

Survey of Beinn Talaidh

26 September 2009

The Team:

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1) Introduction

Beinn Talaidh (Section 17E, OS 1:50000 Map 49, Grid Ref. NM625347) is a Graham/Marilyn situated in the South East of the Island of Mull and is about 8km North West of Loch Spelve. Prior to 1997 this mountain had a spot height of 762m and therefore just crept into the list of Corbetts (762.00m = 2500.0 feet). However, in the publication of Munro's Tables in 1997, Beinn Talaidh was given a height of 761m and therefore was re-assigned to the list of Grahams. Recent 1:50000 and 1:25000 OS maps list the hill with two spot heights; 761m, and 763m in brackets. The 761m and 763m heights refer to the trig point and the summit of the hill respectively in accordance with recent OS practice where there is a trig point on a hill that is not the summit.

At 763m, this raises the question that Beinn Talaidh should be a Corbett. This has been discussed with Rab Anderson of the SMC, and Graham Little of the OS who is currently revising a guide for the SMC of this area of Scotland. Graham believes that the 763m height is a mistake on the maps and probably arises because the photogrammetric measurement has been taken to the top of the large cairn.

The purpose of this survey was to measure the height of Beinn Talaidh with GPS to confirm whether the mountain is a Corbett or a Graham.

2) Equipment used and Conditions for Survey

The ground survey to locate the summit position was carried out using Trekking Poles and an Abney Level.

Absolute heights were measured using a Leica Geosystems 530 GPS receiver. It is a dual-frequency, 24-channel instrument, which means it can lock on to a maximum of 12 satellites and receive two signals (at different frequencies) from each of these satellites. The latter feature reduces inaccuracies that result from atmospheric degradation of the satellite signal. As a stand-alone instrument it is capable of giving position and height to an accuracy of about one to two metres respectively. Note that a hand-held GPS receiver can only receive up to 12 satellites and each at a single frequency and therefore it has a poorer positional accuracy of +/-5m and a height accuracy of no better than 10 metres. Despite the on-board features of the 530 GPS receiver, there are still sources that create residual errors. To obtain accurate positions and heights, corrections were made to the GPS data via imported RINEX data from the Ordnance Survey which was post-processed using Leica Geo Office Version 6 software.

Conditions for the survey, which took place between 11.00hr and 15.00hr, were good. The weather was mild, about 10 degrees Celsius with a light mist. The wind was quite breezy and the anemometer recorded the speed between 15 and 20mph. However, this was not strong enough to cause any problems with the survey.

3) The Survey

3.1) Character of Mountain

Beinn Talaidh is the highest point on a horseshoe ridge that encircles the upper reaches of Allt a'Choire Bhain. This ridge passes, in a clockwise direction from Beinn Talaidh, over a number of minor tops, all above 500m, before finally descending from Beinn Chaisgidle to the glen. To the east of Beinn Talaidh lies Glen Forsa which runs South to meet the A849 at its highest point. A track leading to the forest there provides a parking place for a limited number of cars and gives access to the mountain. There are trees on the lower slopes but the route quickly leads to steep open hillside. Once the nose of Maol nam Fiadh has been reached, the summit of Beinn Talaidh can be seen at the end of a gently curving ridge. Higher up the ground becomes more broken. The summit area is quite broad with a large cairn and a trig point.

3.2) The Summit of Beinn Talaidh

Visually the highest point of Beinn Talaidh seemed to be ground a few metres away from the trig point; Figure 1. This position was confirmed by placing trekking poles set to the same length of 60cm at different positions and measuring their relative heights using an Abney Level. The cairn was quickly confirmed not to be at the highest point since the top of the cairn was approximately level with a 60cm trekking pole placed at the summit. If the cairn had been built around a “permanent buried rock” and was therefore hiding the summit, then the top of this rock would have to be about 60cm below the top of the cairn. Visual inspection of the cairn showed no rock of this type present.

The area around the trig point was systematically surveyed and the highest point was found to be a small rocky outcrop about 4.5m South East of the trig point. We estimated that its height was about 0.07m lower than the Flush Bracket on the trig point. The OS has recorded the Flush Bracket at 761.70m and therefore this measurement would height the summit of Beinn Talaidh at 761.6m

The Leica 530 GPS was set up with tripod support to hold it firmly over the summit position. The AT502 antenna was mounted on a 1.000m pole and data were collected for 2 hours with an epoch time of 5 seconds.

The ten-figure Grid References for the **summit** were:-

Garmin Map60CSx	NM 62551 34700	Accuracy 4m	Height = 766m
Garmin Venture	NM 62547 34700	Accuracy 5m	Height = 768m
Garmin Etrex	NM 62550 34700	Accuracy 5m	Height = 765m
Magellan Explorist 100	NM 62550 34702	Accuracy 3m	Height = 764m

The position and height data for the summit that were recorded by the Leica 530 and post-processed with Leica GeoOffice using imported OS RINEX data from the nearest five OS Active Base stations were:-

System	Easting	error(1SD)	Northing	error(1SD)	Height(m)	Error(1SD)
SR 530	162543.171	0.004	734709.111	0.005	761.699	0.008

In order to confirm the height of the Flush Bracket on the trig point, the Leica 530 was set up next to the trig point with the bottom of the supporting antenna rod positioned as near as possible to the

Flush bracket. Data were collected for 20 minutes with an epoch time of 5 seconds. The AT502 Antenna was measured to be 0.99m above the Flush Bracket.

The ten-figure Grid References for the Trig Point were:-

Garmin Map60CSx	NM 62551 34704	Accuracy 3m Height = 766m
Garmin Venture	NM 62549 34704	Accuracy 2m Height = 768m
Garmin Etrex	NM 62549 34703	Accuracy 5m Height = 764m
Magellan Explorist 100	NM 62548 34703	Accuracy 2m Height = 765m

The position and height data for the flush bracket that were recorded by the Leica 530 and post-processed with Leica GeoOffice using imported OS RINEX data from the nearest five OS Active Base stations were:-

System	Easting	error(1SD)	Northing	Error(1SD)	Height(m)	Error(1SD)
SR 530	162542.144	0.005	734713.474	0.008	761.826	0.022

The ten-figure Grid References for the cairn were:-

Garmin Map60CSx	NM 62538 34679	Accuracy 2m Height = 765m
Garmin Venture	NM 62536 34678	Accuracy 5m Height = 764m
Garmin Etrex	NM 62538 34682	Accuracy 5m Height = 765m
Magellan Explorist 100	NM 62538 34679	Accuracy 2m Height = 765m

4) Discussion of Results

Although only using trekking poles and an Abney level instead of an automatic level and staff to locate the summit position of Beinn Talaidh, we are confident that we found the summit position to a height accuracy of about 0.05m. The actual area that required surveying was only a few square metres around the trig point. As distances were short and the area quite flat, it was possible to systematically survey this area with the equipment used.

The summit heights calculated from each GPS Base station were within a spread of +/-0.02m and therefore the data set used to calculate the mean height was very consistent. We are confident that this measurement would have an error of less than +/-0.08m. Combined with the uncertainty in the location of the summit position we would estimate that the total error in our height measurement was better than about +/-0.1m.

5) Summary and Conclusions

The **summit** of **Beinn Talaidh** is at grid reference * **NM 62550 34700** and is a rocky outcrop 4.5metres to the South East of the Trig Point. Its height is **761.7+/-0.1m**.

As the height of Beinn Talaidh does not reach 762.00m (2500.0 feet), the mountain remains a Graham.

* NB average hand-held Garmin/Magellan GPS grids are quoted in the summary.

John Barnard and Graham Jackson, 15 October 2009.

Figure 1: Summit of Beinn Talaidh



This picture shows the GPS set up on the summit position near the trig point. The base of the cairn in the background is about 0.5m lower than the summit.