



RAYNET APRS Team ***2008***



Event Report

Prepared by Jim Andrews, G1HUL

Tour of Mull 2008

RAYNET APRS report

To start off...

Building on the success of last year, 2008 has proved that the results from 2007 weren't a fluke and that we now have a system that is providing an excellent service to the rally.

The event is a huge team effort getting everything sorted, rigged, looked after and retrieved again - A big THANK YOU to the Team!!!

Overall coverage

Quite simply, road coverage was 100%. Nothing more to say!

Digipeaters

One change made this year, which was the removal of the Bunessan infill as the Ardtun stage had been dropped.

Ensay

Stunning coverage over a large part of the island, in line with previous years.

A third battery was provided so the digi could be switched on at the time it was rigged on the Thursday, avoiding the need for a Friday return visit.

[Action for 2009](#)

None

Dervaig

Was again placed on the lower hillock and provided the expected coverage.

A third battery was provided so the digi could be switched on at the time it was rigged on the Thursday, avoiding the need for a Friday return visit.

[Action for 2009](#)

None

Lettermore

After last year's path problems and apparent perfect coverage in the Glen Aros area without any beacons from Lettermore, the unit was rigged but not switched on.

During stage 1 the unit was manned and vehicles in the Glen Aros area were monitored for loss. No loss occurred so there was no need for the equipment to be used.

[Action for 2009](#)

Delete this digipeater.

Dhiseig

As ever, a superb location!

[Action for 2009](#)

None

Duart

Coverage much as before.

[Action for 2009](#)

None

Direct reception at control

Coverage much as before, including well into Glen Aros.

[Action for 2009](#)

None

iGates & D-Star

General

A couple of changes were made this year.

Infill for Dervaig

Formalisation of arrangements at the Isle of Mull hotel

Salen Hotel

No iGate issues were encountered and the control system worked as planned.

[Action for 2009](#)

None

Dervaig

This was a new location, at the home of Catherine Duffy (Iain & Calum's Mum) alongside the estuary in Dervaig.

Coverage was very good despite the sea-level location and helped coverage in the Glen Bellert forest blind spot.

[Action for 2009](#)

None

Tobermory – Harbour Association

This was another new location, a move from the Masonic Hall.

Coverage was significantly worse onto the road directly above the cliff (compared with the Masonic Hall), but this did not cause any problems as its purpose is as an infill for the town and seafront areas.

D-Star worked satisfactorily.

[Action for 2009](#)

None

Isle of Mull Hotel

A 4m aerial was placed outside the lower bar windows to ensure good reception.

D-Star signals to Craignure bay were weak, partly due to blocking vehicles on the quayside. The hotel aerial was in the same place, but there might have been increased foliage.

Action for 2009

Put the 23cm aerial on a tripod outside the window.

Kinloch Hotel

No issues were encountered and coverage was as expected.

Action for 2009

None

ADSL provision

ADSL lines were utilised at five locations and, once set up, proved to be 100% reliable.

Salen Hotel

After the 2007 confusion, things were somewhat more organised this year!

Adrian GM1FML & Crawford GM8HBY installed a router on Wednesday evening (in place of Gerry's USB modem) and used mains PowerPlug Ethernet boxes to "cable" through to the dining room. This arrangement worked well.

The only problem was random line resetting, which was traced to an additional phone that did not have a microfilter. Once fixed, the line stayed up for the rest of the event.

Having the line fully available from the Thursday morning made our installation work a lot easier as we could commission every iGate without a possible return visit.

Action for 2009

Arrange for the same installation, with the additional microfilters!

Dervaig

Initial setup went OK, with the only problem being Catherine trying to remember what the ADSL password was!

The ADSL router (a 3Com unit) proved to be somewhat quirky in its setup and dropped out sometime on the Friday morning, requiring a visit to kick it back into life. No further problems were encountered and the site provided a 100% reliable service.

Action for 2009

Use one of the Draytek Vigor routers, as they are more reliable.

Tobermory – Harbour Association

The THA was a move of location from the Masonic Hall, so another set of unknowns! As it turned out the THA building has been LAN wired and has a direct internet connection.

No problems were encountered, with the system surviving a couple of LAN re-wires by the rally results team as they installed their own equipment.

Action for 2009

None

Isle of Mull Hotel

Another change of management! Thankfully the latest manager was more than helpful, again allowing us to pretty much do what we wanted with their system.

The downstairs office is now the managers' office, but he was happy for us to re-wire the network there for us to be able to tap into the Ethernet port.

Action for 2009

None

Kinloch Hotel

Charles was, as ever, very helpful in providing the ADSL line for our use.

An Ethernet connection was provided into the lounge and worked as planned.

Action for 2009

The Kinloch hotel is still up for sale, so there is uncertainty over the line for 2009. However Charles is building a house next to the hotel and has said that we can continue to use his broadband once it's installed.

Issues arising from the 2008 event

Specific problems were experienced as follows:

- Incorrect battery voltage reporting
- Equipment security

Incorrect battery voltage reporting

Dervaig consistently reported a very low battery voltage (around 2.5v) which was clearly wrong, having been checked a couple of times by Chris.

This was puzzling as the equipment had been tested prior to the event (after the same problems in 2007) and the voltages were being recorded correctly.

This has been traced to a mis-configured TNC.

The analogue input on a KPC-3 can be swapped between the radio and serial connectors. By default this is linked to the radio port but we use the serial connector for cabling flexibility. Simply, the links were set wrong.

Action for 2009

Physically check the selection links.

Equipment security

For the second year running, Strathclyde RAYNET had an item of radio equipment stolen.

Sometime during the early (dark) hours of Sunday morning a handheld talkthrough radio was stolen from the picnic site (just south of Tobermory, alongside the road). Only the radio was taken; all other bits and an 81MHz repeater were left.

The cases were padlocked with combination locks and chained to the bottom of the masts.

From their initial investigations, someone had spent some time there and picked/cut both locks (they were missing), but only took the single radio – a Standard C528, same as the one that went missing in 2007.

Action for 2009

Although our equipment is in more obscure and off-road locations, or inside buildings, we need to consider what, security measures ought to be taken.

Log analysis

History

Looking back through the logs since 2001 when we were playing with APRS for the first time, three major changes stand out as making the biggest improvements in the reliability of information received at control.

- 2002 – Decent aerial at control
- 2005 – Duplicate packet issue resolved
- 2007 – Time slotting, intelligent digi pathing & iGates

In addition, the 2004 Digipeater location changes made a big improvement in coverage in the Loch Scridain and Calgary / Torloisk areas, although overall loss remained consistent.

Percentage of beacons lost

- 2001 55%**
First trial, control RX relied on local (small-masted) digi
- 2002 32.4%**
Good aerial at control, more digi's using TNC's, better system configuration
- 2003 30.5%**
Switch to Ascoms
- 2004 31.1%**
Killiemore moved to Pennycross, Ensay moved to top of the hill
- 2005 23.9%**
Duplicate packet issue resolved
- 2006 28.9%**
- 2007 4.8%**
Time slotting, intelligent digi pathing + iGate usage to reduce RF
- 2008 5.2%**
Simply proved that 2007 wasn't a fluke!

Full analysis of the beacon loss is in Appendix A

Battery power usage

Detailed below is the power usage for all digi sites.

Prior to 2007 the capacity was checked using a simple voltage switch-off timer, reading from 2007 us the West Mountain Computerised Battery Analyser. The higher figures from 2007 are assumed to be an inaccuracy in previous measurements.

Site	2006	2007	2008	Notes (for 2008)
Ensay	26 Ah	32 Ah	48Ah	Extra day (Thursday switch-on) with 3x 24Ah SLA
Dhiseig	33 Ah	46 Ah	53Ah	
Duart	24 Ah	41 Ah	40Ah	
Dervaig	26 Ah	30 Ah	46Ah	Extra day (Thursday switch-on) with 3x 24Ah SLA

APRS “Service” and remote internet connections

Service

The reliability of the equipment meant that the service teams had a quiet time!

The single problem encountered was with GM4SRL's own equipment which was not anchored in its box, thus causing the cables to be pulled from the radio.

In the event this was actually fixed by GM1GQJ at the Isle of Mull hotel, not the service team based at Craignure.

Action for 2009

Consideration of any dual-function for the voice net.

Data links

We were again loaned 23cm D-Star radios which, with the pair from Aylesbury, were used for wireless internet connections at the service points in Craignure and Tobermory. This enabled the “APRS service crew” to monitor the entire system.

These links again proved successful, although signal problems were encountered at Craignure and operator training / knowledge needs to be addressed as these are not simple radios!

Manning

Setup phase

We had 10 people involved in setting up, which due to the geography and scattered nature of the installations is about right.

Rally phase

Apart from service cover, control monitoring and manning of Lettermore on Friday evening (not planned for 2009), no other APRS duties exist as there is little we can do during the rally.

Strip-out phase

Some initial co-ordination was done on Sunday morning and all the equipment was recovered within the day.

Recommendations / Actions / Suggestions for 2008

Digipeater locations

Coverage is about as good as it will get so no plans to move any of the digi's.

iGates

The position of the iGates is about right for "listening" coverage.

Extension of tracking to other Doctor, Rescue and Recovery vehicles

There are other units who are Amateur licensed and, if approached may be interested in being "on the map".

Action for 2009

We need to contact all rescue and recovery units to establish exact numbers and ensure we have sufficient equipment.

This will rely on commitment from the crews in terms of provision of some equipment (aerial and GPS) and to a guaranteed standard.

The new time slotting system allows for expansion without impacting on the update rate of the course cars. We could expand by another 12 vehicles without any noticeable impact on the course vehicle tracking.

Replacement radios

Investigate the Motorola MC-Micro's as a replacement for the Ascom sets.

The Ascoms can be quirky and are proving to be rather unreliable. Of the 36 sets available to us, 14 have faults. There are also a few more unmodified ones that could be pressed into service if needed. Whilst the numbers are not a problem at present levels, any increase in vehicles tracked will leave us with few spares.

The MC-Micro's have been donated (removed from a working PBR scheme) and are single channel E-band (68-88MHz) units. We have about 40 sets which, if they work satisfactorily, will enable us to replace all Ascoms.

System monitoring / Use by others

Monitoring was done at the Ensay 81MHz control point and there were many favourable comments about its usefulness, even though it was only listening to the RF.

Also one operator was using a GPRS connection to monitor the internet traffic and, again, this proved to be very useful.

Action for 2009

Formalise arrangements for system access, particularly for the MSA radio controls.

Equipment configuration

A number of personal kits are configured on-island; however Jim was the only one with the software and files to do this.

Action for 2009

Ensure the software, profiles and knowledge is available so the car rigging team can update units as needed.

Appendix A

Tour of Mull APRS Beacon Analysis

Lost beacons – 2008

35 Second rate	Expected	Lost	
GM0RAY (Car 00)	2365	127	5%
GM4SRL (Chief Safety)	1816	148	8%
GM6LEZ (Chief Marshal)	2672	106	4%
GM7GXI (Stage Setup)	2197	115	5%
GM7NOA (Road Closing)	2487	72	3%
MM3MGX (Road Opening)	2378	127	5%
Average loss:			5.2%

Dislodged cable sat eve

245 Second rate	Expected	Lost	
GM1LTK (Earl Recovery)	352	8	2%
MM0PFR (Piper 1 Recovery)	336	29	8%
2M0CRR (Piper 2 Recovery)	219	40	18%
MM1CMV (Castle Recovery)	290	3	1%
MM1ECR (Stoke Rescue)	354	16	4%
MM3AWC (Dr. Harrington)	280	6	2%
MMODNH (Dr. Shippey)	106	3	2%
Average loss:			5.6%

Parked in null, Calgary beach

Lost beacons - 2007

35 Second rate	Expected	Lost	
GM0RAY (Car 00)	2443	132	5%
GM4SRL (Chief Safety)	2657	77	3%
GM6LEZ (Chief Marshal)	3493	140	4%
GM7GXI (Stage Setup)	2494	148	6%
GM7NOA (Road Closing)	2589	91	4%
MM3MGX (Road Opening)	3664	252	7%
Average loss:			4.8%

175 Second rate	Expected	Lost	
GM1LTK (Earl Recovery)	507	16	3%
MM0PFR (Piper 1 Recovery)	415	11	3%
MM1CMV (Castle Recovery)	594	32	5%
MM1ECR (Stoke Rescue)	450	79	18%
MM3AWC (Dr. Harrington)	550	18	3%
Average loss:			6.4%

Lost beacons - 2006

30 Second rate	Expected	Lost	
GM0RAY (Car 00)	2052	729	36%
GM4SRL (Chief Safety)	3276	872	27%
GM6LEZ (Chief Marshal)	3019	814	27%
GM7GXI (Stage Setup)	3184	959	30%
GM7NOA (Road Closing)	1452	411	28%
MM3MGX (Road Opening)	3313	859	26%
Average loss:			28.9%

300 Second rate		Expected	Lost	
GM1LTK	(Earl Recovery)	221	58	26%
MM1CMV	(Castle Recovery)	278	67	24%
MM1ECR	(Stoke Rescue)	126	39	31%
MM3AWC	(Dr. Harrington)	211	59	28%
				Average loss: 27.3%

Lost beacons - 2005

30 Second rate		Expected	Lost	
GM0AGR	(Clerk of Course)	1870	442	24%
GM0RAY	(Car 00)	1382	429	31%
GM4SRL	(Chief Safety)	2796	750	27%
GM6LEZ	(Chief Marshal)	2506	453	18%
GM7GXI	(Safety)	2424	894	37%
GM7NOA	(Road Closing)	2242	566	25%
MM3MGX	(Road Opening)	2282	331	15%
MM1ECR	(Stoke Rescue)	1723	256	15%
				Average loss: 23.9%

300 Second rate		Expected	Lost	
GM1LTK	(Earl Recovery)	215	48	22%
MM1CMV	(Castle Recovery)	148	18	12%
				Average loss: 17.2%

Lost beacons - 2004

30 Second rate		Expected	Lost	
GM0RAY	(Car 00)	1344	413	31%
GM1LTK	(Earl Recovery)	3667	1089	30%
GM4SRL	(Safety Officer)	3380	1184	35%
GM6LEZ	(Chief Marshal)	2567	907	35%
GM7GXI	(Dr. Cowan)	3171	2175	69%
MM1ECR	(Stoke Rescue)	3021	446	15%
MM3AWC	(Dr. Harrington)	3316	703	21%
MM3FOR	(Forest Recovery)	2337	596	26%
MM3MGX	(Road Opening)	4248	819	19%
				Average loss: 31.1%

Lost beacons - 2003

30 Second rate		Expected	Lost	
GM1LTK	(Earl Recovery)	2316	779	34%
GM1PST	(Road Opening)	1348	282	21%
GM4SRL	(Safety Officer)	2315	775	33%
GM6LEZ	(Chief Marshal)	2666	681	26%
GM7GXI	(Dr. Cowan)	2405	982	41%
GM7NOA	(Road Closing)	1864	814	44%
MM1CMV	(Castle Recovery)	2650	405	15%
				Average loss: 30.5%

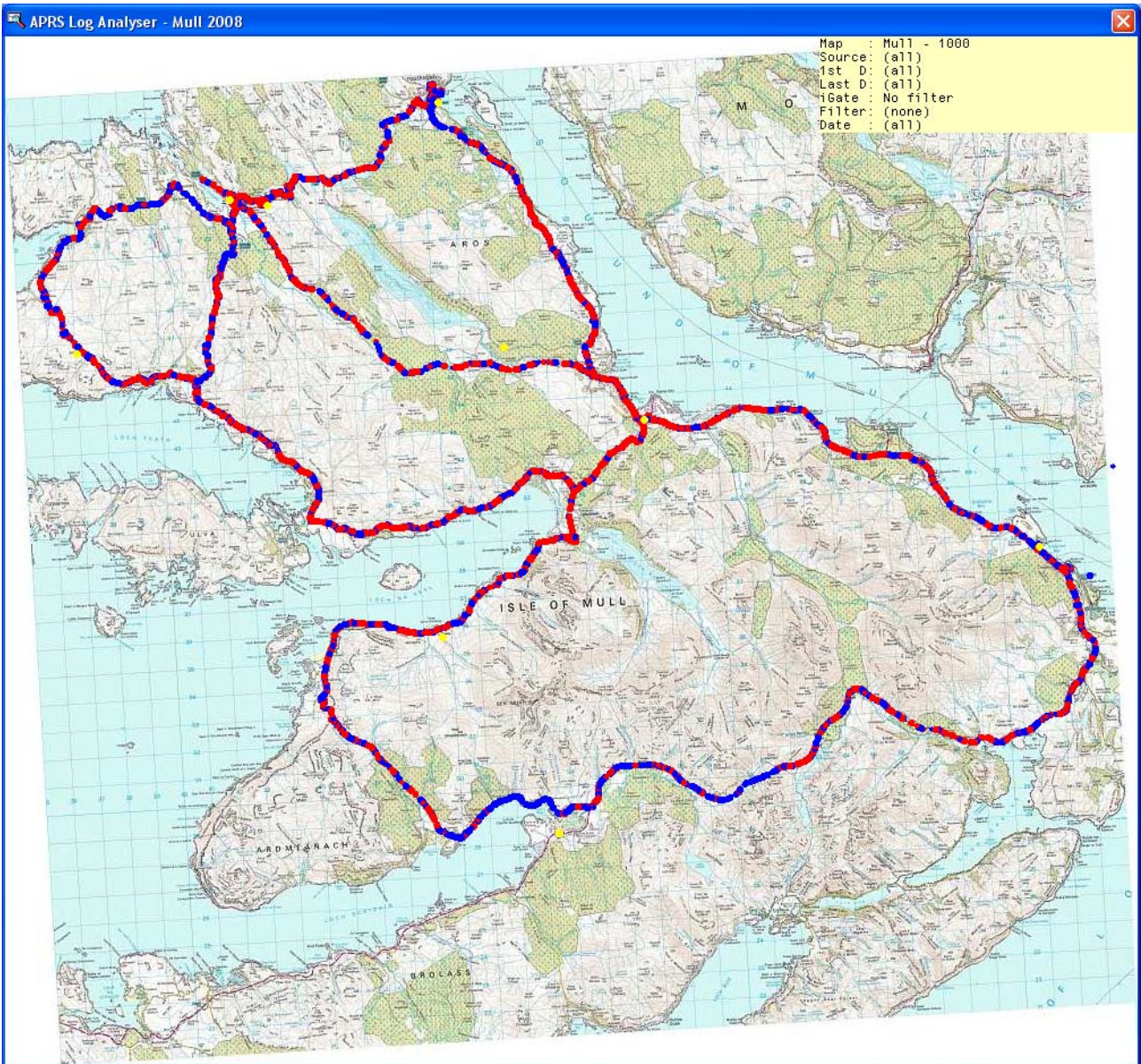
Lost beacons - 2002

30 Second rate	Expected	Lost	
GM1PST (Road Opening)	719	198	28%
GM4SRL (Safety Officer)	1483	496	33%
GM6LEZ (Chief Marshal)	1709	508	30%
GM7GXI (Dr. Cowan)	659	356	54%
GM7NOA (Road Closing)	1983	342	17%
			<u>Average loss: 32.4%</u>

Lost beacons - 2001

90 Second rate	Expected	Lost	
CHFMAR	638	366	57%
CLOSE	281	144	51%
CMO	442	293	66%
DOCTOR	749	401	54%
OPEN	670	374	56%
SAFETY	854	393	46%
			<u>Average loss: 55.0%</u>

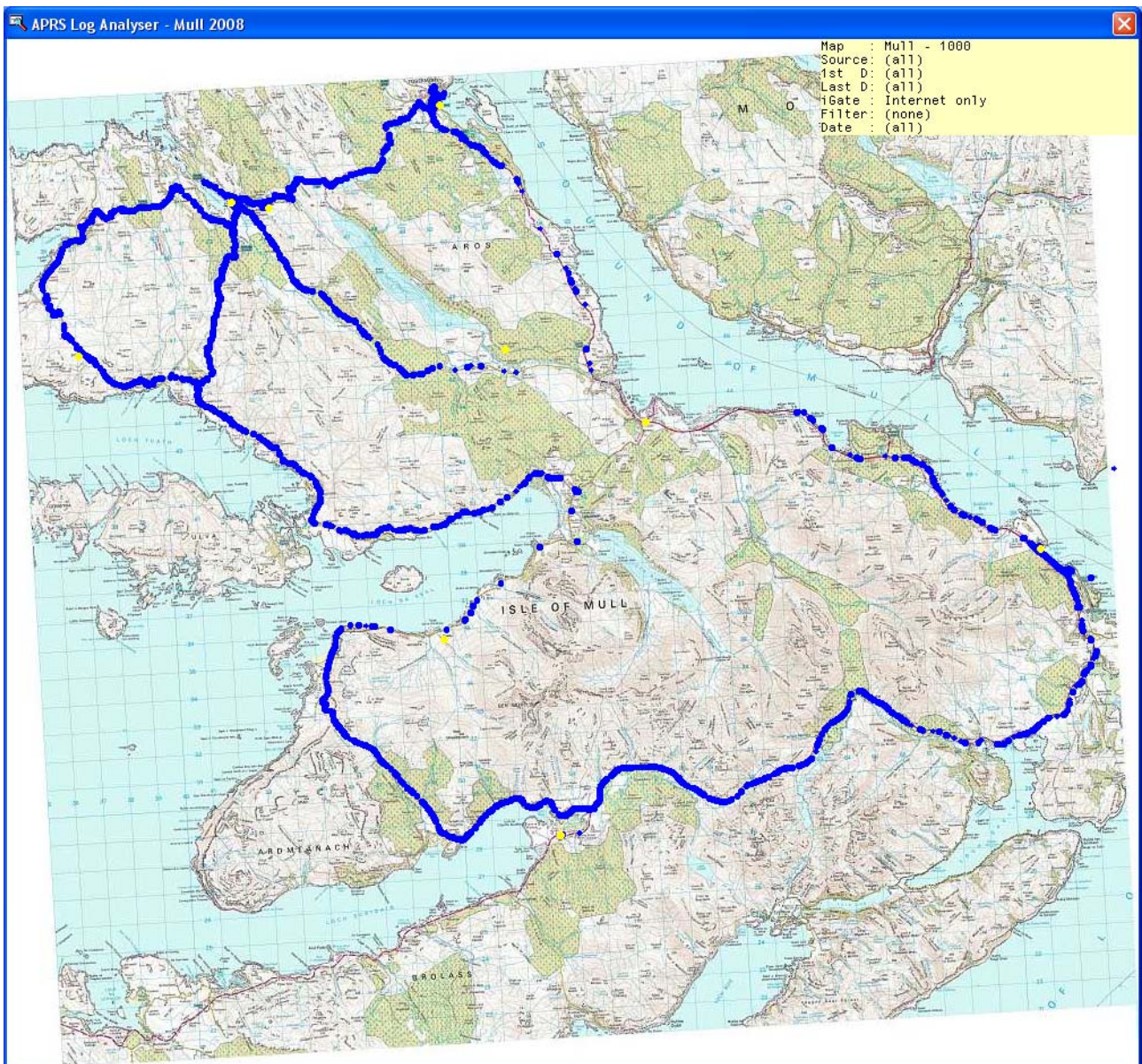
Appendix B



Route for first beacon to be received at control

Red RF
Blue Internet

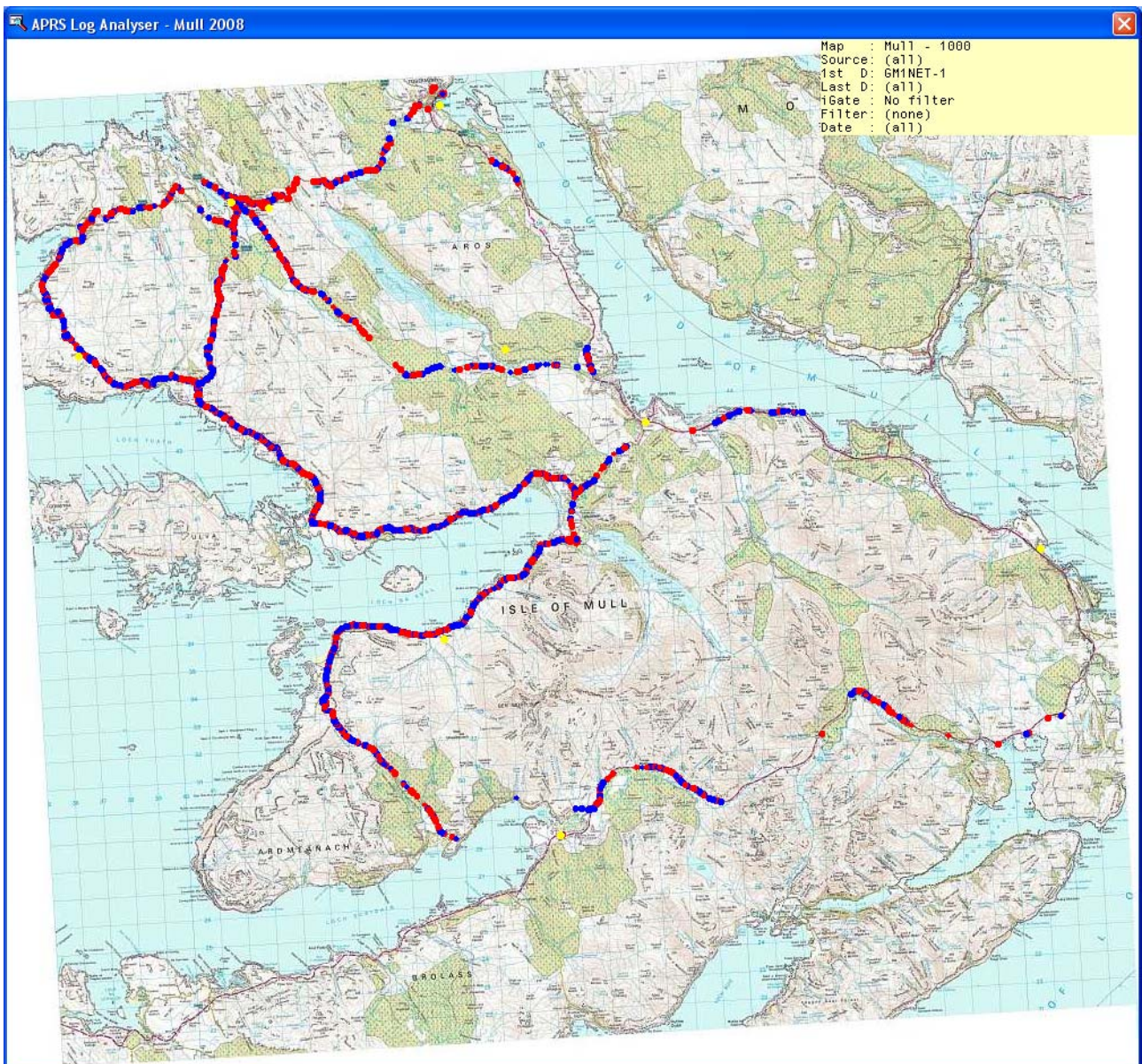
This map also shows the total RF coverage throughout the island.



Beacons received at control via Internet

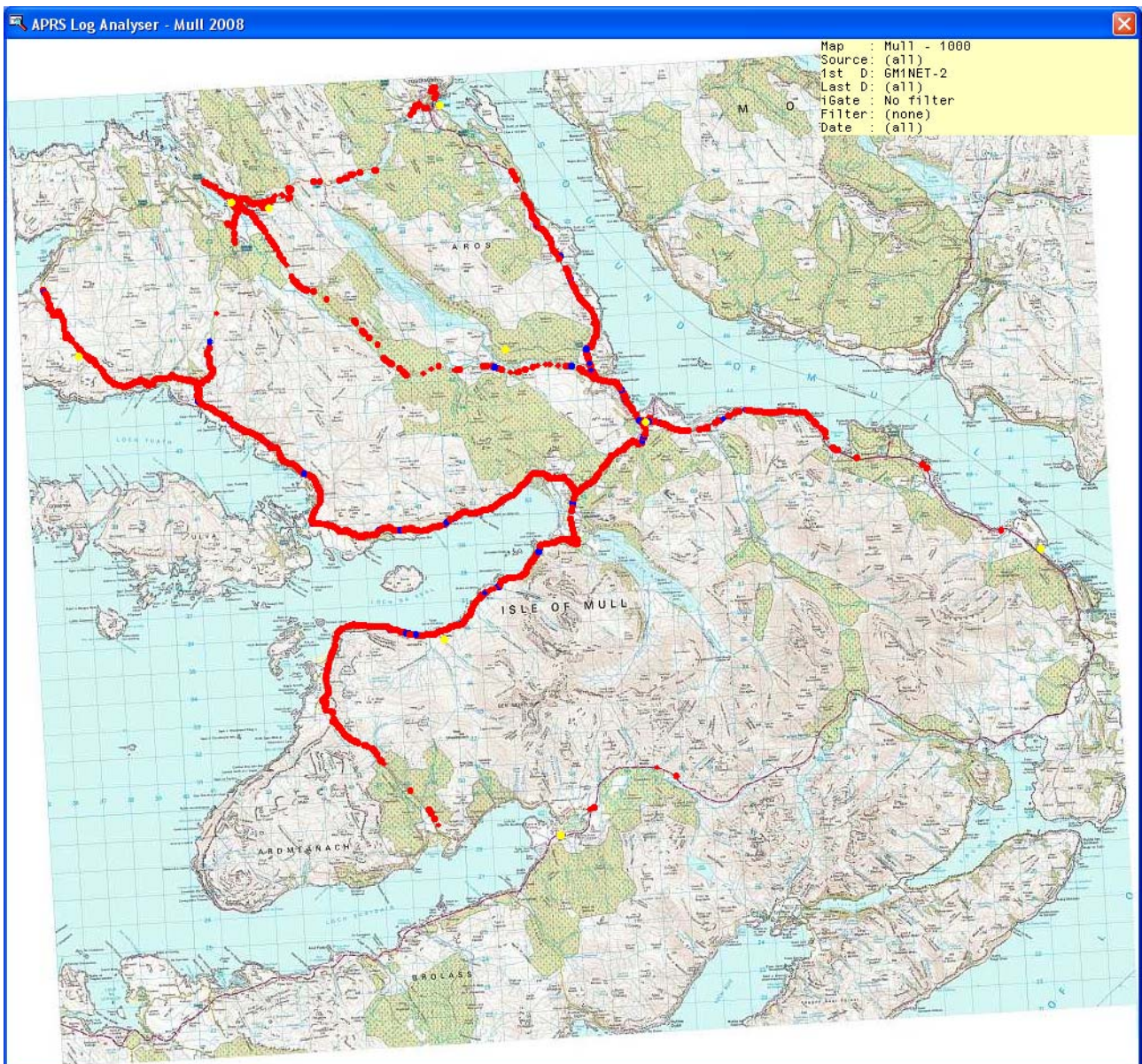


Radio coverage from Control



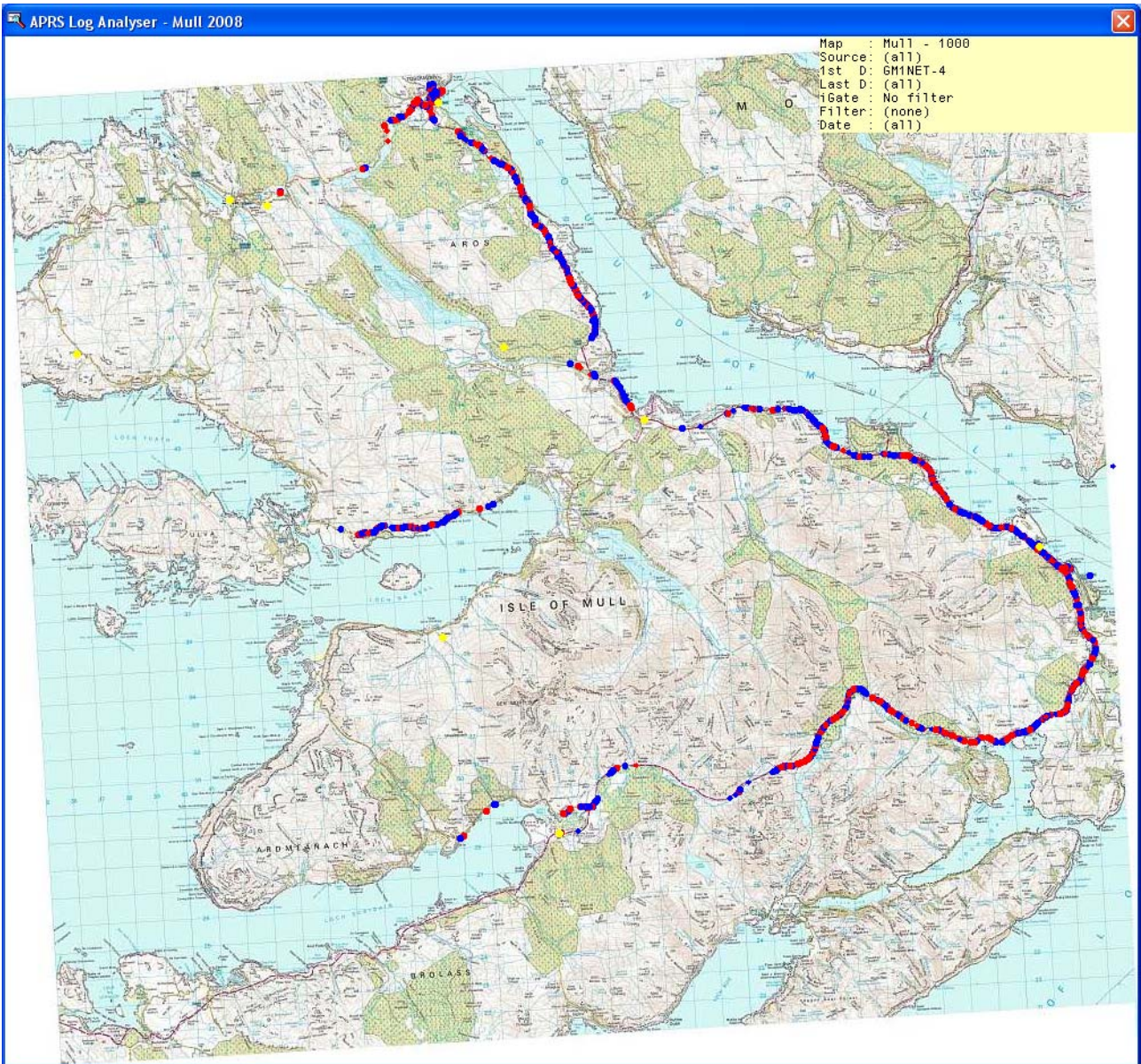
Radio coverage from Ensay digipeater

- Red** Received via RF
- Blue** Received via Internet



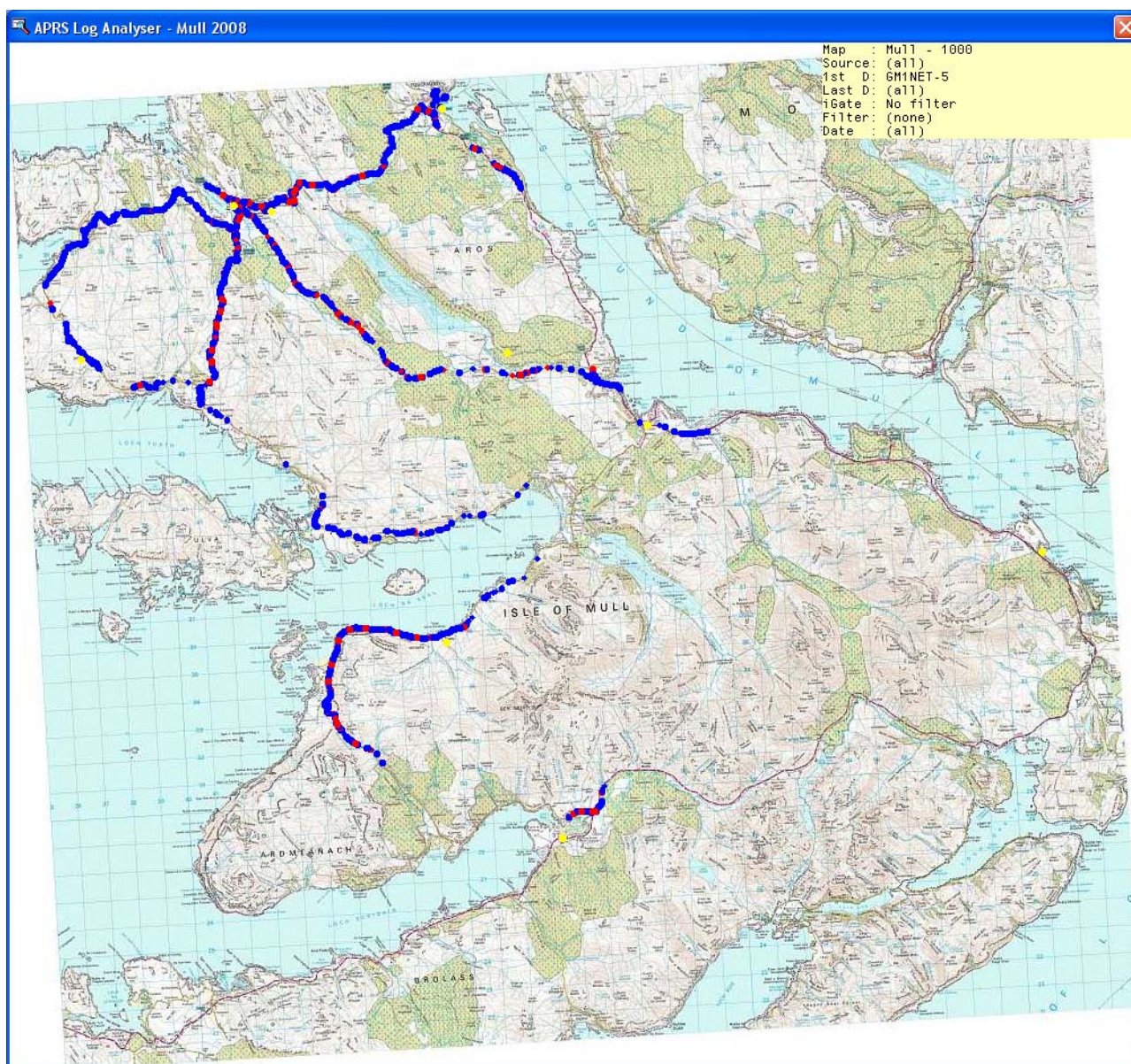
Radio coverage from Dhiseig digipeater

- Red** Received via RF
- Blue** Received via Internet



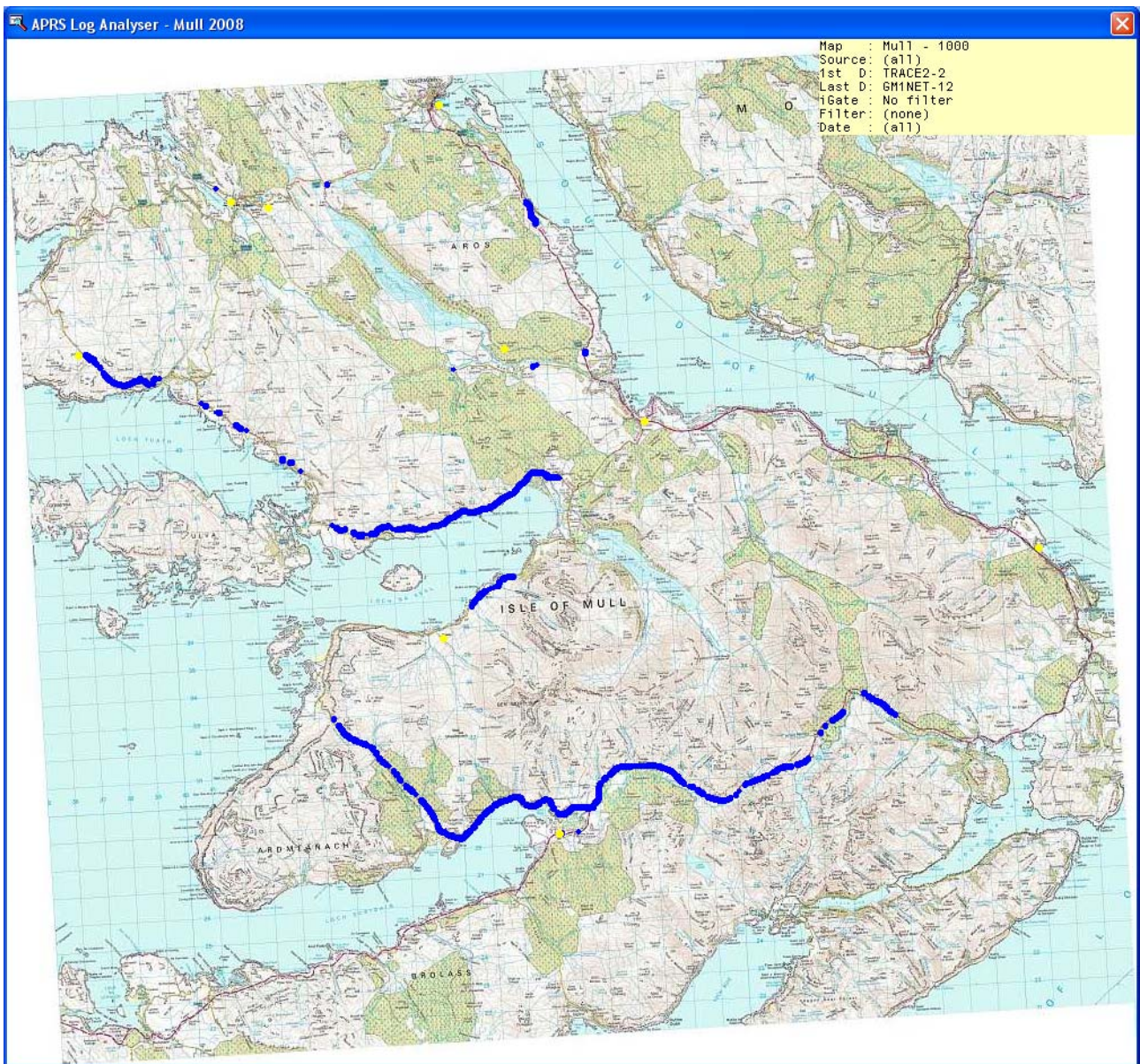
Radio coverage from Duart digipeater

- Red Received via RF
- Blue Received via Internet

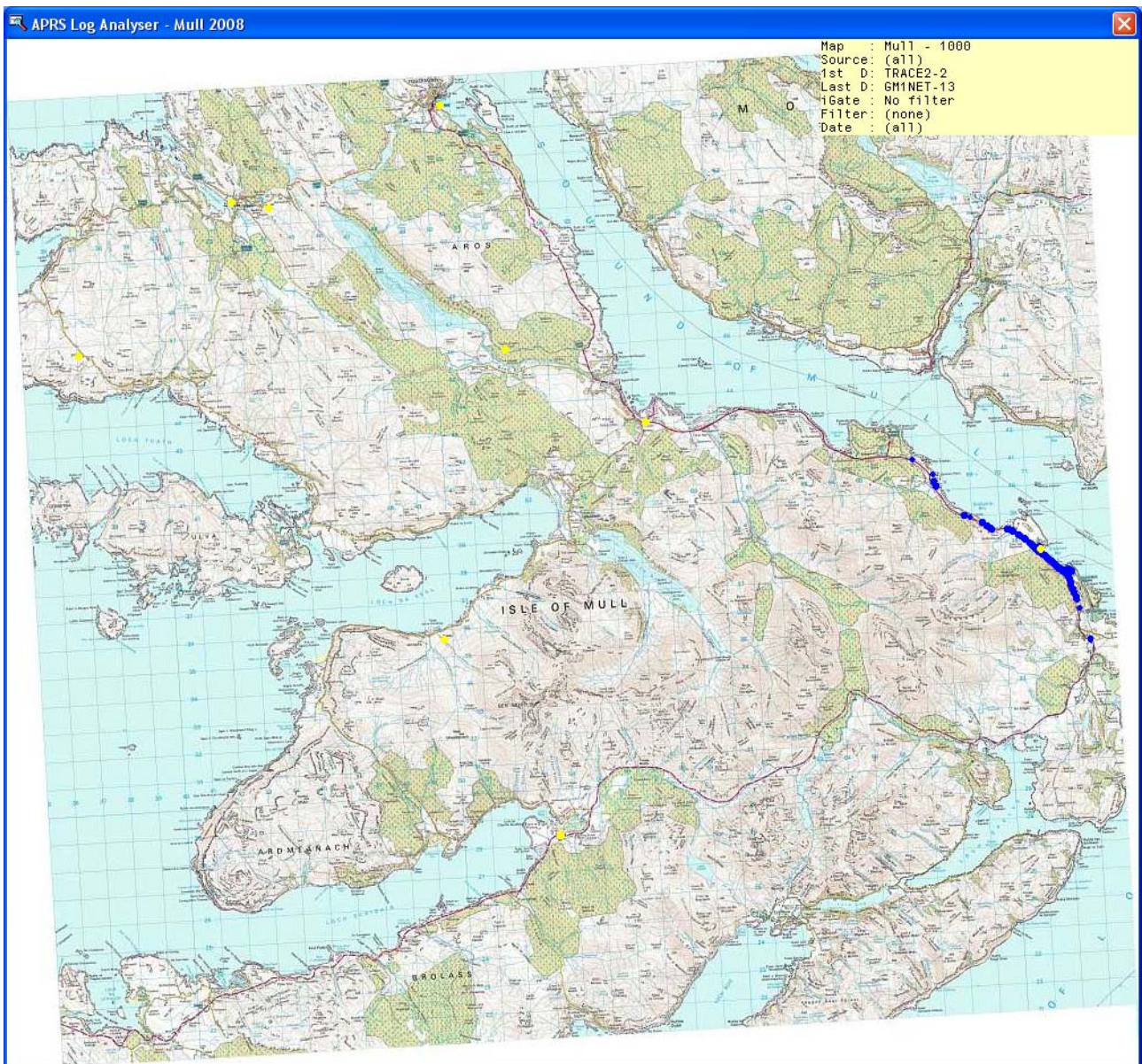


Radio coverage from Dervaig digipeater

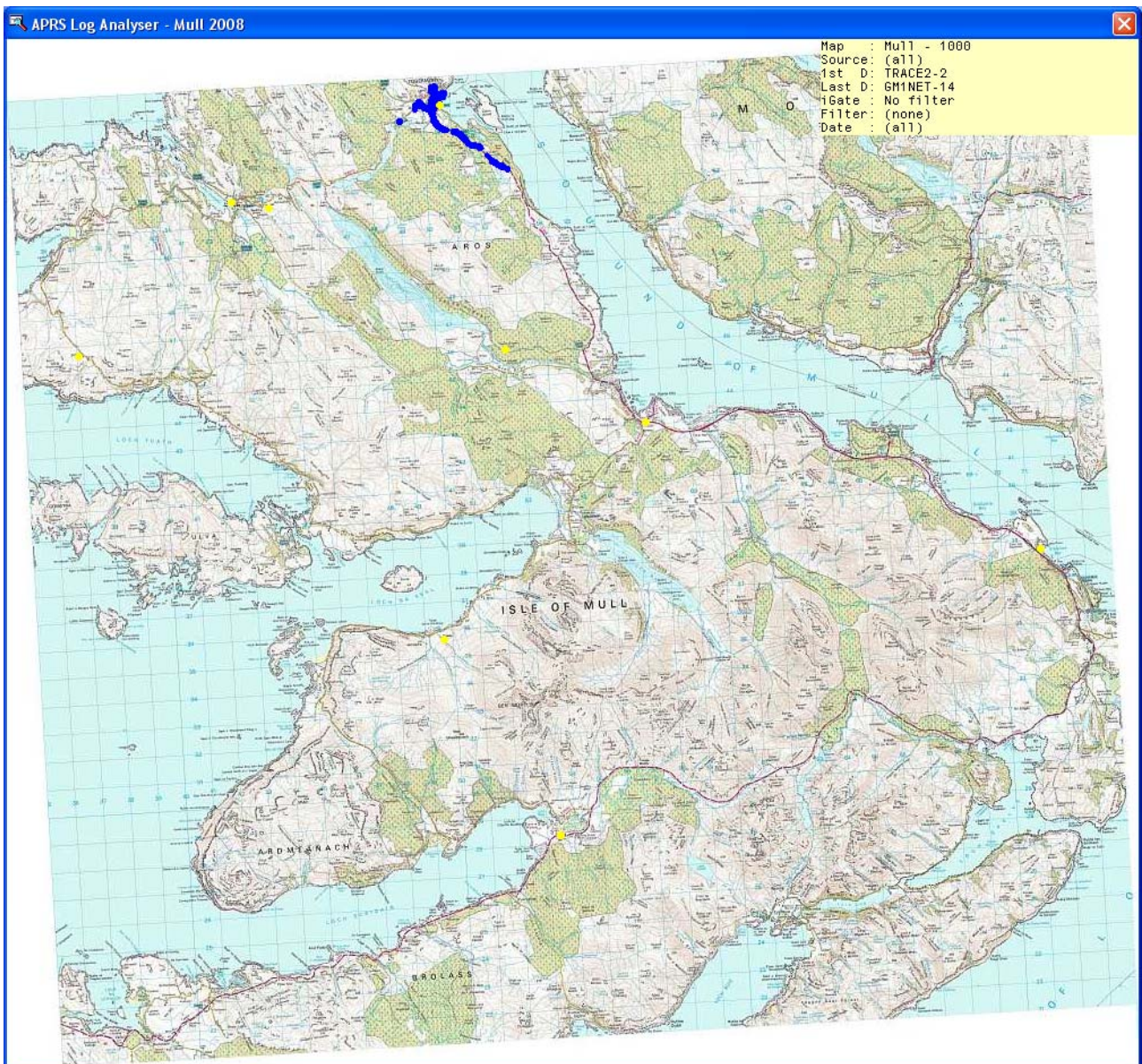
- Red** Received via RF
- Blue** Received via Internet



Radio coverage from Kinloch Hotel iGate



Radio coverage from Isle of Mull Hotel iGate

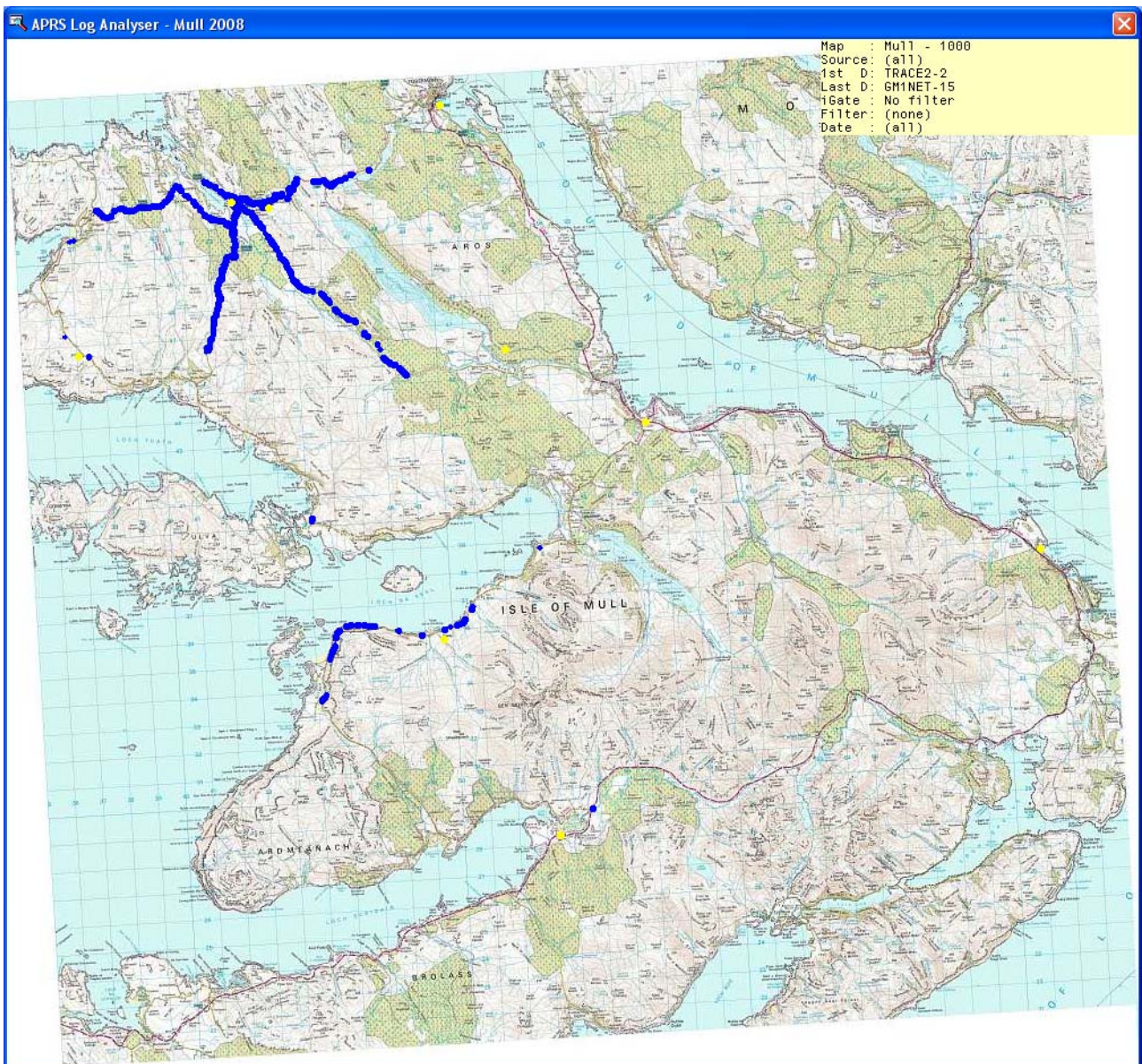


Radio coverage from Tobermory iGate

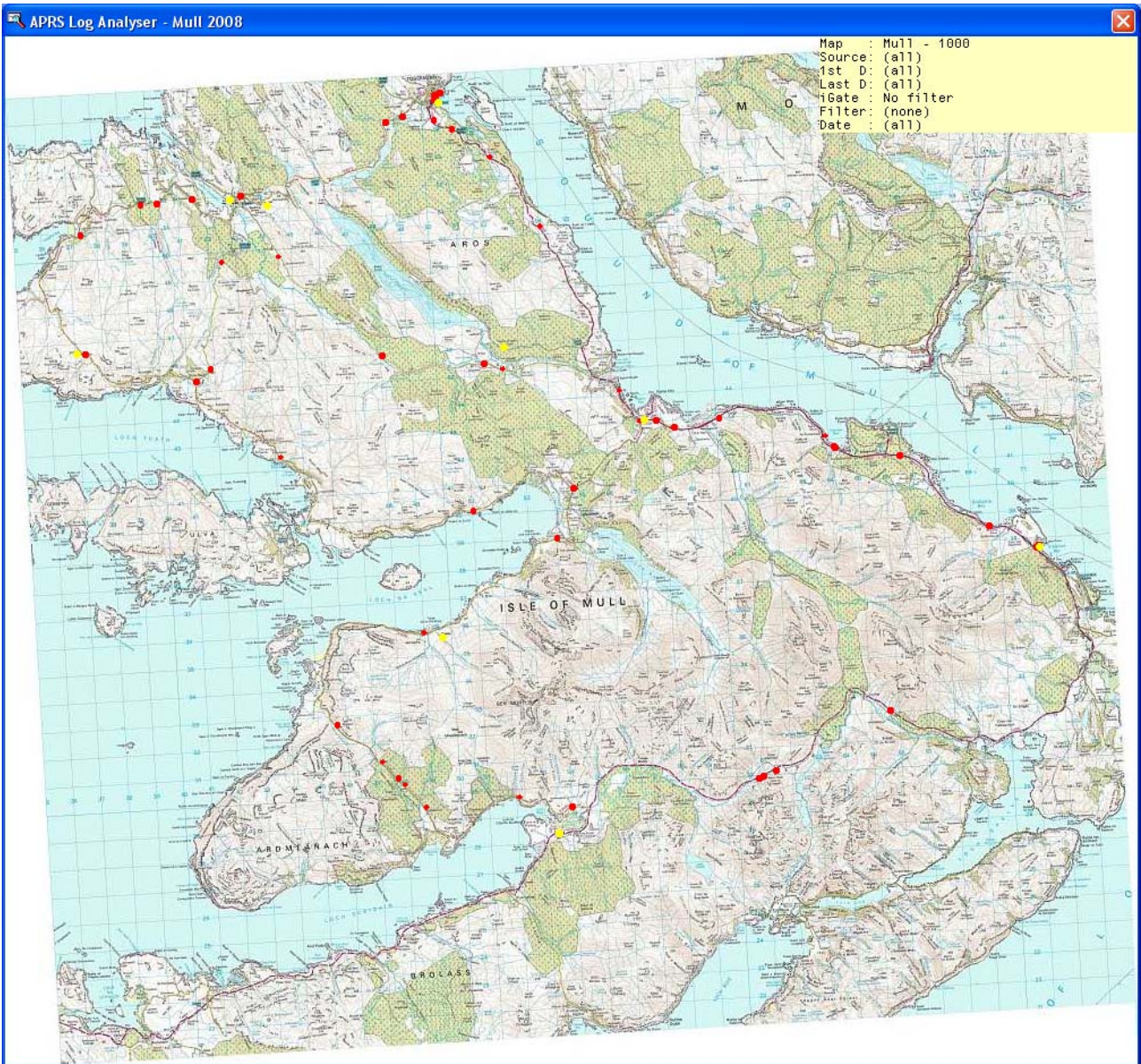
Compare with 2007.



The difference is because of the new location at the THA, which is closer in to the cliff. The reduced coverage is not a problem, as the iGate purpose is as an in-fill for the town.



Radio coverage from Dervaig iGate



Locations where 2 or more beacons were missed