

# Laser brain finds internet short cut

■ Heriot-Watt device cuts time it takes to sort digital data

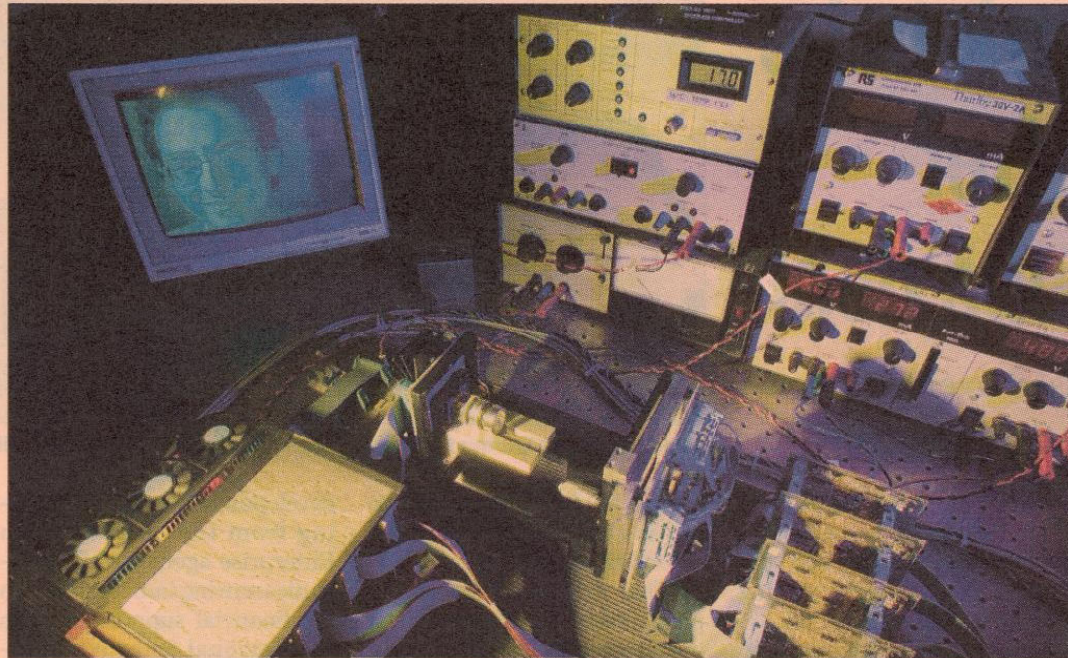
Douglas Friedli

A LASER-DRIVEN “brain” that can speed up internet traffic by a factor of 100 and may even help trains to run on time has been successfully tested in Edinburgh.

The brain, or high-performance optoelectronic neural network scheduler, to give it its technical name, has been under development for the past six years. It is based on a concept from the former BT laboratories in Suffolk which found its way to Heriot-Watt because of the university’s reputation for doing clever things with lasers.

The brain’s task is to decide what to do with the “packets” of data, web pages, e-mails or audio files, which travel down cable and telephone lines.

At some point these have to be checked, in networks such as the internet, and sent in the right direction. The order in which they are processed – known as



John Snowdon’s device could make the internet 100 times faster. Picture: Nick McGowan-Lowe

the assignment problem – is crucial to the way the system works.

The brain consists of a series of chips, or neurons, where decisions are made about where and when the data should go.

These are connected by lasers which weave complex inter-connection patterns and can transfer large amounts of data at high speeds. By working in tandem, the chips break down

the assignment problem and allow a solution to be reached more quickly.

This combination decides almost instantly which path the data should take, and makes the brain faster and easier to build than traditional electronic switches.

The system set up at Heriot-Watt can take data from eight inputs and transfer it into eight

outputs. The team of Keith Symington, Gordon Russell and Andrew Waddie has also proved it will work with 64 inputs and 64 outputs.

John Snowdon, the leader of the physics department team which worked on the brain, said: “You can increase the number of users on a computer network with no time penalties and without using any extra space.”

## LIGHT SPEED

### Advantages

PICTURES and sounds are sent over optical systems by switching a laser on and off millions of times a second.

Light has a number of advantages over electricity as a medium for carrying telephone traffic.

It has a higher carrying capacity, meaning that more information can be transferred through a given point over a given amount of time.

Signals degrade more slowly in optical fibres than in copper wire. Light uses less power, is clearer and more suited to carrying “on/off” digital data.

By using the data packets to represent trains, the system could be used to draw up railway timetables and ensure that the rail network runs at maximum efficiency.

A number of telecoms equipment companies have taken an interest in the system, but none has so far committed to it.

douglas.friedli@businessam.co.uk

Link: [www.phy.hw.ac.uk/~phykjs/OIC/index.html](http://www.phy.hw.ac.uk/~phykjs/OIC/index.html)