SARTrack GPS tracking using Tait TP9300 radios – quick start guide

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PARTNERSHIPS IN LAND SEARCH AND RESCUE

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SARTrack introduction

Tait portable TP9300 (and 9400) use the Tait audio FSK CCDI data protocol

- Compatible with almost all analog repeaters
- Built in GPS transmits position using bursts (periodic or on PTT release)

John ZL4JY has worked with Bart Kindt CEO, the SARTrack developer and Tait to get these new portables working with SARTrack and to develop codeplugs for AREC use

- Need to use SARTrack from at least Version 0.9.745

Base station can be any modern Tait mobile radio

- Tait TM8100, TM8200, TM9300, and TM9400

Radio IDs are form the world-wide amateur digital radio identification system

✓ Tait TP9300 radios are DMR compatible, TP9400 are P25

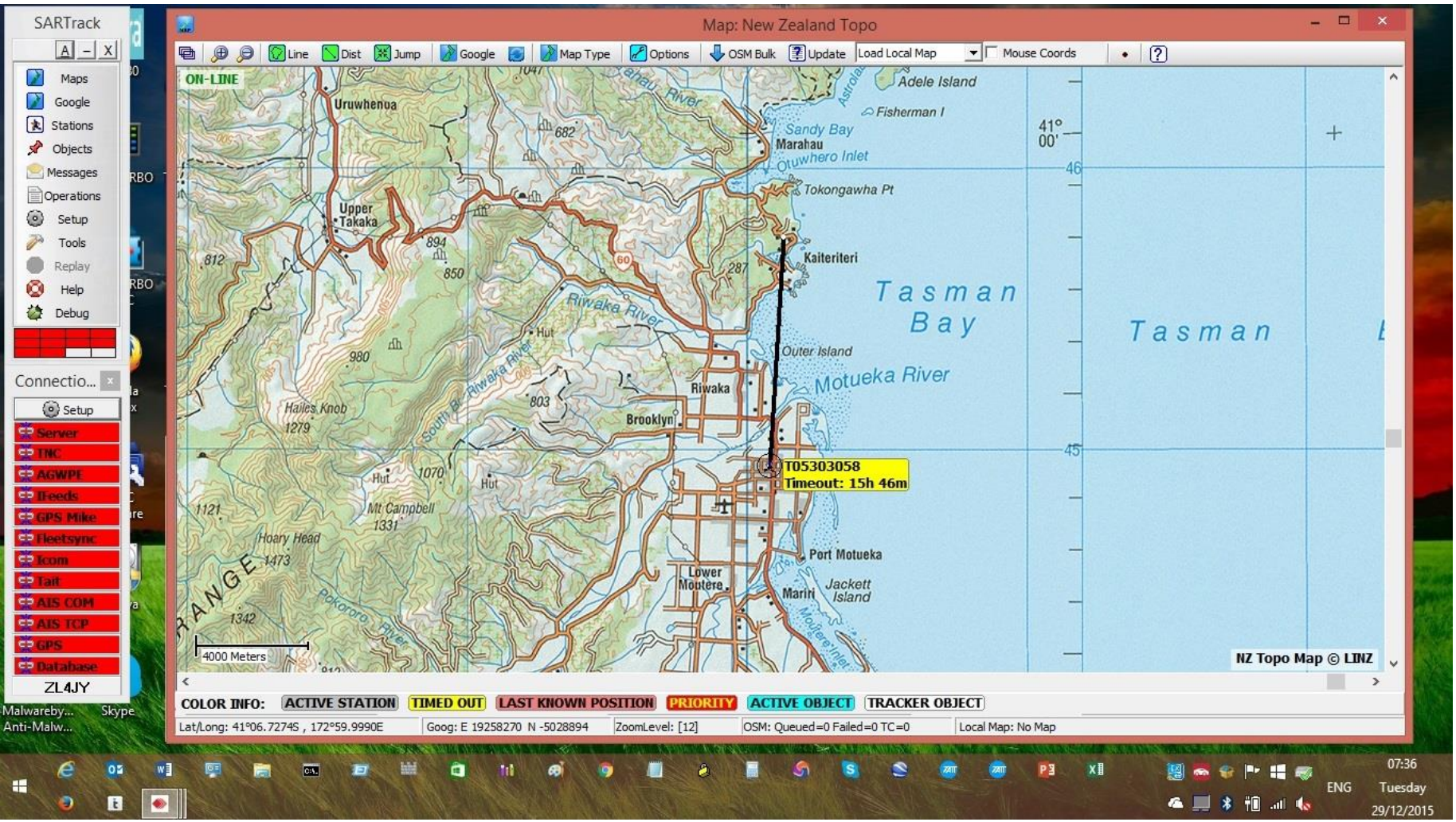
Example Motueka ZL2GK DMR IDs are 5303054, 5303055 to 5303059

- 0530 prefix (New Zealand), 4 digit suffix, refer: http://www.dmr-marc.net/cgi-bin/trbo-database/

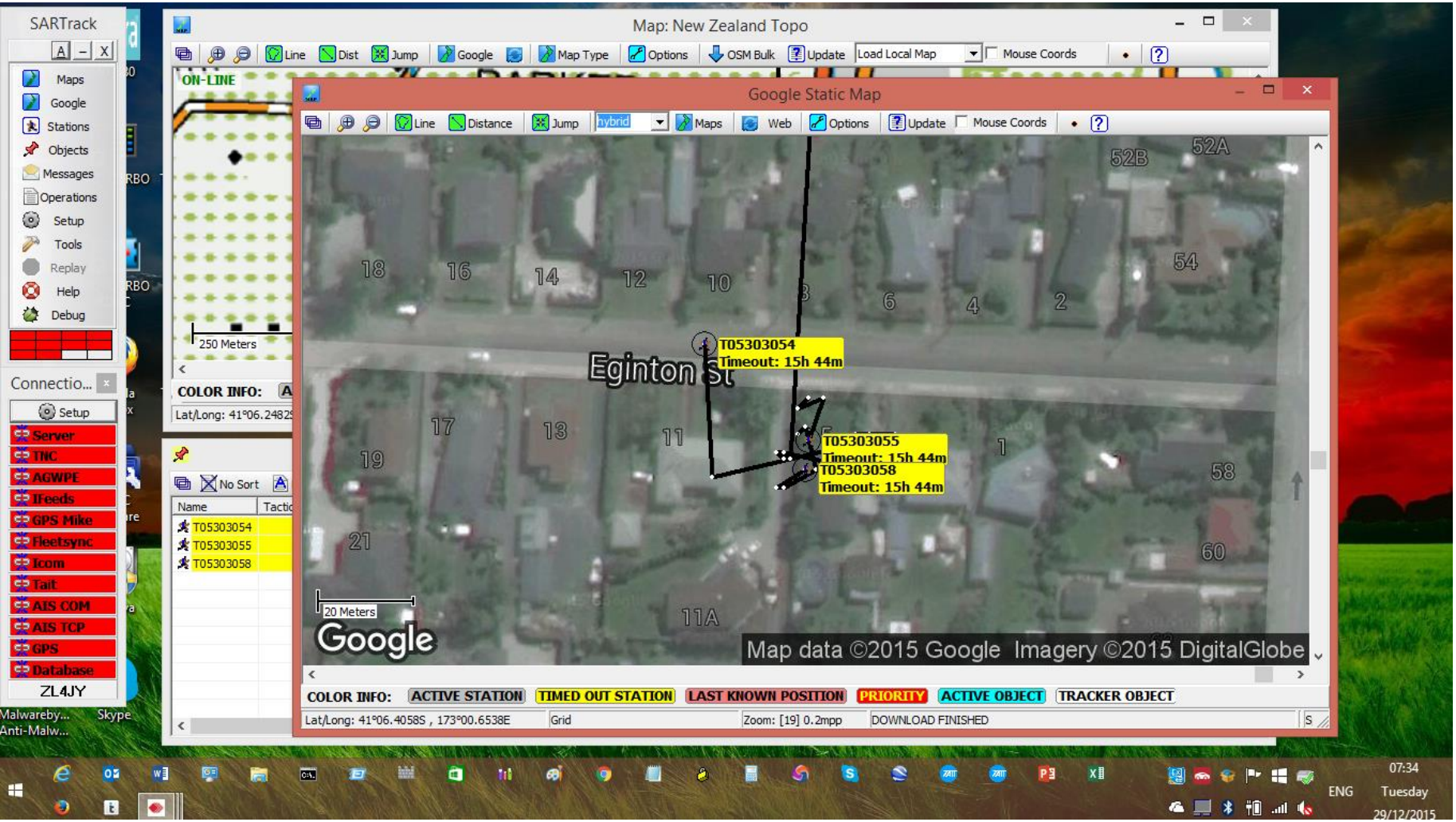
Tait CCDI supports this format

- SARTrack is set up for 4 digit prefix and 4 digit suffix to suit DMR out-of-the box

Example SARTrack topo map view – single object



Example SARTrack Google Earth view – multiple objects



Quick start

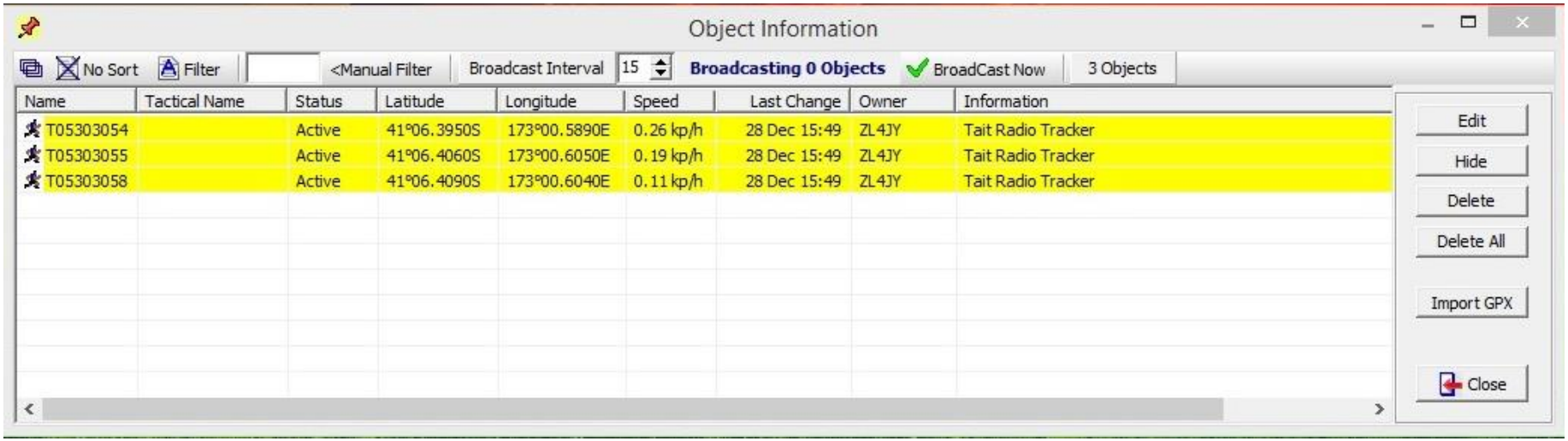
Start SARTrack

Select Tait radio, set COM port to that which connects to base radio

- Can use Tait radio programming cable via MIC jack to get started, optionally a codeplug change is needed to allow AUX RS-232 connection at rear of base radio

Set base ID to 1042, Prefix to 0530, Baud rate to 9600, and tick connect to radio

When base starts to receive positions tracking data initially appears in the Object Information box as shown in the example below

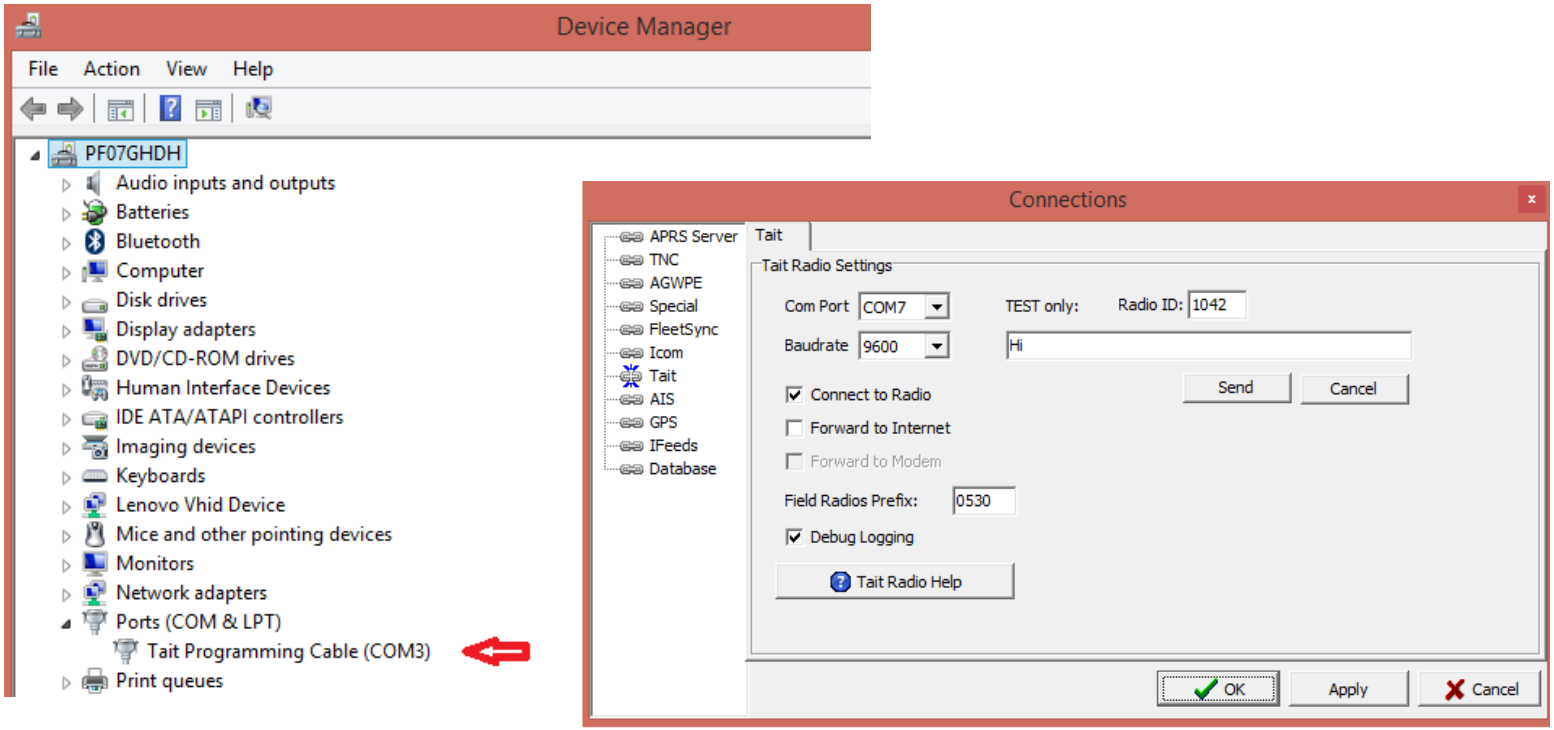


COM port selection – detail

Navigate to Control Panel > All Control Panel Items > Device Manager

Locate COM 1, 2, etc, if using a desktop with a dedicated COM port(s), or find the correct serial to USB adapter (example shows Tait programming cable for testing)

In SARTrack Connection box click on Tait and then click Setup Tait radio (example shows COM7) also check Radio ID is set to 1042 and Field radio prefix is 0530

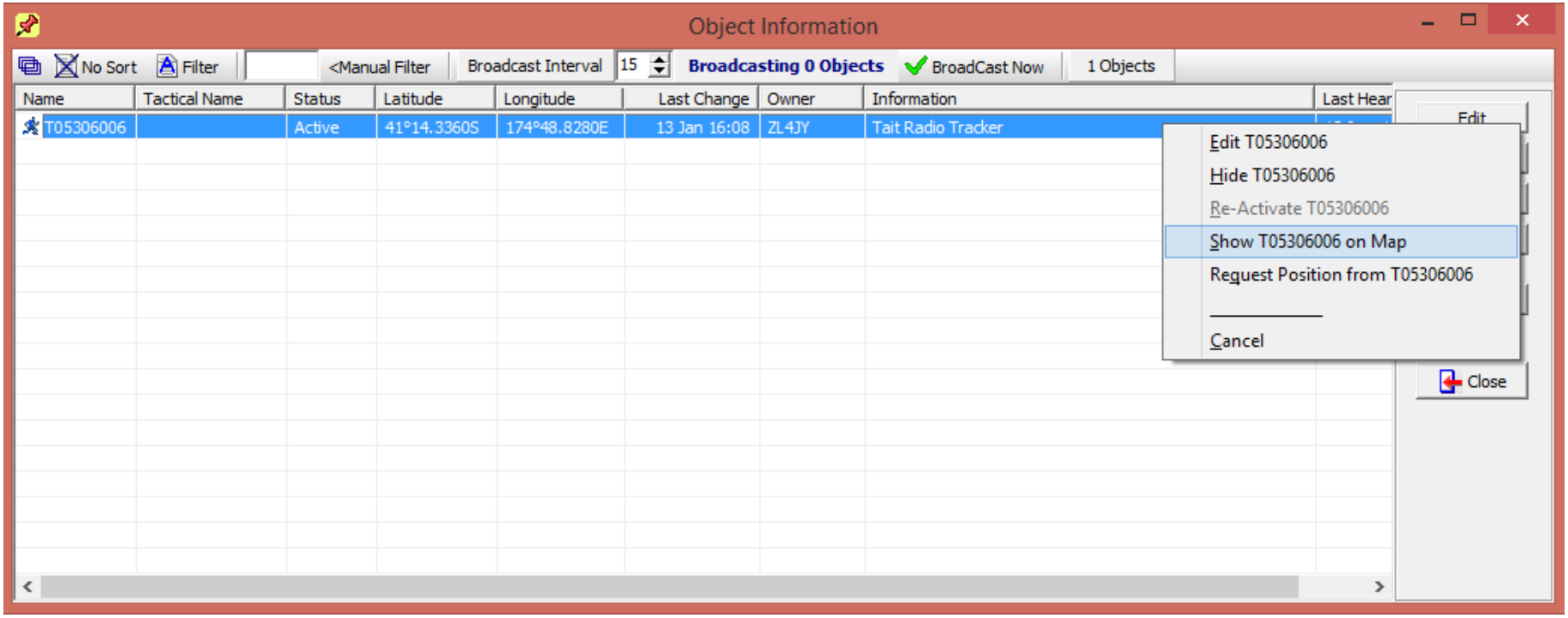


Show tracked objects on map

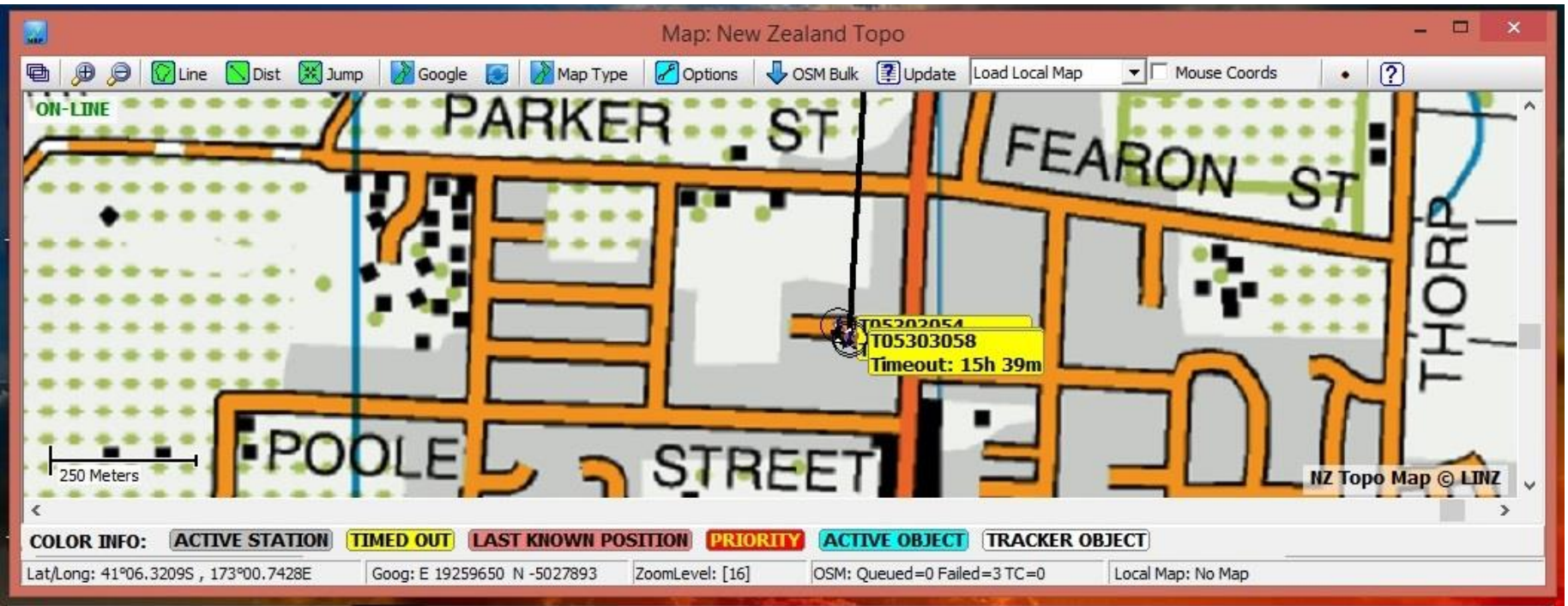
Select Maps (topo) or Google (Google Earth) map window from top floating menu

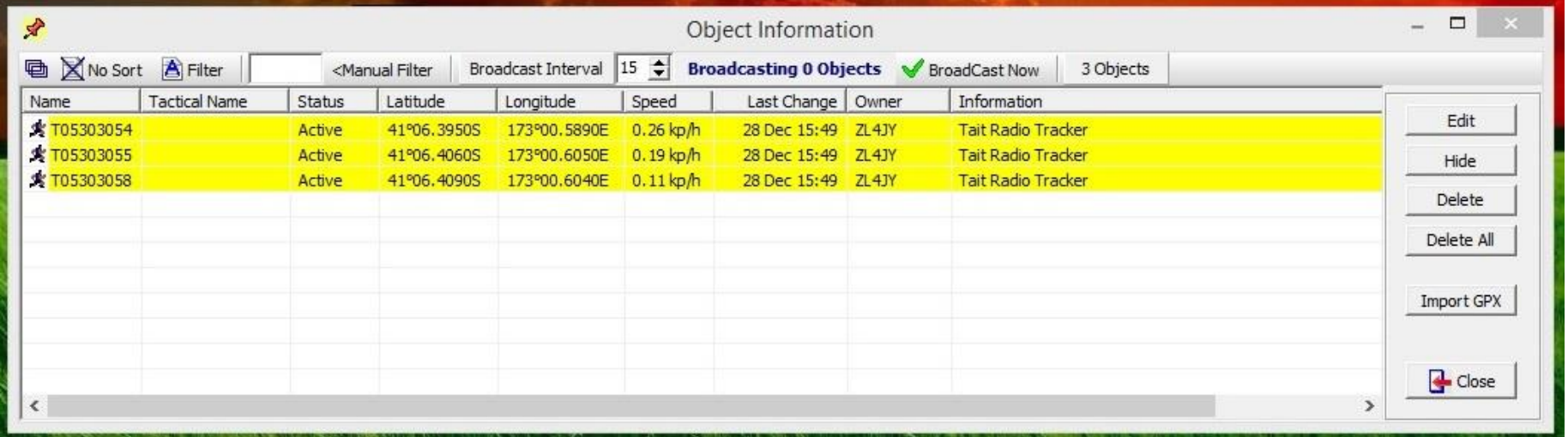
Right click object in the Object information window

- Select Show T0530xxxx on Map
- Note that an Internet connection is required for map display

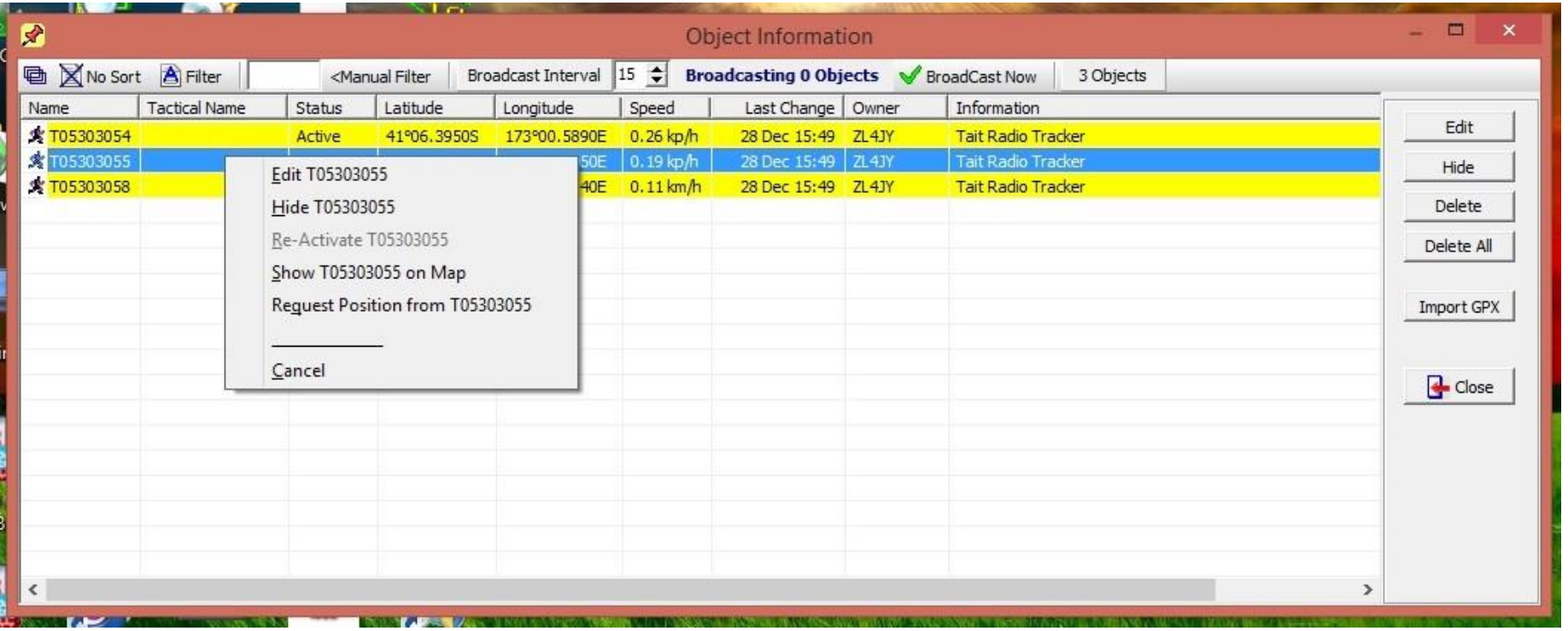


Initial object tracking can be viewed on map





Next select object and set it as a team

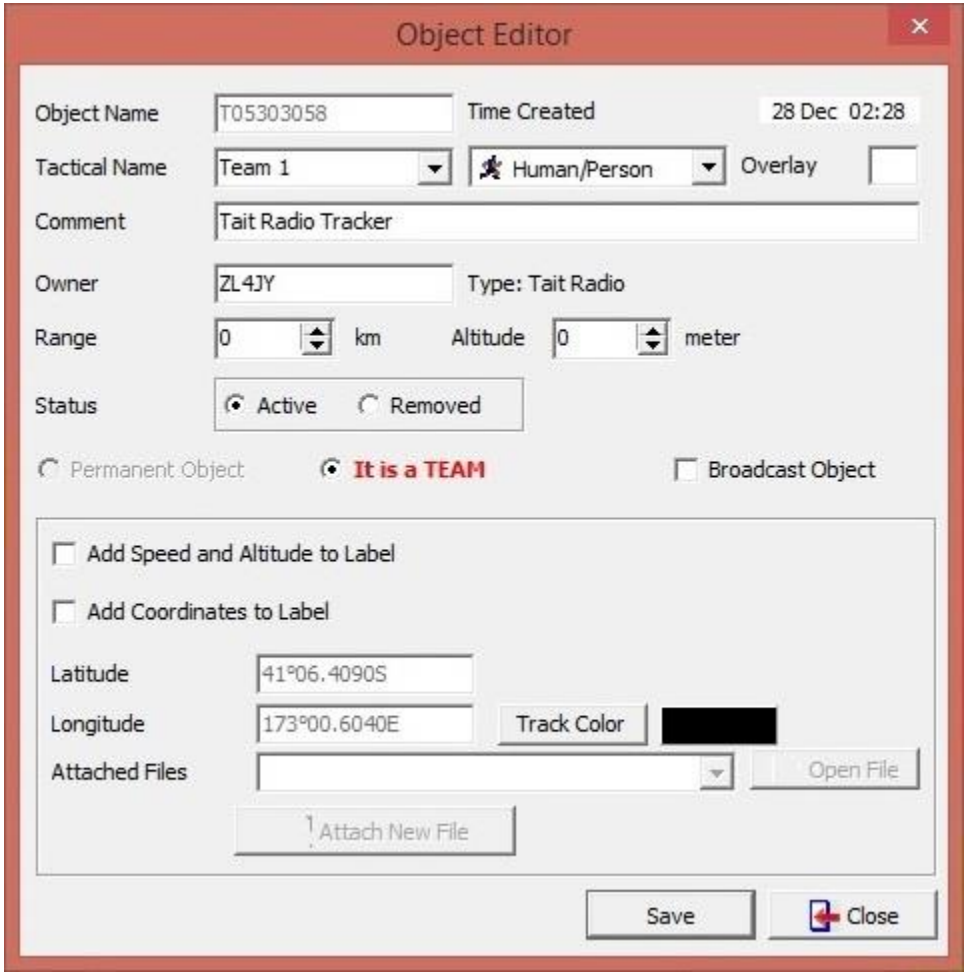


Right click object name …

Select object and set it as a team

Right click object name …

… enter team name in the Tactical Name box to make the team to radio assignment



Tait mobile DB15 auxiliary connector to PC DB9 wiring

Using the programming cable is adequate for testing but prevents microphone use

PC to base radio connection should ideally use the auxiliary connector on the rear of the Tait TM9100/8200/9300 and 9400 radios as the standard external serial interface

- Edit codeplug Global Features > Serial Protocol > CCDI UART Port from MIC to AUX to change from the programming cable and MIC to the AUX auxiliary connector

The auxiliary connector only supports a subset of the RS232 standard but will work with most computer COM ports and USB serial port cables

Where interface difficulty is experienced use the Tait TMAA01-02 RS-232 Option Board

TAIT END DB15 MALE	FUNCTION	COM PORT END DB9 FEMALE
3	RXD	3
11	TXD	2
15	AGND	5
	DTR/DSR	Loop 4 to 6
	RTS/CTS	Loop 7 to 8

Common issues

Unable to use Tait Programing Application on the TM9300 mobile

- If you are using the Tait programming cable for testing then the TM9300 mobile is set up with CCDI operation via the microphone connector. To get around this leave the mobile off until after you click read Radio > Read in the Programming Application then turn the mobile on.

If you are using the Tx9300 radios in DMR mode in conjunction with Motorola radios and you get the key lock symbol on the display and muted audio then the radio firmware must be upgraded

- Requires firmware 2.08.00.0073 or later
- DMR and P25 Terminals Calibration Application version 2.23.0.64, Tait Firmware Upgrade Tool 1.25.0.29, TM8200/TM9300/TP9300 Programming Application 2.8.22

If you are using the Tx9300 radios in DMR mode and are experiencing distorted audio the above firmware will also address this issue

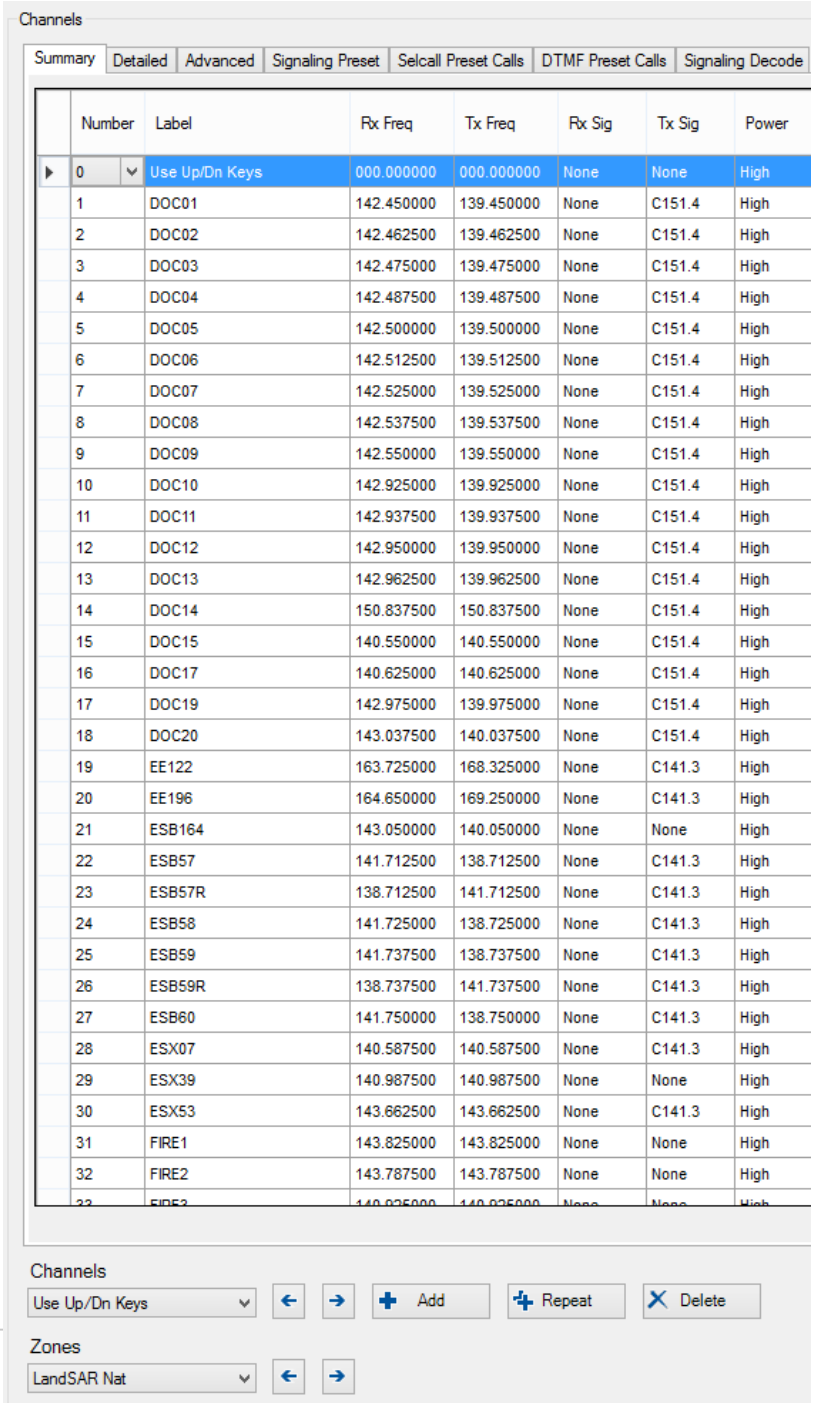
If you are using the TM9100 you may need a feature key (SFE) to enable CCDI operation

To program a LandSAR plan

LandSAR portables have 80 to 100 channels in one bank while AREC portables usually have multiple banks for different purposes or operating areas

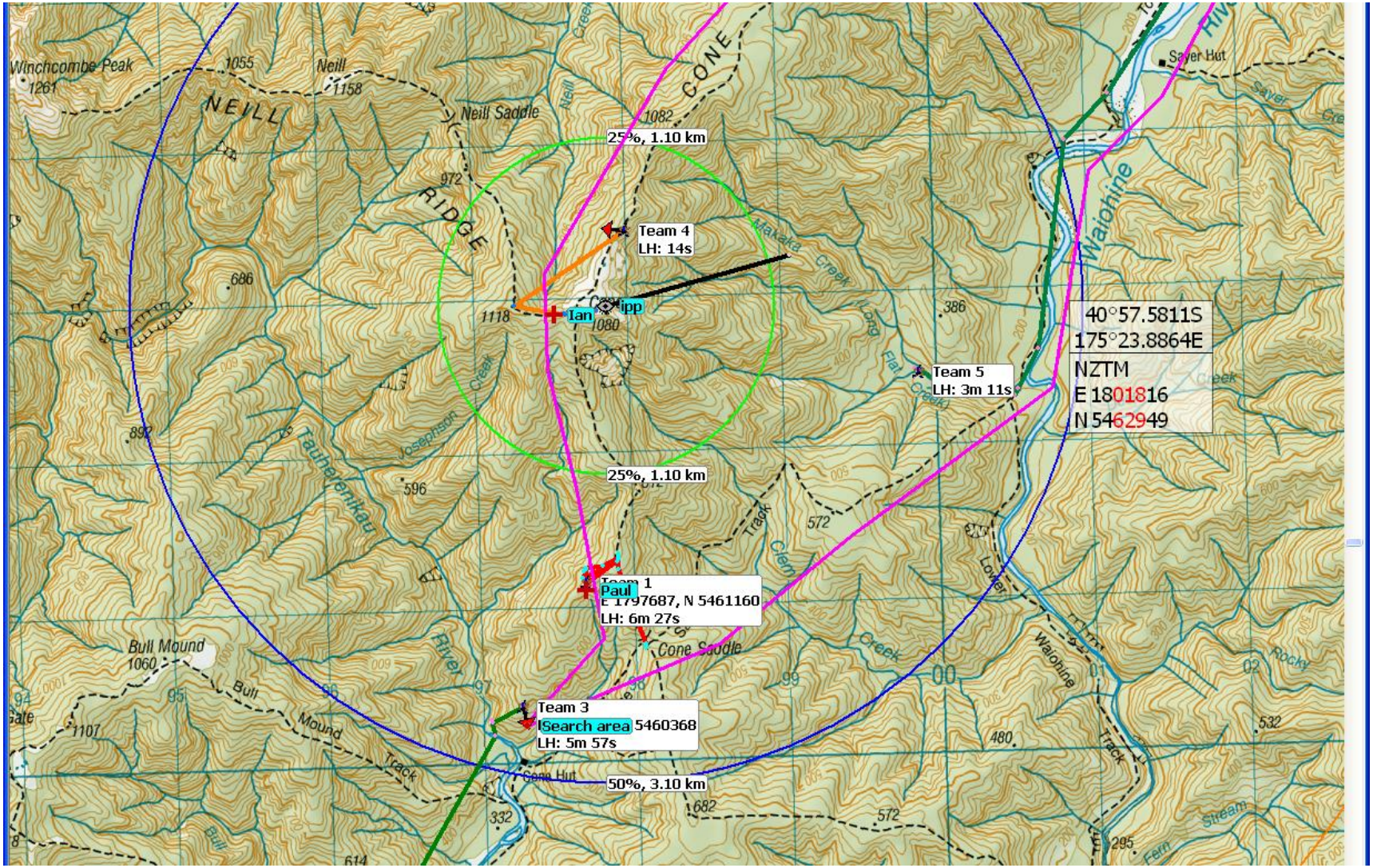
It is possible to combine both approaches in the Tait TP9300 portable

- In Conv Key Settings check that the Scroll Keys are set to Channels Menu
- In the LandSAR zone, label channel 0 “Use Up/Dn Keys” and enter freqs of 000.0 MHz
- Complete the entry of the LandSAR channels
- In the 16-Way Selector tab for the matching zone set Selector Positions to either pick the 16 national channels or if a dedicated national zone has been created, set all Selector Positions to Channel 0
- If multiple LandSAR plans are to be programmed (for neighbouring regions ie LandSAR National, LandSAR North Otago, LandSAR Canterbury) then add additional zones and repeat.
- Sample codeplugs are available with the LandSAR plans already entered from John Yaldwyn



Number	Label	Rx Freq	Tx Freq	Rx Sig	Tx Sig	Power
0	Use Up/Dn Keys	000.000000	000.000000	None	None	High
1	DOC01	142.450000	139.450000	None	C151.4	High
2	DOC02	142.462500	139.462500	None	C151.4	High
3	DOC03	142.475000	139.475000	None	C151.4	High
4	DOC04	142.487500	139.487500	None	C151.4	High
5	DOC05	142.500000	139.500000	None	C151.4	High
6	DOC06	142.512500	139.512500	None	C151.4	High
7	DOC07	142.525000	139.525000	None	C151.4	High
8	DOC08	142.537500	139.537500	None	C151.4	High
9	DOC09	142.550000	139.550000	None	C151.4	High
10	DOC10	142.925000	139.925000	None	C151.4	High
11	DOC11	142.937500	139.937500	None	C151.4	High
12	DOC12	142.950000	139.950000	None	C151.4	High
13	DOC13	142.962500	139.962500	None	C151.4	High
14	DOC14	150.837500	150.837500	None	C151.4	High
15	DOC15	140.550000	140.550000	None	C151.4	High
16	DOC17	140.625000	140.625000	None	C151.4	High
17	DOC19	142.975000	139.975000	None	C151.4	High
18	DOC20	143.037500	140.037500	None	C151.4	High
19	EE122	163.725000	168.325000	None	C141.3	High
20	EE196	164.650000	169.250000	None	C141.3	High
21	ESB164	143.050000	140.050000	None	None	High
22	ESB57	141.712500	138.712500	None	C141.3	High
23	ESB57R	138.712500	141.712500	None	C141.3	High
24	ESB58	141.725000	138.725000	None	C141.3	High
25	ESB59	141.737500	138.737500	None	C141.3	High
26	ESB59R	138.737500	141.737500	None	C141.3	High
27	ESB60	141.750000	138.750000	None	C141.3	High
28	ESX07	140.587500	140.587500	None	C141.3	High
29	ESX39	140.987500	140.987500	None	None	High
30	ESX53	143.662500	143.662500	None	C141.3	High
31	FIRE1	143.825000	143.825000	None	None	High
32	FIRE2	143.787500	143.787500	None	None	High

SARTrack SAREX March 2016, images: Rowena ZL2ROW



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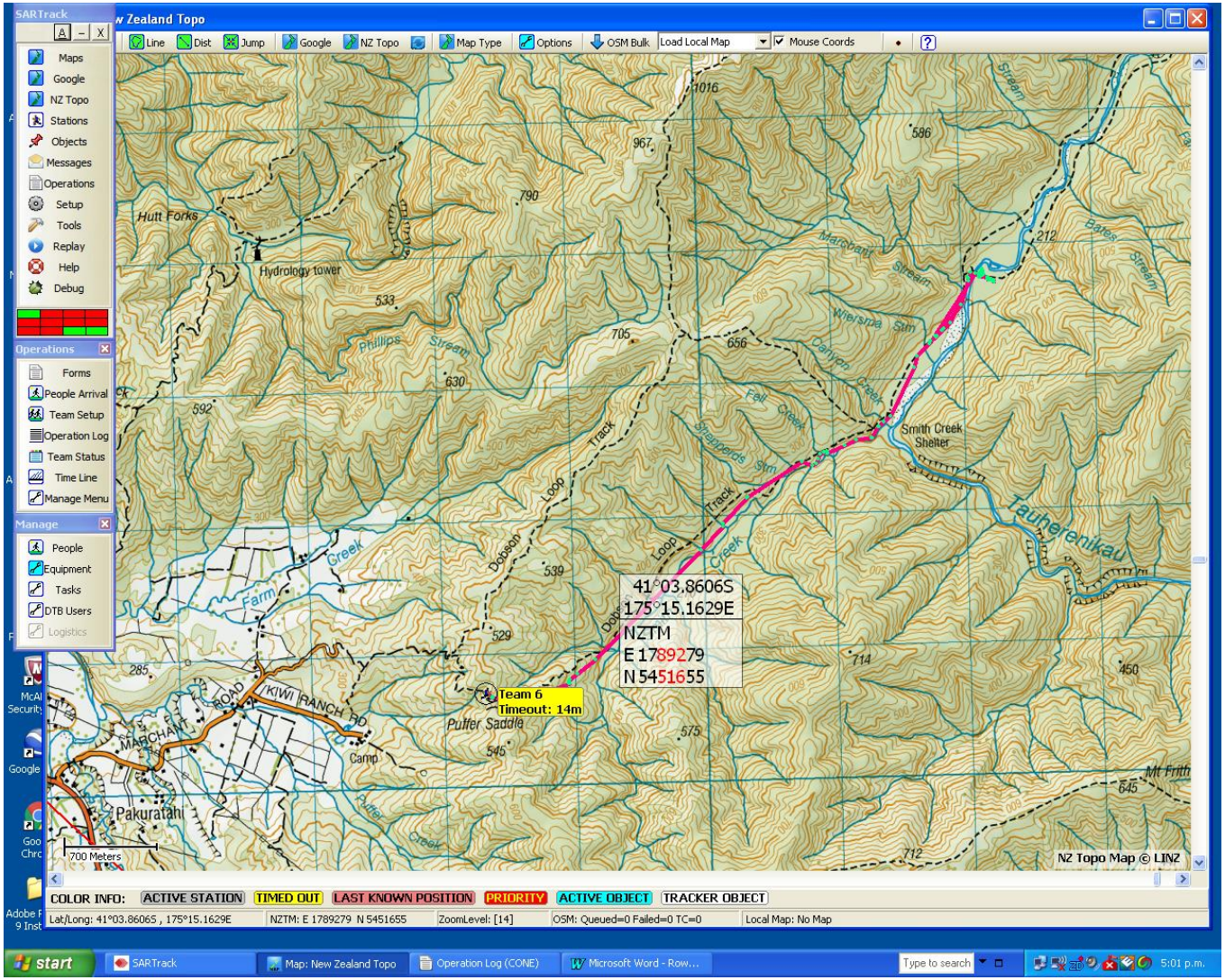

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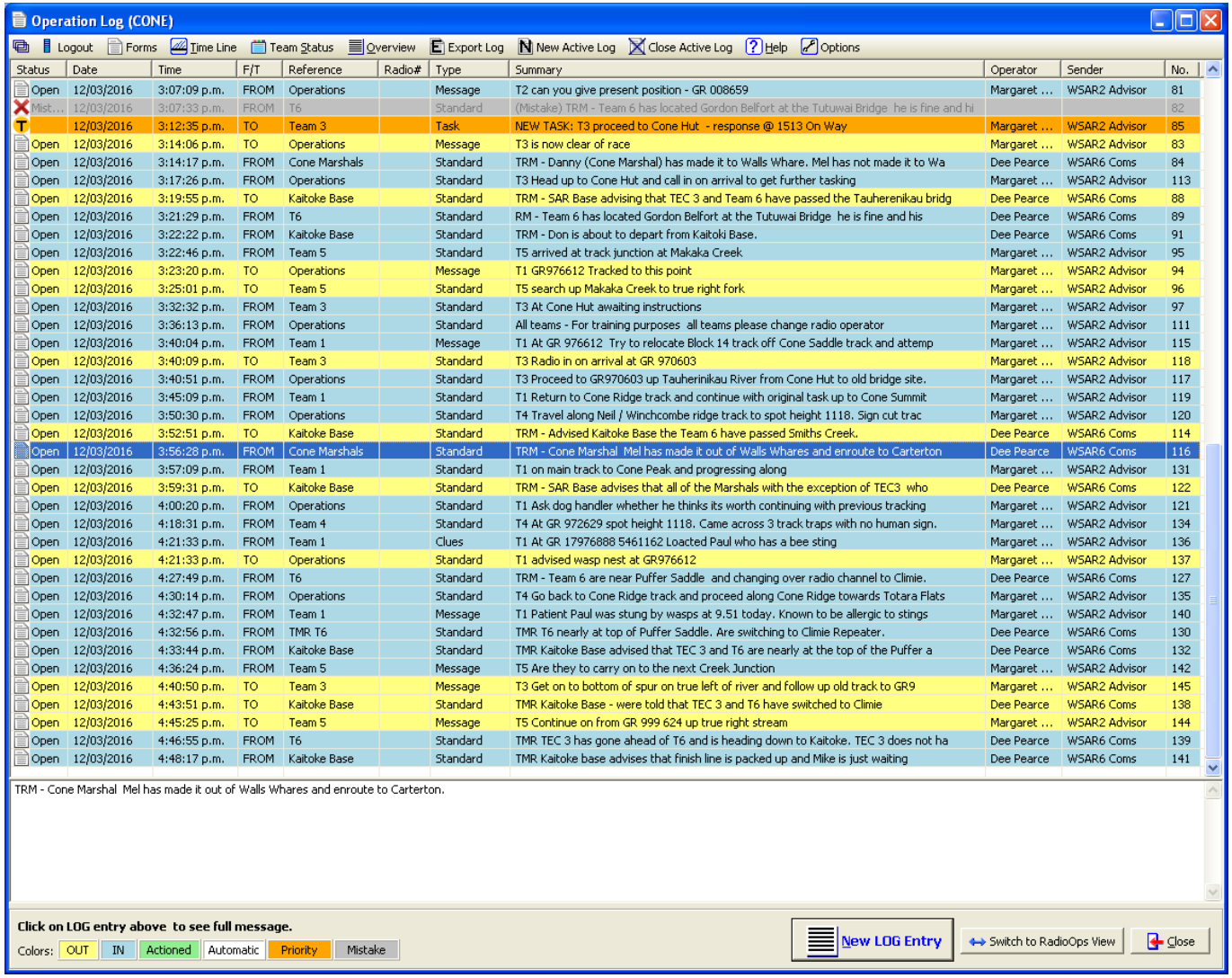

Notes on SARTrack compatibility

Automatic Packet Reporting System (APRS) is an amateur radio standard used in the original SARTrack equipment. It works with any radio as the APRS sensor had both GPS and a radio modem built in. All the radio needs to do is transmit the audio tones over the air and the modems at each end do the rest. For more information see: https://en.wikipedia.org/wiki/Automatic_Packet_Reporting_System

Tait CDDI Analog is a Tait developed system that sends command and control messages uses MPT1327 fast frequency shift keying (FFSK) tones over the air. Tait have a range of radios that support GPS location reporting using the Computer Controlled Data Interface (CCDI) method, some using standard external NMEA GPS sensors that are connected to the radio via RS-232 (within the radio the GPS location messages are converted to CCDI) and some with built in GPS sensors.

Icom IDAS radios support position reporting over analog using a built in GPS sensor. Typical radios include the IC-F3263DT. Some AREC groups are using these radios, particularly where an existing support infrastructure exists for Icom radios.

Icom Analog radios such as the IC-F50 can also have GPS sensors connected externally using a OPC-966 (or similar cable) and the portable will then report positions using the Icom SDM short data message format (based on MDC/BIIS).

Cellular phone positions can be displayed by using a separate program to capture the cellular positions as reported (for example by Google Latitude) and storing them in a SARTrack database for display.

Maritime AIS is an IMO standardized automatic tracking system used on ships. It contumeliously transmits vessels positions. It is widely used by all vessels over 300 tons and optionally by smaller craft. Transmission can be picked up by shore stations or satellite. It is supported by AREC in Wellington who have AIS receiving station installed to cover Cook Strait. See: http://arec.info/marine-traffic/

SARTrack supports all of the above protocols AT THE SAME TIME. In a recent SAREX in the Wairarapa, AREC tested both Tait CCDI and Icom IDAS portables running on the same radio repeater and reporting into the same SARTrack computer. No problems were experienced with this multi-vendor scenario.

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