Earth Observation Policy

Earth Observation Data Pricing Policy

Free Data for All Users, Full Cost Pricing and Access Key Pricing

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Earth observation uses a variety of pricing models. The author explores the benefits and disadvantages of the different pricing models commonly used in Earth observation. These models are: free data for all users, full cost pricing and access key pricing. He also discusses the opportunities for new pricing approaches offered by the Internet.

Pricing policy is part of data policy, which is of vital and growing importance in Earth observation. The project entitled Earth Obser-vation Data Policy and Europe (EOPOLE) has been examining a range of data policy issues, including pricing policy, see also www.geog.ucl.ac.uk/eopole. EOPOLE is supported by the European Commission through the Framework IV Programme. The data pricing policy options commonly used are:

- Free data for all users
- Marginal cost price for all users
- Market driven, realisable prices for all users
- Full cost pricing
- Two tier pricing
- Information content pricing
- Access key pricing

Three of these options are examined, namely free data for all users, full cost pricing and access key pricing.

Free Data for All Users

The term free of charge is defined here as no charge to the recipient at the point of delivery. No charge is made for the data in itself, nor for the medium via which the data is distributed. The arguments in favour are:

- It allows open and easy sharing of valuable environmental data. Sharing of Earth observation data should be encouraged with the lowest possible barriers
- The tradition of free exchange of meteorological data has been highly successful and suggests that environmental data for research purposes may benefit from a similar policy
- Experience in the U.S. suggests that the free exchange of basic meteorological data can contribute to the commercialisation of the Earth observation sector by encouraging the value added sector to develop applications on the basis of free data
- It is simple to administer

The arguments against are:

- If large volumes of data are available free of charge this may result in a lack of discipline on the part of users in demand for the data
- If no cost is associated with the data, this may also be perceived to have no value
- The supplier continues to pay for the data rather than the user, so that the user does not have a sufficiently clear say in the amount and type of data collected
- Free supply has not generated sufficient recognition of the value and economic impact of the data, particularly meteorological satellite data. This makes it more difficult to justify increased budgets for satellite programmes. The more successful an Earth observation programme is then the greater the costs falling to the data supplier rather than to the data user

Ikonos image of the pyramids of Giza, Egypt, 17th November 1999. (Copyright Space Imaging).

Implications of Free Data for All Users

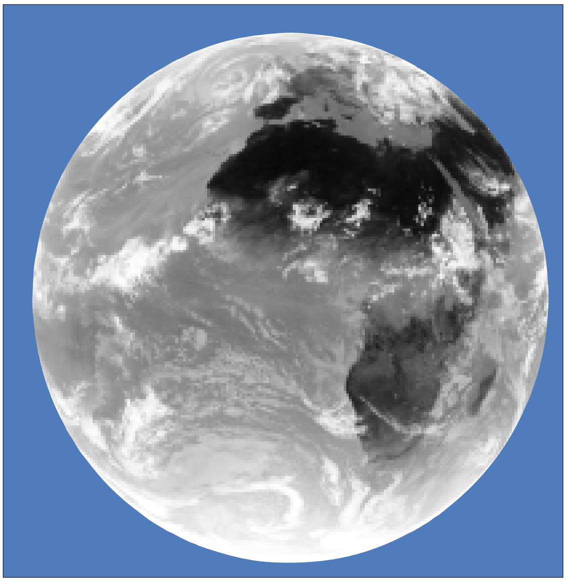
Providing data free of charge to all users maintains a situation in which the cost of providing the data falls to the supplier. In a system such as EUMETSAT this is acceptable because the community which funds the system is also the recipient of the data. When EUMETSAT wishes to enhance its capability, for example by bringing in a new Meteosat satellite, it requests its member agencies for further financial support.

Data supplied free of charge to all users could be perceived initially by users to be a positive initiative. However, the cost of data is only one part of the total costs involved in a research, operational or commercial programme. So that by seeing the data as free, users may underestimate the other, supporting, tasks which are required for the successful completion of a programme.

It is not normally the cost of data that curtails use by the research community but rather the availability of research funding. If funding is not available for research using Earth observation data, including labour, equipment, geographic information and overhead costs, then free data will have little more than pictorial or curiosity value.

Full Price

Prices set at the full price, or competitive market price, capture the investment costs of building and launching an Earth observation satellite and its payload, plus the costs of the ground segment and marketing activities. In addition, the price reflects the profit needed on any one satellite and the investment in research and development for the next generation of Earth observation satellites. The arguments in favour are:



Meteosat thermal infrared image, 28th June 1986. Free exchange of basic meteorological data can contribute to commercialisation by encouraging the value added sector to develop applications on the basis of free data. (Copyright ESA).

- A full, commercial price would recover all the initial investment costs
- It would be possible to investigate easily the development of new instruments directly geared to user needs
- Full prices may provide a basis for the sustainable and long term growth of the Earth observation sector independent of government funding

The arguments against are:

- The price levels would be very high
- A full price policy would also fail to recognise the need to invest in space for scientific and humanitarian returns as well as for operational and commercial benefits

Implications of Full Prices

Space Imaging is the first company in the private sector to be responsible for the full delivery of an Earth observation system and the sale of its data and derived products. Therefore the prices charged by Space Imaging are a good guide to the levels of full pricing of Earth observation data. Table 1 summarises the prices of the main Space Imaging product offerings.

In the longer term this commercial basis is both desirable and necessary because it cannot be anticipated that governments will continue to fund Earth observation indefinitely. The key question is when will this transition occur?

Access Key Pricing

The discussions surrounding pricing policy in Earth observation revolve around the prices of data and products. While this concerns the purchase of a licence to use the data, rather than the data it itself, the focus is still on the price of the data. An alternative approach is to provide the data free of charge but encrypted in such a way that only those users with a decryption key can gain access to the data. The arguments in favour are:

- Encourages wide dissemination of Earth observation data
- Focuses attention on that data required for a particular project or service
- Direct broadcasting technologies are growing in capability and could be harnessed to the benefit of Earth observation
- Emphasises the value of the information rather than the data in itself

The arguments against are:

- Could involve large volumes of data for dissemination
- Restricts access to those organisations with access to suitable technologies
- There is not yet a mature technology for all Earth observation data
- The approach is better suited to low-rate Earth observation data

Implications of Information Content Pricing

EUMETSAT already encrypts its data and sells a decryption key to the data. A broader application of this

	CARTERRA Geo Products	CARTERRA Reference Products	CARTERRA Precision Products
Price per sq km North America	US$ 12 - US$ 17	US$ 29 - US$ 44	US$ 66 - US$ 99
Minimum order value	US$ 1,000	US$ 1,000	US$ 1,000
Minimum order area	67 sq km	27 sq km	12 sq km
Price per sq km outside North America	US$ 29 - US$ 44	price on application	price on application
Minimum order value	US$ 2,000	US$ 2,000	US$ 2,000
Minimum order area	27 sq km	-	-

***Table 1**, Sample Space Imaging product prices. Source: Space Imaging web site (www.spaceimaging.com) 6th March 2000.*

approach could benefit Earth observation. Receiving stations could receive all relevant Earth observation data but only have access to that data which is accessible with a decryption key. The key could be transmitted over the Internet to paying customers and provided under specific conditions, such as access only for certain satellite passes, geographical locations or time periods. The decryption keys could themselves have relatively short lives (say one month) enabling avoidance of fraudulent access to data. This approach would require a step change in the investments by user organisations. The prices of satellite telecommunications technologies and services are coming down but their adoption in Earth observation has been limited. The ASTRON project of the European Commission may assist in encouraging a more widespread use of these technologies.

Internet Opportunities

In the past, Earth observation has provided a lead in information technologies. Now, however, Earth observation is in the happy situation of following other technologies, particularly in communications. The lessons for pricing policy are emerging day by day, especially with the approaches to the Internet of the dot-com companies. Technologies such as MP3 are providing a means of transferring large volumes of data over the Internet. MP3 itself is designed to compress and disseminate digital music data and so is not orientated towards Earth observation data. However, generic systems which disseminate image data will become more widespread and more useful. This then poses the question: how can Earth observation benefit from new data transmission capabilities? Gunter Schreier of Definiens has discussed in the EOPOLE project a range of options which Earth observation could exploit by using the Internet to selling Earth observation data:

- All Earth observation data are offered free of charge while the data supplier generates revenue from the advertisers who use the web site
- Sophisticated on-line services deliver only the Earth observation data the user really needs
- New developments, such as DLR's EOWEB and GAF's SATWEB, allow sub-regions to be specified and parts of the data to be ordered and delivered over the web
- Earth observation data is auctioned via the web. If this were linked to satellite programming then the auction would be for data rights (subject to international agreements) rather than for the data per se. Inverse auctioning could occur when a user posted on the web a data requirement plus the amount he or she would be willing to spend to have the requirement fulfilled

The effective application of Earth observation data is only as good as the tools to analyse the data. A closer synergy between data supplier and software provider could generate new pricing models. For example, the data could be provided free but the costs could lie in the software to access the data. A comparative example is with cell phones, where some providers provide a cell phone for free but the user has to sign a two year service contract.

Conclusions

There is no single pricing policy that is right for all Earth observation data. Pricing policy is the servant of the mission objectives. A pricing policy is (or should be) put in place to enable the objectives of an Earth observation mission to be achieved. Users in the Earth observation sector often claim that data is too expensive and should be provided completely free or as cheaply as possible. These comments are often not set in context. Data costs rarely exceed 20 per cent of project costs and often there is no consideration of the other costs involved in completing a project. A continuing claim for very low cost data does little to encourage sustainable Earth observation. The emphasis should always be on the value of the data provided by Earth observation. The new ERS and Envisat data policies are geared towards maximising the beneficial use of Earth observation data with the exploitation left to the distributing entities and not to ESA. This means that distributing entities will have an improved assessment of the value of their data and product offerings.

This paper is based on a paper presented to the special session on UNISPACE III at the Congress of the ISPRS held in Amsterdam, July 2000. The information and ideas presented here are developments of earlier work on this subject reported in Earth Observation Data Policy (John Wiley & Sons, Chichester) published by the author in 1997.