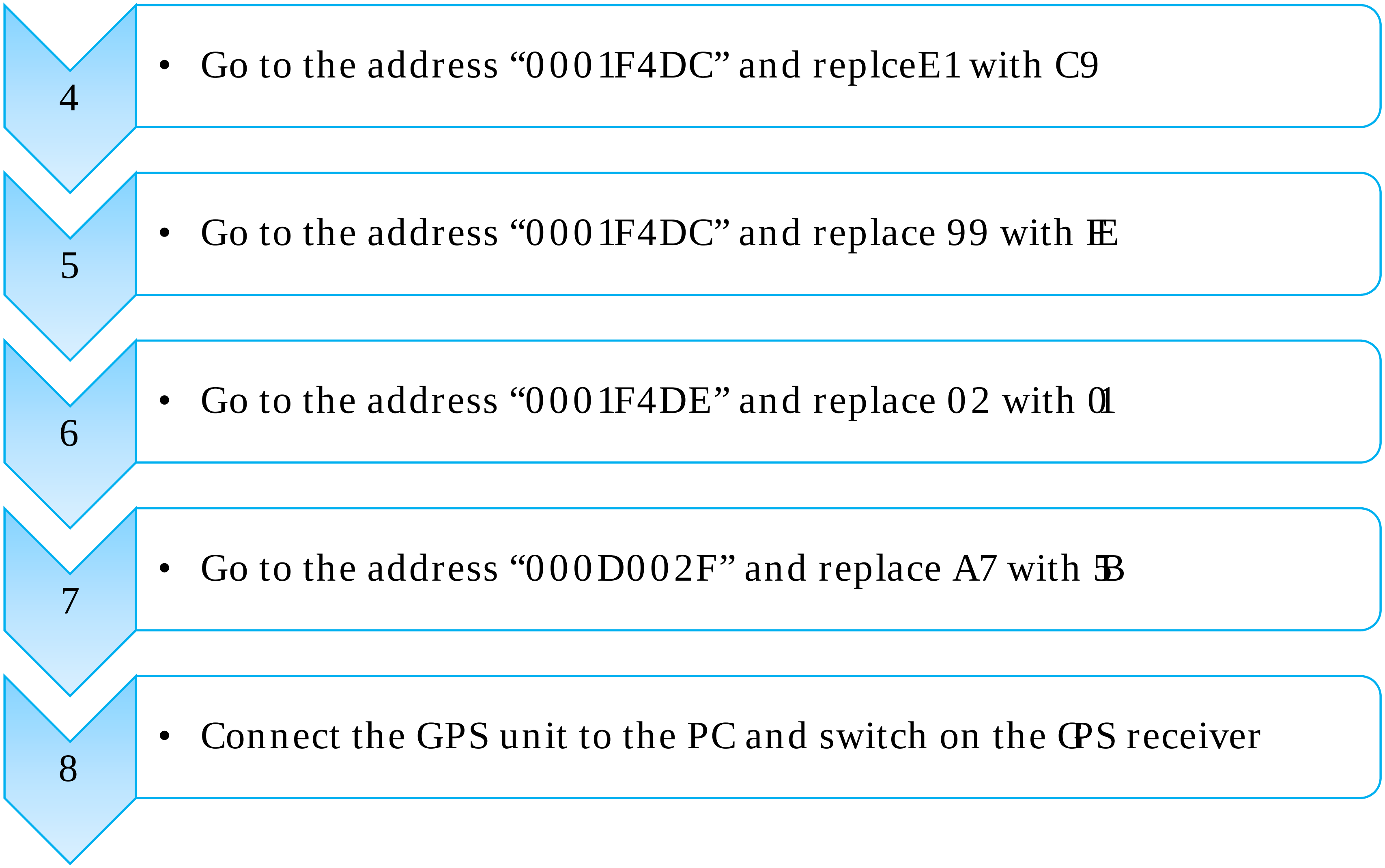
- Download the 2.34 version firmware for the GarmineTrex Vista and extract it

3

- Open the 015401000234.RGN file in a hex editor and perform the following changes on it

EC-Council

Hacking GPS Firmware: Bypassing the Garmin eTrex Venture Startup Screen (cont'd)



4

- Go to the address “0001F4DC” and replceE1 with C9

5

- Go to the address “0001F4DC” and replace 99 with EE

6

- Go to the address “0001F4DE” and replace 02 with 01

7

- Go to the address “000D002F” and replace A7 with 5B

8

- Connect the GPS unit to the PC and switch on the GPS receiver

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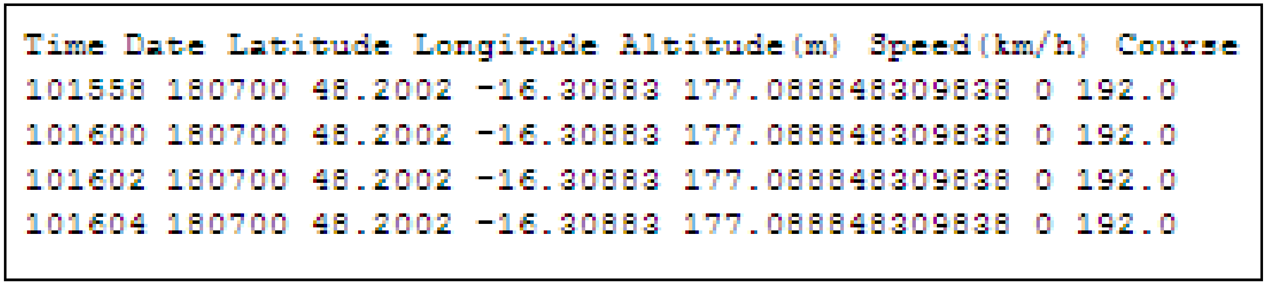
GPS Tools

Tool: GPS NMEA LOG

NMEALOG.ZIP contains 2 programs, one for logging all NMEA protocol data, and one specially for GPS data

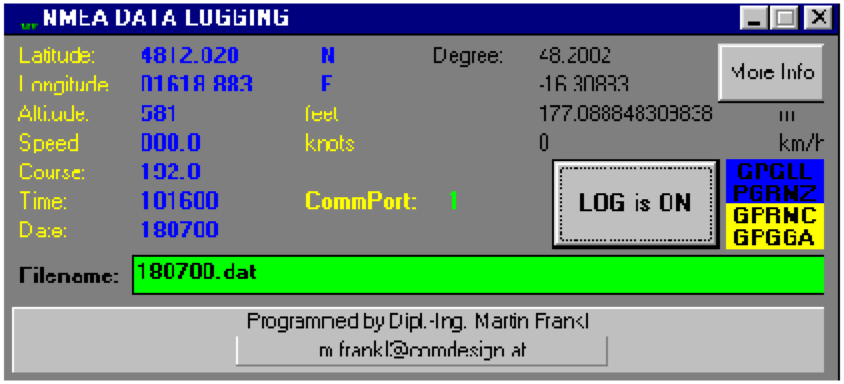
The serial com port can be passed to the program as a command line parameter

The program NMEA DATA LOGGING writes one LOG file that contains all the important information line by line



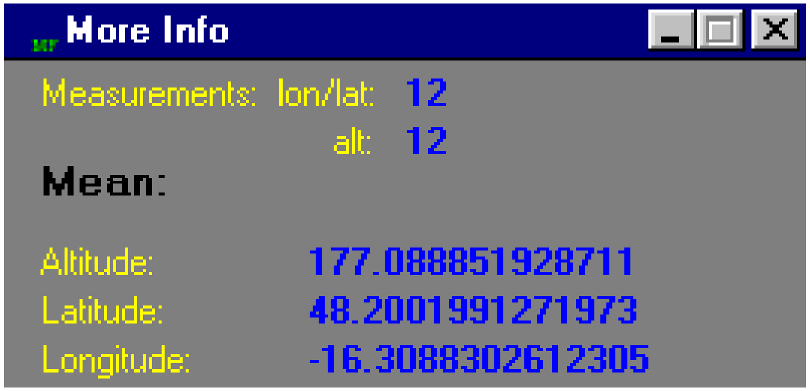
```
Time Date Latitude Longitude Altitude(m) Speed(km/h) Course
101558 180700 48.2002 -16.30883 177.088848309838 0 192.0
101600 180700 48.2002 -16.30883 177.088848309838 0 192.0
101602 180700 48.2002 -16.30883 177.088848309838 0 192.0
101604 180700 48.2002 -16.30883 177.088848309838 0 192.0
```

GPS NMEA LOG: Screenshots



Latitude: 4812.020 N Degree: 48.2002
Longitude: 01618.883 E -16.30833
Altitude: 581 feet 177.088848303838 m
Speed 000.0 knots 0 km/h
Course: 192.0
Time: 101600 CommPort: 1
Date: 180700
Filename: 180700.dat

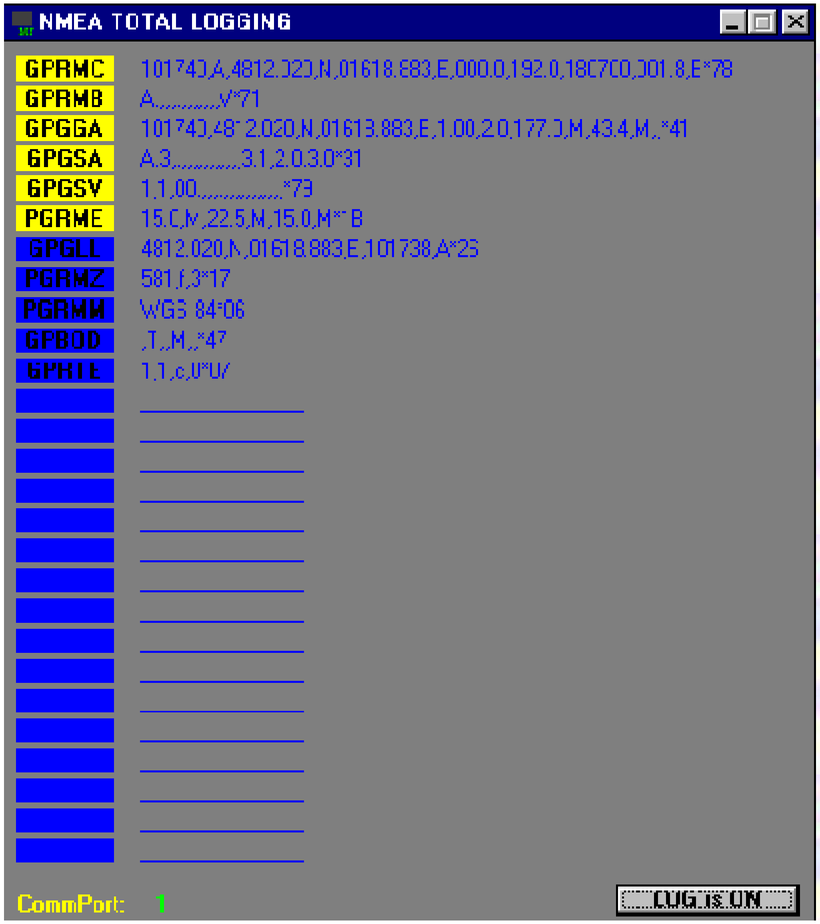
Programmed by Dipl.-Ing. Martin Frankl
m.frankl@ommdesign.at



Measurements: lon/lat: 12
alt: 12

Mean:

Altitude: 177.088851928711
Latitude: 48.2001991271973
Longitude: -16.3088302612305



```
GPRMC  101740,A,4812.020,N,01618.883,E,000.0,192.0,180700,001.8,E*78
GPRMB  A,,,,,,,,,,,,V*71
GPGGA  101740,4812.020,N,01618.883,E,1,00,2.0,177.0,M,43.4,M,,*41
GPGSA  A,3,,,,,,,,,,,,3.1,2.0,3.0*31
GPGSV  1,1,00,,,,,,,,,,,,,,,,*79
PGRME  15.0,M,22.5,M,15.0,M*1B
GPGLL  4812.020,N,01618.883,E,101738,A*25
PGRMZ  581,f,3*17
PGRMM  WGS 84*06
GPBOD  ,T,,M,,*47
GPRTE  1,1,c,0*07
```

CommPort: 1

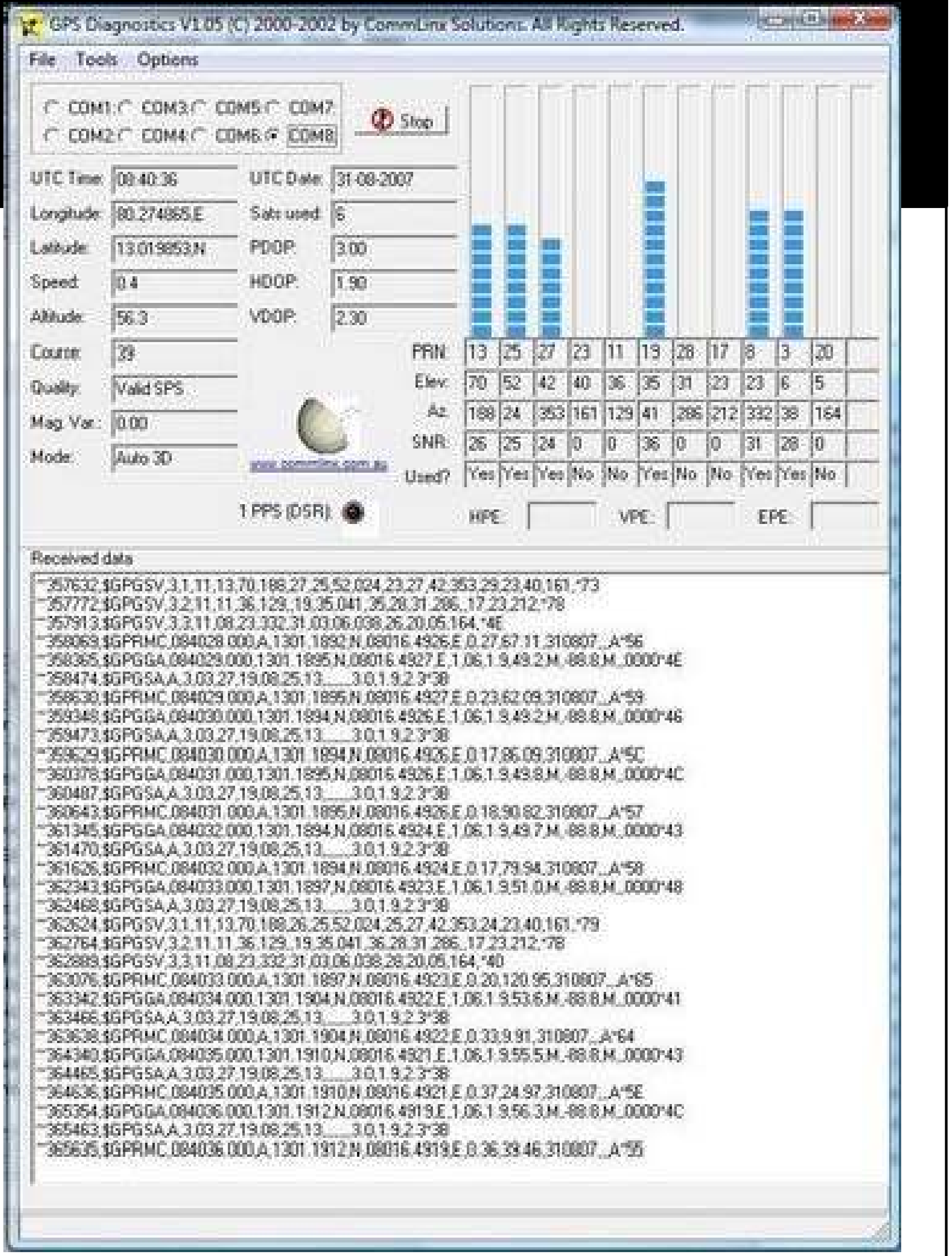
EC-Council

Tool: GPS Diagnostic

GPSDiag is a free GPS program for 32-bit Microsoft Windows platforms to monitor incoming NMEA GPS messages from a serial port

It displays the interpreted data in the top half of the window with raw data in the bottom half

GPS Diagnostic: Screenshot



GPS Diagnostics V1.05 (C) 2000-2002 by CommLinx Solutions. All Rights Reserved.

○ COM1: ○ COM3: ○ COM5: ○ COM7:
○ COM2: ○ COM4: ○ COM6: ● COM8

UTC Time: 08:40:36
Longitude: 80.274865,E
Latitude: 13.019853,N
Speed: 0.4
Altitude: 56.3
Course: 39
Quality: Valid SPS
Mag. Var.: 0.00
Mode: Auto 3D

UTC Date: 31-08-2007
Sats used: 6
PDOP: 3.00
HDOP: 1.90
VDOP: 2.30

PRN:	13	25	27	23	11	19	28	17	8	3	20	
Elev:	70	52	42	40	36	35	31	23	23	6	5	
Az:	188	24	353	161	129	41	286	212	332	38	164	
SNR:	26	25	24	0	0	36	0	0	31	28	0	
Used?	Yes	Yes	Yes	No	No	Yes	No	No	Yes	Yes	No	

1 PPS (DSR): ●

HPE:
VPE:
EPE:

Received data

```
~357632,$GPGSV,3,1,11,13,70,188,27,25,52,024,23,27,42,353,29,23,40,161,*73
~357772,$GPGSV,3,2,11,11,36,129,,19,35,041,35,28,31,286,,17,23,212,*78
~357913,$GPGSV,3,3,11,08,23,332,31,03,06,038,26,20,05,164,*4E
~358063,$GPRMC,084028.000,A,1301.1892,N,08016.4926,E,0.27,67.31,310807,,,A*56
~358365,$GPGGA,084029.000,1301.1895,N,08016.4927,E,1,06,1.9,49.2,M,-88.8,M,,0000*4E
~358474,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~358630,$GPRMC,084029.000,A,1301.1895,N,08016.4927,E,0.23,62.09,310807,,,A*59
~359348,$GPGGA,084030.000,1301.1894,N,08016.4926,E,1,06,1.9,49.2,M,-88.8,M,,0000*46
~359473,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~359629,$GPRMC,084030.000,A,1301.1894,N,08016.4926,E,0.17,86.09,310807,,,A*5C
~360378,$GPGGA,084031.000,1301.1895,N,08016.4926,E,1,06,1.9,49.8,M,-88.8,M,,0000*4C
~360487,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~360643,$GPRMC,084031.000,A,1301.1895,N,08016.4926,E,0.18,90.82,310807,,,A*57
~361345,$GPGGA,084032.000,1301.1894,N,08016.4924,E,1,06,1.9,49.7,M,-88.8,M,,0000*43
~361470,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~361626,$GPRMC,084032.000,A,1301.1894,N,08016.4924,E,0.17,79.94,310807,,,A*58
~362343,$GPGGA,084033.000,1301.1897,N,08016.4923,E,1,06,1.9,51.0,M,-88.8,M,,0000*48
~362468,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~362624,$GPGSV,3,1,11,13,70,188,26,25,52,024,25,27,42,353,24,23,40,161,*79
~362764,$GPGSV,3,2,11,11,36,129,,19,35,041,36,28,31,286,,17,23,212,*78
~362889,$GPGSV,3,3,11,08,23,332,31,03,06,038,28,20,05,164,*40
~363076,$GPRMC,084033.000,A,1301.1897,N,08016.4923,E,0.20,120.95,310807,,,A*65
~363342,$GPGGA,084034.000,1301.1904,N,08016.4922,E,1,06,1.9,53.6,M,-88.8,M,,0000*41
~363466,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~363638,$GPRMC,084034.000,A,1301.1904,N,08016.4922,E,0.33,9.91,310807,,,A*64
~364340,$GPGGA,084035.000,1301.1910,N,08016.4921,E,1,06,1.9,55.5,M,-88.8,M,,0000*43
~364465,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~364636,$GPRMC,084035.000,A,1301.1910,N,08016.4921,E,0.37,24.97,310807,,,A*5E
~365354,$GPGGA,084036.000,1301.1912,N,08016.4919,E,1,06,1.9,56.3,M,-88.8,M,,0000*4C
~365463,$GPGSA,A,3,03,27,19,08,25,13,,,,,,,3.0,1.9,2.3*38
~365635,$GPRMC,084036.000,A,1301.1912,N,08016.4919,E,0.36,39.46,310807,,,A*55
```

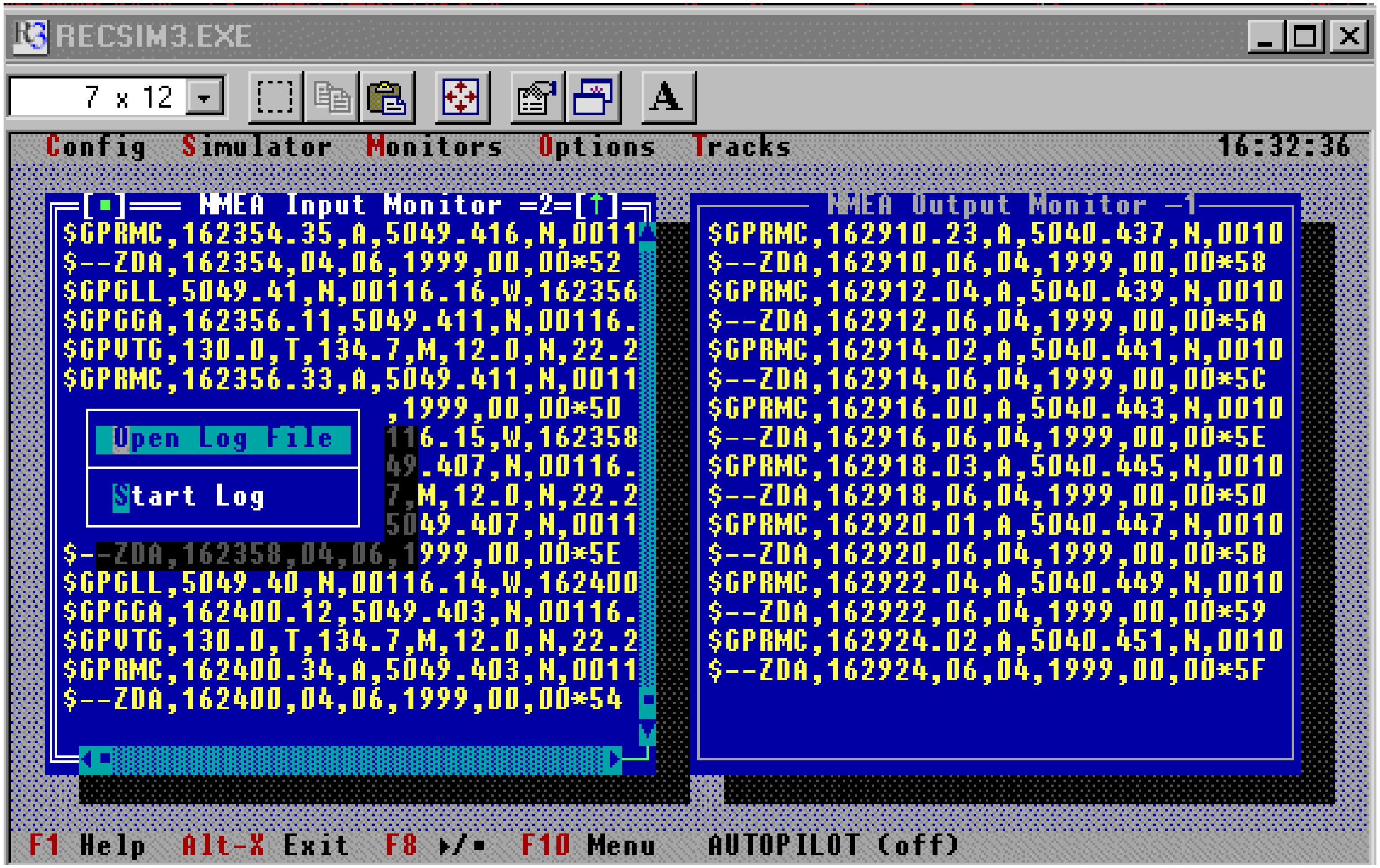
Tool: RECSIM III

It enables a PC to generate National Marine Electronics Association (NMEA) sentences via the serial port to simulate the output of a GPS, DECCA, or LORAN navigation receiver

Features:

- Reset the PC's date/time from within RECSIM for ease of time related testing
- NMEA filtering on input monitors
- Optional NMEA Logging to text files
- Support for COM ports 1 - 4 (not just COM1 and COM2)
- Handles dates beyond 2000
- NMEA compatible format
- Optional 4 digit year format for use in ZDA sentences for time related testing

RECSIM III: Screenshot


RECSIM3.EXE
7 x 12
Config Simulator Monitors Options Tracks 16:32:36
[▪]══ NMEA Input Monitor ═2═[↑]
NMEA Output Monitor ─1
Open Log File
Start Log
F1 Help Alt-X Exit F8 ▸/▪ F10 Menu AUTOPILOT (off)

```
$GPRMC,162354.35,A,5049.416,N,0011
$--ZDA,162354,04,06,1999,00,00*52
$GPGLL,5049.41,N,00116.16,W,162356
$GPGGA,162356.11,5049.411,N,00116.
$GPVTG,130.0,T,134.7,M,12.0,N,22.2
$GPRMC,162356.33,A,5049.411,N,0011
                        ,1999,00,00*50
                       116.15,W,162358
                        49.407,N,00116.
                        7,M,12.0,N,22.2
                        5049.407,N,0011
$--ZDA,162358,04,06,1999,00,00*5E
$GPGLL,5049.40,N,00116.14,W,162400
$GPGGA,162400.12,5049.403,N,00116.
$GPVTG,130.0,T,134.7,M,12.0,N,22.2
$GPRMC,162400.34,A,5049.403,N,0011
$--ZDA,162400,04,06,1999,00,00*54
```

```
$GPRMC,162910.23,A,5040.437,N,0010
$--ZDA,162910,06,04,1999,00,00*58
$GPRMC,162912.04,A,5040.439,N,0010
$--ZDA,162912,06,04,1999,00,00*5A
$GPRMC,162914.02,A,5040.441,N,0010
$--ZDA,162914,06,04,1999,00,00*5C
$GPRMC,162916.00,A,5040.443,N,0010
$--ZDA,162916,06,04,1999,00,00*5E
$GPRMC,162918.03,A,5040.445,N,0010
$--ZDA,162918,06,04,1999,00,00*50
$GPRMC,162920.01,A,5040.447,N,0010
$--ZDA,162920,06,04,1999,00,00*5B
$GPRMC,162922.04,A,5040.449,N,0010
$--ZDA,162922,06,04,1999,00,00*59
$GPRMC,162924.02,A,5040.451,N,0010
$--ZDA,162924,06,04,1999,00,00*5F
```

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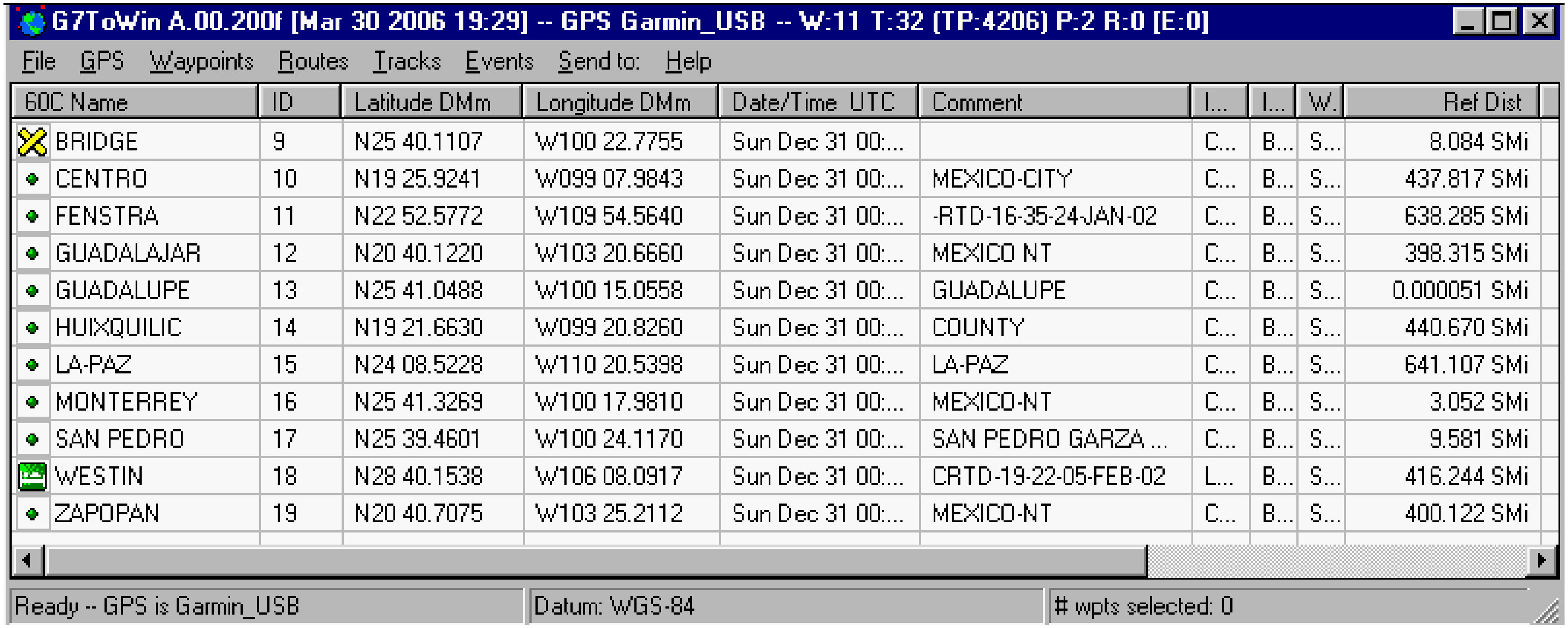
Tool: G7toWin

G7ToWin is designed to transfer data between a PC and Garmin, Magellan, or Lowrance/ Eagle GPS units

G7ToWin supports download of waypoints, track logs, routes, and events

Selected waypoints in the waypoints list can be used to create a track

G7toWin: Screenshot



G7ToWin A.00.200f [Mar 30 2006 19:29] -- GPS Garmin_USB -- W:11 T:32 (TP:4206) P:2 R:0 [E:0]

60C Name	ID	Latitude DMm	Longitude DMm	Date/Time UTC	Comment	I...	I...	W.	Ref Dist
BRIDGE	9	N25 40.1107	W100 22.7755	Sun Dec 31 00:...		C...	B...	S...	8.084 SMi
CENTRO	10	N19 25.9241	W099 07.9843	Sun Dec 31 00:...	MEXICO-CITY	C...	B...	S...	437.817 SMi
FENSTRA	11	N22 52.5772	W109 54.5640	Sun Dec 31 00:...	-RTD-16-35-24-JAN-02	C...	B...	S...	638.285 SMi
GUADALAJAR	12	N20 40.1220	W103 20.6660	Sun Dec 31 00:...	MEXICO NT	C...	B...	S...	398.315 SMi
GUADALUPE	13	N25 41.0488	W100 15.0558	Sun Dec 31 00:...	GUADALUPE	C...	B...	S...	0.000051 SMi
HUIXQUILIC	14	N19 21.6630	W099 20.8260	Sun Dec 31 00:...	COUNTY	C...	B...	S...	440.670 SMi
LA-PAZ	15	N24 08.5228	W110 20.5398	Sun Dec 31 00:...	LA-PAZ	C...	B...	S...	641.107 SMi
MONTERREY	16	N25 41.3269	W100 17.9810	Sun Dec 31 00:...	MEXICO-NT	C...	B...	S...	3.052 SMi
SAN PEDRO	17	N25 39.4601	W100 24.1170	Sun Dec 31 00:...	SAN PEDRO GARZA ...	C...	B...	S...	9.581 SMi
WESTIN	18	N28 40.1538	W106 08.0917	Sun Dec 31 00:...	CRTD-19-22-05-FEB-02	L...	B...	S...	416.244 SMi
ZAPOPAN	19	N20 40.7075	W103 25.2112	Sun Dec 31 00:...	MEXICO-NT	C...	B...	S...	400.122 SMi

Ready -- GPS is Garmin_USB

Datum: WGS-84

wpts selected: 0

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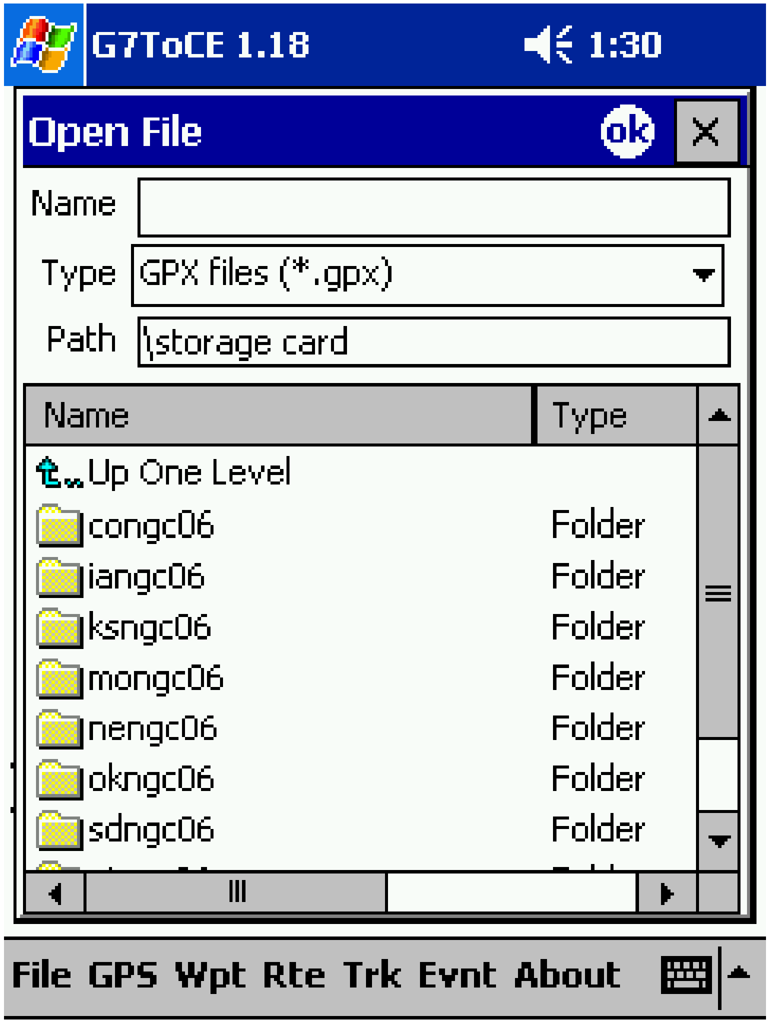
Tool: G7toCE

G7ToCE can create IGC track files with and without a 'G' validation record

Features:

- Added support for record D304 for Garmin units
- Added a Waypoint Name Length parameter for use in name comparisons
- Added Category edit for Garmin Waypoint Category values
- Modified .gpx output to support Garmin Extensions
- Supports input datum in Ozi files
- Added track color to .gpx routines--needs further debugging

G7toCE: Screenshot

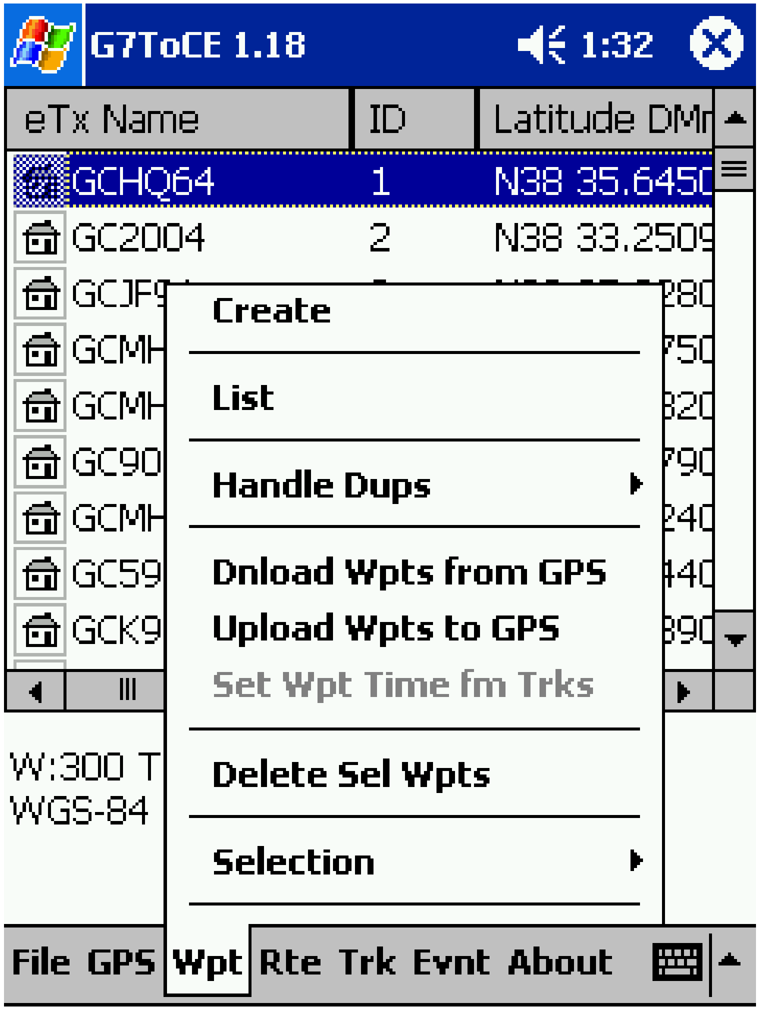


Name

Type GPX files (*.gpx)

Path \storage card

Name	Type
Up One Level	
congc06	Folder
iangc06	Folder
ksngc06	Folder
mongc06	Folder
nengc06	Folder
okngc06	Folder
sdngc06	Folder



eTx Name	ID	Latitude DMm
GCHQ64	1	N38 35.6450
GC2004	2	N38 33.2509
GCJF9		280
GCMH		750
GCMH		320
GC90		790
GCMH		240
GC59		440
GCK9		390

W:300 T
WGS-84

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Security Tool

Tool: GPS Security Guard

Components of GPS Security Guard

- G-Guard is a new generation of high-tech satellite security system
- Unmanned Control Center is designed for G-Guard users to have DIY vehicle location search, Tracking and SOS Emergency reporting services

Features:

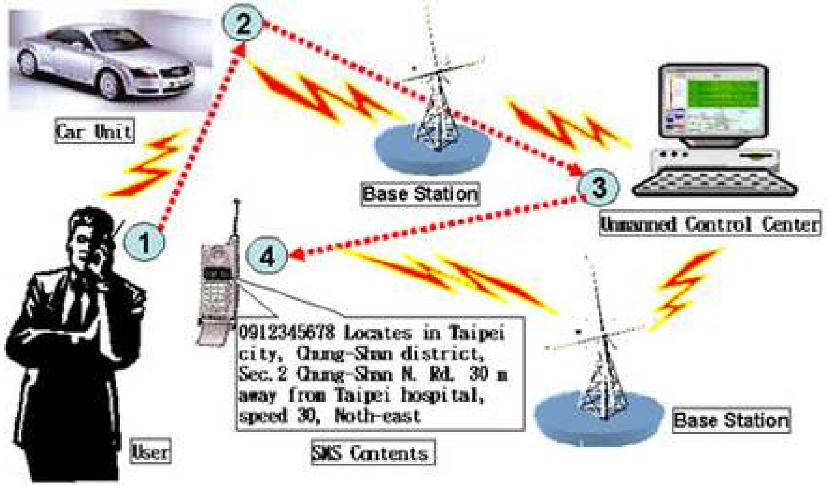
- Using unmanned control center and Internet, the users can find their car in 30 seconds
- Car Unit and remote control are designed in separate body to increase safety
- Car Unit and it's accessories are designed to be installed at well hidden place to prevent any intentional destruction
- G-Guard has self-testing and automatic recharging functions

GPS Security Guard Functions

Mobile Phone Searching and Tracking Function

Vehicle Searching: Using any mobile phone can show vehicle physical location

Continuous Tracking: Using any mobile phone can show vehicle continuous tracking



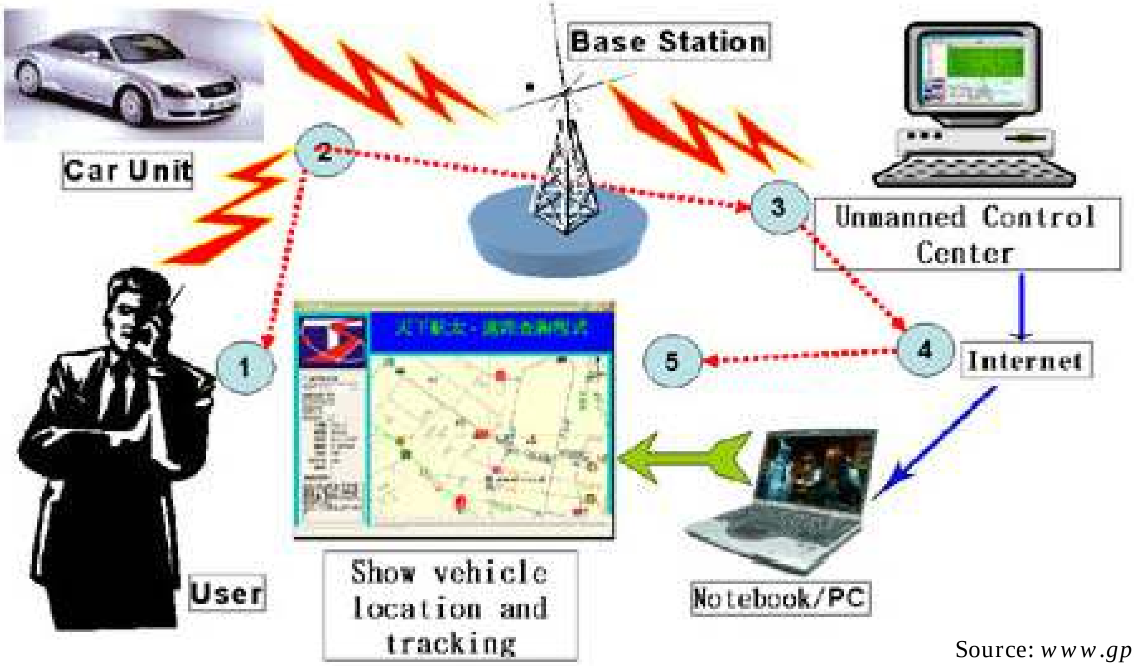
0912345678 Locates in Taipei city, Chung-Shan district, Sec. 2 Chung-Shan N. Rd. 30 m away from Taipei hospital, speed 30, Noth-east

Source: *www.gps.electronic.com*

GPS Security Guard Functions (cont’d)

Internet Searching and Tracking Function

- Using Notebook or PC through Internet to link withunmanned control center for vehicle searching and tracking

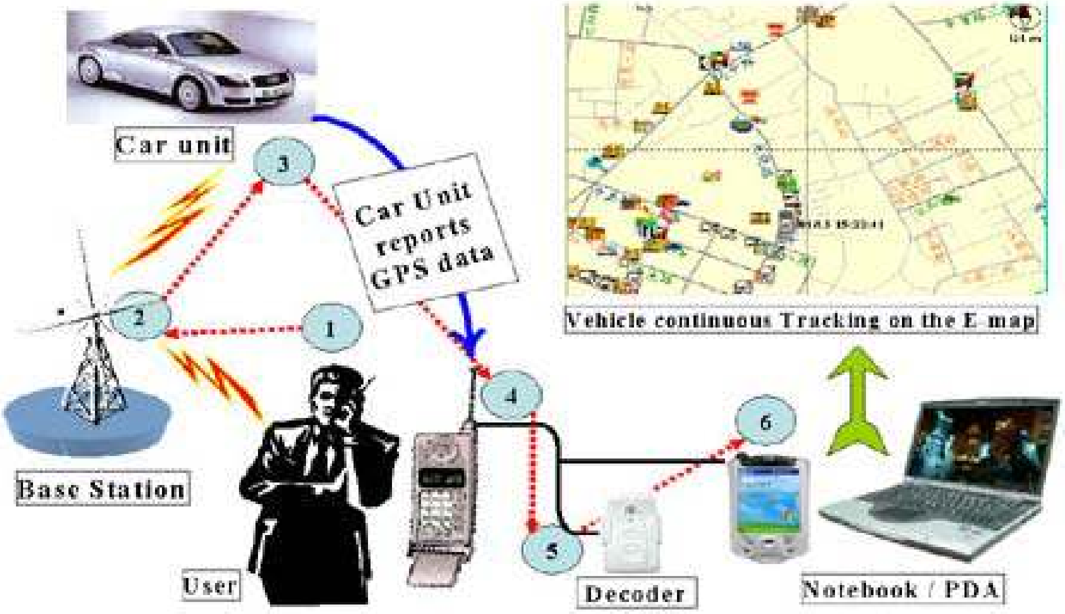


Source: *www.gps.electronic.com*

GPS Security Guard Functions (cont’d)

Portable Decoder for Continuous Tracking Function

- Use portable decoder and PDA or Notebook with E-map for continuous tracking of the vehicle without Internet


Car unit
3
Car Unit reports GPS data
Vehicle continuous Tracking on the E map
2
1
4
6
Base Station
5
User
Decoder
Notebook / PDA

Source: *www.gps.electronic.com*

UberTracker

The UberTracker represents a merger of GPS and Cellular technologies into one package capable of real-time asset tracking

GPS fixes are taken according to a user specified interval, then reported via email or GPRS to the user's designated email address

Features:

- Able to report via email in 3 different formats: Google Maps links, regular text and NMEA standard (RMC)
- Configurable to send to a web server
- Able to take GPS fixes frequently

Source: *http://www.sparkfun.com*

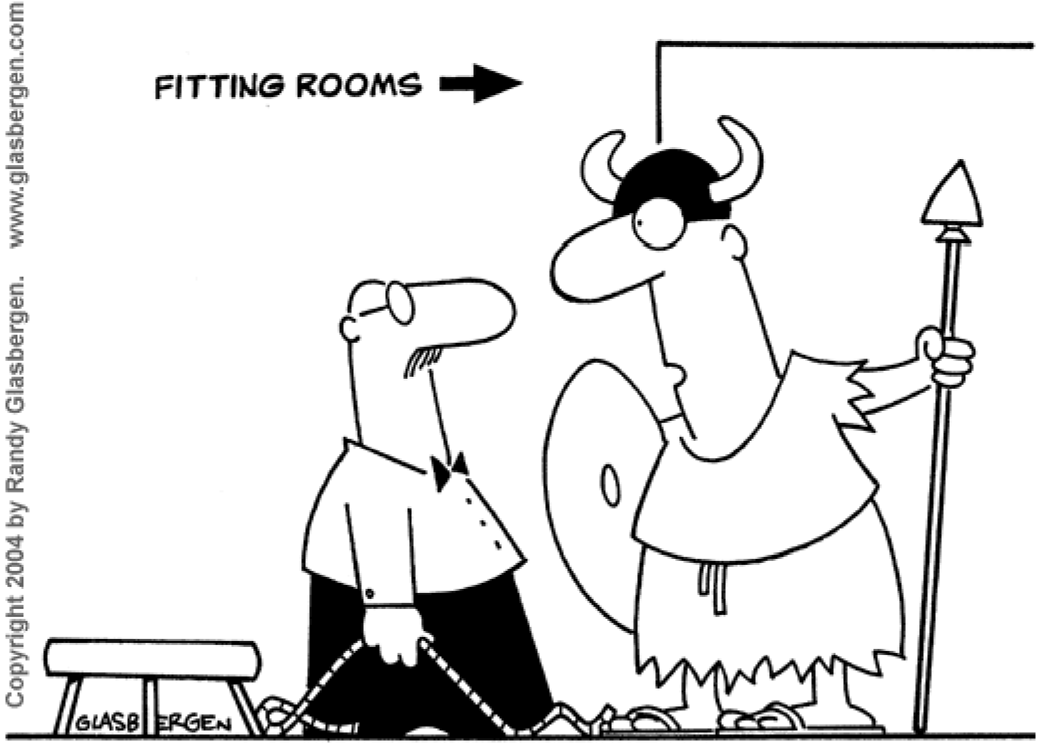
Summary

The Global Positioning System (GPS) is a satellite-based navigation system that provides reliable positioning, navigation, and timing services

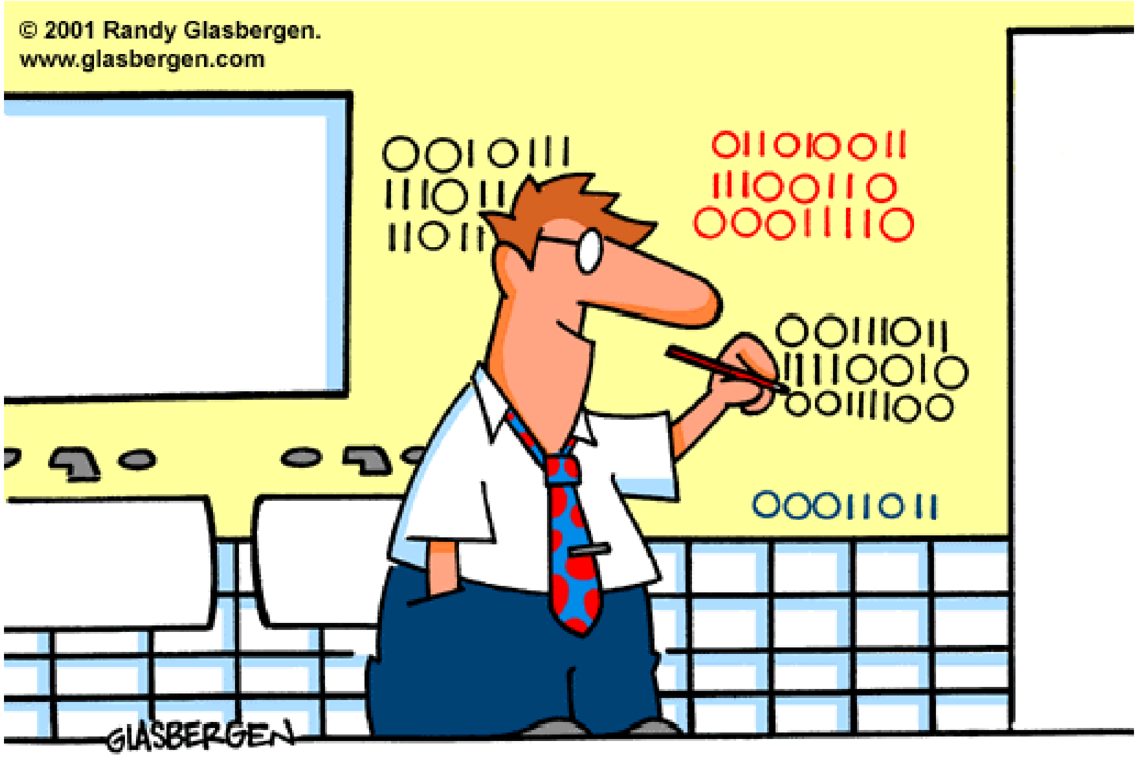
Electronic devices contain hidden diagnostic screens or setup menus

Firmware is a software which controls working of the hardware and respond to inputs

Wardriving is an activity by which WiFi networks, broadcasting signals are detected



"I don't want to conquer the world,
I just want to intimidate my computer!"



GRAFFITI FOR THE NEW MILLENNIUM.