

Bandway, the technology

*Why use a satellite?*

Please consider the options for the mass distribution of data, being either connected wires or fibre – or a form of radio transmission, be that in the microwave spectrum, or below. Providing a physical connection in remote areas is a non starter, and reliable radio requires line of sight – though very long wave radio could be used selectively. A satellite, on the other hand, not only can connect any point on the ground, it also does so over an extremely large area, thus becoming very economic in the Bandway application.

*So any satellite will do?*

Yes, and also no. It is possible that any satellite would be able to provide services that would carry the Bandway protocol, but it would not normally be geared to that application. It is a benefit that we can employ an often unused part of the satellite spectrum, but it would be an uninteresting return for the majority of satellite companies who concentrate on bulk two way data, or television transmissions.

*Why have you developed your own protocol?*

In order to keep development costs for content providers down to the minimum, the preparation of all material is managed and transmitted to the uplink using absolutely standard TCP/IP Internet protocols, which employ an “acknowledgement” structure to ensure data accuracy. If attempts are made to deliver this “ack” over a two way satellite link it causes the transmission to slow markedly, not least because the data takes more than 300 ms to get to the satellite and back – that is a lifetime in electronics terms.

Our protocol changes the TCP/IP into a transmission without the “acks”, but adds in a technique called ‘forward error correction’ that corrects any loss of ‘bits’ during the transmission.

Once it is received at the ground station, the protocol turns everything back into TCP/IP, so once again we can leverage standard techniques with the work station, and build on a thoroughly understood training base.

*So what does the ground station consist of?*

It has three basic components, and some that are optional. The basics are a “satellite modem”, a storage and display medium (which can be a PC, but there are other options – one of which would be diskless for use in very hot environments), and a means of generating or delivering power. Optionally you can have a “local radio” broadcast that would also provide a “mobile phone” structure with a very limited range.

*Why is this so efficient?*

Because the satellite is “topping up” the data within a local library structure within the storage medium it is able to service a huge quantity of delivered data over a very wide area – probably meaning that it is servicing a number of different cultural and language requirements, meaning that it is shared, and thus less expensive per capita. Whilst geared to delivery in remote areas, where there is no other option, it can also service towns where there might be more conventional Internet options, meaning that a single educational project could have a significant reach.

*But you said it was not Internet?*

Thanks for reminding me, that is true, and we need to constantly stress that the design structure provides off line services, with none of the search capabilities we associate with the Internet. It is a delivery medium that is geared to the lowest possible cost provision over the widest practical area. Visually the content will look very like what you would view over the Internet, and it uses a local Internet protocol, but any ‘requests’ using the back channel will take time to deliver because it would have to wait to be scheduled for a quiet moment when the satellite is not busy.

*There is a back channel then?*

Yes, a very limited one, probably running at even less than 9.6 Kilobits, so it is only suitable for extremely restricted text. However, it will support the messaging that we have called “e-grams”, and that will give each location far more contact with the outside world than they have enjoyed historically.

*And the content?*

That, together with the manning of the uplink station and the distribution of equipment on the ground, is the responsibility of the instructing managers who contract to use the service. Bandway is an enabling delivery platform, and we hope it will be used for multiple social mission purposes, and each provider in those fields has their own specialist competence.

*Thanks, that is just what we need!*