

A CCD image taken over the city of Beijing, capital of the Popular Republic of China. In the centre of the image, a small square appears, formed by the large avenues that encircle the Square of the Celestial Peace. Just above the Square appears in red the Forbidden City, residence of the Chinese Emperors until 1948. (Courtesy of CBERS / INPE).

BRAZIL'S NATIONAL INSTITUTE for Space Research operates the Earth Resources Satellites (CBERS-1) and CBERS-2. The satellites are a co-operative venture between China and Brazil. However, while space agencies in most of the developed world are out to recover the cost of developing and operating satellites through charging for Earth Observation (EO) data, Brazil is breaking the mould by providing

supporting evidence. He produced a chart showing the area of Brazil deforested annually since the 1960s. Interesting, he said, but without an understanding of where the tree-cutting is going on and the spatial factors affecting the activity, it is not possible to formulate policy and control. His argument is that if the data is freely available, anyone can validate it and the conclusions derived from it.

He went on to describe the looming crisis in Earth Observation. He encapsulated the problem by showing how NASA's mission in space has changed. NASA used to be charged with understanding the earth but now the first part of its mission is to "pioneer the future in space exploration". This change of mission is reflected in the shift of funding to the International Space Station and missions to Mars – while earth observation has been side-lined.

In putting forward his case for making EO data free, Prof Câmara took Envisat as an example. The cost of putting the satellite into orbit was \$3 billion but the income raised from sales of imagery is only \$5 million

Brazil takes up the Global EO Baton

Gilberto Câmara, General Director of Brazil's National Institute for Space Research (INPE), gave a lecture at The Royal Society recently entitled "Free Earth Observation data on a global scale: A View from Brazil". **Richard Groom** report's on the lecture's key points.

their data free of charge. Given the current debate in the UK, the timing of the lecture could not have been more appropriate.

Prof Câmara posed the central question: How is the earth's environment changing and what are the consequences for human civilisation? To study global change we need to know where the changes are taking place, how much change is going on and who is affected. At present, he said, we are not able to answer these questions thoroughly.

The importance of spatial context It is not possible to answer these questions without remotely sensed data. Prof Câmara was scathing about non-spatial figures that are plucked out of the air without

per year. How long will it take to recover the cost? Indeed, is the sum that would be collected throughout the life of the satellite worth collecting at all?

The looming data gap Landsat 5, SPOT4 and SPOT5 will only be operational for a couple more years. As things presently stand, there will be a data gap until at least 2012 when Landsat 8 might be launched. It is of vital global importance to fill this gap. The proposal is for CBERS to provide data between 30°N and 30°S. The CBERS programme is planned up to 2020 and ground stations are being established to support this ambition.

Prof Câmara was in the UK to encourage Surrey Satellite Technology, the operators of the Disaster



... if the data is freely available, anyone can validate it. . .



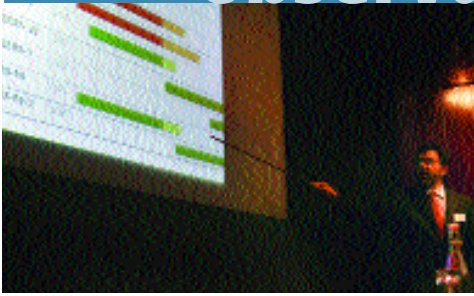
About CBERS

CBERS-1 was launched in 1999, followed by CBERS-2 in 2003. Both satellites are identical with three sensors in the payload – a CCD camera, Infrared Multispectral Scanner (IRMSS) and Wide Field Imager (WFI). The CCD camera is a five-band sensor with a swath width of 113km and a resolution of 20m, which can be angled up to 32° to take stereo imagery. The IRMSS is a 4-band sensor including thermal infrared. It has a swath width of 120km and resolution of 20m. The WFI has a swath width of 890km and resolution of 260m. The repeat cycle is 26 days.

CBERS-2B was launched on 19th September, 2007. It is the same as the other satellites except that the IRMSS sensor has been replaced with a high resolution panchromatic camera (HRC) with a swath width of 27km and a resolution of 2.5m.

Images data can be ordered and downloaded from the CBERS website.

EARTH observation



Gilberto Câmara compares CBERS-1 and CBERS-2 with other satellites.



A pixel unused is a penny wasted!



Monitoring Constellation (DMC), to co-operate with INPE so that CBERS and DMC would operate as a single constellation providing global data.

To reinforce the argument for free data, Prof Câmara drew an analogy with fine art, aided by a slide of his screen saver – a painting by Turner. Works of art should be in galleries where they can be viewed, not hidden away in vaults. If they are in the safe no one is getting value from them. And yet this is exactly what we do when we archive EO data, making it available only if a fee is paid to remove it from the vault. “A pixel unused is a penny wasted!” is his motto.

A hundred thousand CBERS images are downloaded from the Internet every year – just because the data is free. This is five times its nearest rival, Radarsat-1. The data is used by government (31%), in education (26%) and by private users (51%). To demonstrate the value of the data he took private farm management as an example. Data is available immediately, when it is needed. It enables new business development, facilitates trial uses for new clients, creates jobs by reducing the cost of

buying data and increases quality of work by encouraging use of the best available data.

Delivery cost What then is the justification for providing data free of charge? Apart from the philosophy that the satellites are provided for the public good and should, therefore, be used with that goal in mind, the justification is that the cost of delivering data over the Internet is virtually zero. So there is no difference between the cost of supplying it and the cost of archiving it.

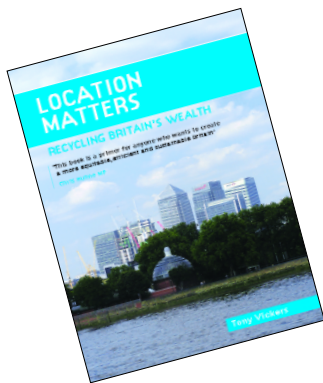
There were several questions concerning the dependence upon good Internet connections – not guaranteed everywhere, data quality and the effect on privately funded satellites.

Finally, Prof Câmara suggested that the highest resolution data should be the preserve of the military. Only data of two to five metre resolution or lower should be free.

The lecture provided an interesting counter to the prevailing view on cost recovery for data.

The lecture was supported by the Foreign and Commonwealth Office and the Department of Innovation, Universities and Skills and was hosted by The Royal Society.

books



Location Matters – Recycling Britain's Wealth

By Tony Vickers
Published by Shephard-Walwyn (Publishers) Ltd
ISBN: 978-0-85683-251-2
Paperback, 110pp, £8.95

This short treatise is an argument for land value taxation (LVT). It is one outcome of the doctoral

research undertaken by the author who describes himself as a construction engineer, military surveyor, local government councillor and a lecturer and researcher in green taxes. In this publication he appears as all these but mostly as a politician arguing for LVT. As such, there are nuggets of wisdom and lacuna in which the good is stressed but important questions remain.

For those unfamiliar with LVT, it is described as “... a method of raising public revenue by means of an annual tax on the rental value of land. It would replace, not add to, existing taxes”. Believe that last statement if you wish. The case histories quoted make it clear that this is not necessarily the case.

Part of the difficulty with any discussion on raising revenue from land lies, of course, in the definition of what we are talking about. The

legacy from Ancient Rome means that, especially for many Western cultures, land extends from the centre of the Earth to the infinite in the sky – from hell to heaven – and includes all appurtenances attached thereto, i.e. buildings and other features including vegetation permanently attached to the soil. For some, however, the land is merely the surface of the earth and improvements are a separate matter, often referred to as “property”. Of course the administration, management and valuation of property in this sense pose different issues from those that arise when dealing with land without its attachment. Therein lie many problems.

One of the nuggets that was unearthed by the author is a quote by Winston Churchill that “Roads are made. . . services are improved. . . and all the while the landlord sits still.

Every one of these improvements is effected by the labour and cost of other people and by the taxpayers. To not one of those improvements does the land monopolist, as a land monopolist, contribute, and yet by every one of them the value of his land is enhanced. He renders no service to the community, he contributes nothing to the general welfare, he contributes nothing to the process from which his own enrichment is derived.” It is this injustice that LVT attempts to address.

According to the author, LVT differs from other land and property based tax systems in that, firstly, it is based on a regular assessment of the value of every parcel of land whereas most land and property based taxes are based on the transaction price of a particular piece of real estate at a particular time. Secondly, the “L” in LVT refers to the site alone, excluding any improvements such as buildings