

The Tegola Project lessons learned

Peter Buneman
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Connecting Scotland

Scottish Executive report, 2001



“We will start where the task is toughest, if we are to ensure no part of Scotland misses out: the Highlands and Islands and the South of Scotland”.

Knoydart & Loch Hourn, where the “task is toughest”



Arnisdale & Corran: some rough statistics

1995

12 full-time residences; 6 part-time and holiday lets

2 children

1 new house since 1930, 1 conversion

1 local employer

2 small businesses, minimal crofting

2010

19 full-time residences; 10 part-time and holiday lets

14 children

5 new houses and 5 substantial conversions since 1995

5 local employers (wind energy, fish farm, hotel, local estates)

Local businesses: fish farm, organic farming, prawn fishing, tourism, photography, web design, cruises, ferry service.

Telecommuting and four part-time residents who can work locally provided they have internet

Campaigns to SG, BT etc. had dubious results!

Legal expert OLLIE MISHCON answers your motoring questions

A BLOW TO SEX DRIVE

I REALLY don't know where to begin. I know you are not that sort of person, but I have got myself into a bit of a pickle and could do with some advice.

My wife and I were driving home from a party last night when we were stopped by a police officer. He asked us if we were having sex in the car. I said no, but he said he thought we were. He then searched the car and found some condoms. He said he was going to take them away and that we were going to be charged with having sex in a car. I am really worried about this. Can you help?

Dear Sir, I am sorry to hear about this. It sounds like you have been misunderstood. Having sex in a car is not a crime, but it is an offence if you are driving and the car is not properly insured. If you are not driving, then it is not an offence. I would advise you to speak to a solicitor for more advice.

BAD SIGNS OF THESE TIMES

I HAVE been flabbed by a speed camera on the A10 near Cambridge. I was doing 30 mph and the camera flashed. I was told that the camera was set to flash at 30 mph. I am really annoyed about this. Can you help?

Dear Sir, I am sorry to hear about this. It sounds like you have been misunderstood. Speed cameras are used to monitor traffic on the A10. They are not set to flash at 30 mph. I would advise you to speak to a solicitor for more advice.

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WE'VE WAITED 6 YRS TO GET ALL WIRED UP

Village hit by internet rage

Villagers in Arnisdale still have trouble getting on the internet while Peter Buneman (right) is leading the battle to get them a broadband link

The Scottish Executive is well meaning but doesn't appear to be in control," he said. "It has spent over £30,000 on consultants, and should have started planning for out-of-reach communities several years ago."

"Politicians talk about investigating the Highlands by bringing in young blood, and this is about the cheapest thing you could do to encourage people to move here, yet they are not doing it."

"BT has pursued a disastrous policy of connecting the Highlands by dropping telephone cables alongside the roads. Though the £16.5 million invested by the Executive has brought broadband to many communities, it still travels over these copper cables and that will leave the Highlands way behind in high-speed internet in the long term."

In 2003 Scotland had the lowest broadband coverage of any part of the UK. But the following year Scotland's then Enterprise Minister, Jim Wallace, promised to deliver "affordable" broadband services to every community in the country by the end of 2005.

"It's important that every community gets the advantages and benefits that broadband provides," he said at the time.

And BT was awarded a multi-million-pound contract to connect each of Scotland's 978 rural and remote telephone exchanges to broadband.

But despite the work, some 10,000 Scots - including Arnisdale - are still without a decent broadband signal because they're too far away from the nearest exchange. A strong broadband signal can only travel up to six miles from there.

It's a problem residents in Arnisdale are only too familiar with.

Jenny Munro works from home as a clinical tutor for NHS Education Scotland. But to check her emails she's forced to drive 30 minutes to a friend's house in nearby Glenisg which has broadband. "A lot of my work is done through email and dial-up

connection is just not adequate because documents get jammed and lost so I've now given up with internet connection in Arnisdale," she said.

"People get annoyed with me because you're so used to corresponding by email at speed that when you don't you're just a nuisance."

Catriona Ballantyne's husband Ewan is the estate manager for the Arnisdale estate. But his HQ is in Northamptonshire and email communication is vital to his job.

Mum-of-two Catriona said: "Ewan has to download paperwork for courses and he's spent all day trying to do it in time for a meeting."

"There is lots we just can't download because of the time it takes and just getting an internet connection is just too stressful that you tend to lose patience with it."

Catriona added: "It is just so time-consuming. It's meant to make things much quicker but you get internet rage just trying to get on to it."

A Scottish Government spokesman said: "Officials are aware of the situation in Arnisdale and it is a top priority."

"It is a good example of the kind of community which misses out on broadband and we want to see the benefit in the next year or so."

newspundagmirror.co.uk

MURDERED IN ITALY. MEREDITH, 21

I FOUND HER BODY. THERE WAS BLOOD ALL OVER. IT WAS HORRIFIC

tells of grim discovery

SCOTLAND

Police officers in Italy have found the body of a young woman, identified as Meredith, who was last seen in Scotland. The discovery was made in a wooded area near the town of Perugia. The woman was found with multiple injuries, including a broken neck. The police are currently investigating the case and have not yet announced any suspects.

A Chance Encounter



Mahesh Marina



Mino Bernardi

Could we use commodity hardware to build effective long-distance wireless distribution?

The Tegola Testbed

Dedicated to research into high-speed, low cost rural broadband

Fortunately, because it is research, we could obtain backhaul through the Janet network at UHI

Research issues:

- Network management
- Propagation over water
- Power management
 - (for self-powered relays)
- Mast location planning



And the residents of Loch Hourn were willing guinea-pigs

Rural communities need broadband more than urban communities!

- People want internet for business
 - ♦ proportion of small businesses *higher* than in urban areas.)
- Greater reliance on on-line shopping.
- Other forms of communication may not work
 - ♦ telephone, radio, TV, mobiles
- Alternative to libraries, cinemas, etc.
- Education.
 - ♦ High-school pupils on Eigg can lose 3 weeks a year due to bad weather.
- “Distance” communications. Don't underestimate their social importance, especially for the oldies!
- Telemedicine?



Willie Sandaig “teleconferences” with his grandchildren in New Zealand



Finlay, in Arnisdale, keeps in touch with his pal Sam in Worcester

Wireless is cheap, fast and easy to deploy

In the past three years there has been a dramatic drop in the cost of wireless equipment

- Fast – capable of delivering superfast –100MB/s
- Modular – “plug-in” components
- Cheap electronics
 - ◆ A 20km link: £400
 - ◆ Consumer receivers: £70
- Only basic electrical knowledge required locally
 - ◆ The “clever stuff” can all be done remotely
- Easily reconfigurable
 - ◆ No need to dig up roads if things change
 - ◆ Masts can be moved

We also got some practical experience

“Masts” need not be masts

“Green” power is neither
green nor reliable



Communities and local business can deliver where centralised organisations cannot

- Rural communities are resourceful
- Travel costs are minimal
- Relay sites can be negotiated by local agreement



Finlay (now age 11)
our on-site engineer

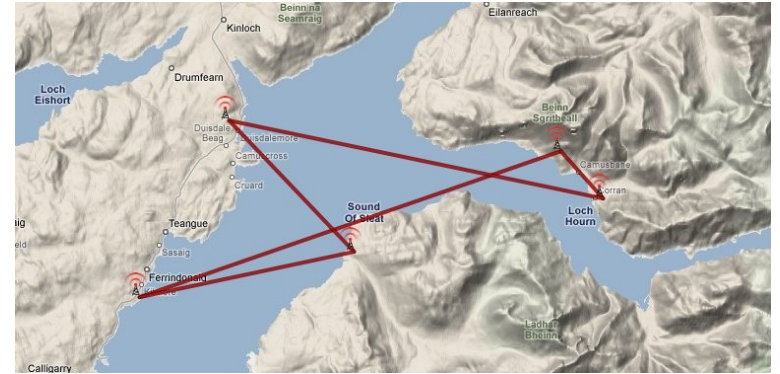


Various transportation systems

6. Resilience and maintenance

- Built-in redundancy
- Stable power supplies
- Remote configuration

In October 2011, lightning strikes knocked out the telephones to Arnisdale and a wider area. Emergency health services were diverted through Tegola



Moral:

- People immediately become reliant on the network

Recent history

In 2011-2012, a set of fortunate events:

- Tegola wins NextGen challenge award
- JANET relaxed its policies on how universities could use their networks.
- SMO gave us a long-term site for our antennae and continued to provide physical access.
- UHI agreed to purchase extra bandwidth to serve Loch Hourn (Tegola), Hebnet and S. Knoydart
- Marine Harvest agreed to subsidise the cost of that bandwidth
- HUBS was funded (Carnegie Trust) to help other communities

Plans for a gigabit network

Communities must keep ahead of the game

Local fibre is essential

- Community undersea fibre?
- Freespace optics?
- 24GHz (commodity) links?

Best bet is a hybrid system

Hebnet+Knoydart+Tegola today

