

Below are thoughts on the importance of “GIS-Ready” data products to increase the accessibility to and usability of, in this case, remote sensing data. Such derived products would greatly increase the value extracted from the vast amount of data stored and being acquired.

It specifically addresses item (1) Preservation, Discoverability, and Access in the RFI, noting that “Access” includes not just physical access—data that is physically accessible but in a format or form that a potential user cannot utilize or understand is not “accessible”.

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The Need for GIS-Ready Products

Concept Note, 7 November 2011, Gary Geller (gary.n.geller@jpl.nasa.gov)

Increased accessibility, usability, and availability of remotely sensed image products is essential if the needs of less technical users such as educators, natural resource managers, policy makers, and the general public are to be met. It is with these goals and users in mind that GIS-ready products and the coordination ideas suggested here are developed.

This concept note provides background information on what GIS-ready products are, why they are important, and who the target users are, then describes the current situation with respect to their availability. It is hoped that additional discussion on this topic will encourage more data providers to make GIS-ready data products available. And, because availability is already starting to increase, it is suggested that coordination among the providing organizations, captured as product guidelines, will benefit users by simplifying access and usability.

GIS-Ready Products. This imprecise but convenient term refers to georeferenced image products that can be incorporated into a GIS with minimal effort. They utilize simple, common formats that do not require sophisticated, specialized software, but rather can be viewed with common software such as browsers, IrfanView, PowerPoint, or of course any GIS software. Although a range of products of varying complexity can be considered “GIS-ready”, here the emphasis is on the simple end of the spectrum with a focus on meeting the needs of less-technical users. And while jpeg images have many advantages, such as small size, any common

format would probably be suitable. GIS-ready products are most commonly surface images from optical sensors like Landsat, but radar images, digitized maps, and atmospheric products such as profiles are also possible.

Cost. Because GIS-ready products are derived from existing scientific products, the algorithms for generating them are simple and easy to code, and generally not a cost consideration. Thus most of the cost of adding these is the marginal cost of extending the system to offer a new product, a cost that will vary depending on the system.

Target Users. GIS-ready products are for any user that can benefit from easy access to images that otherwise would utilize complex formats geared towards remote sensing specialists. These complex formats include, for example, HDF, or any multi-band format that requires knowledge of image processing to compose an image. Target users need not be GIS experts, use GIS software, or even know what GIS is. Because GIS-ready products can be viewed with simple, common software they greatly increase access to and usability of scientific data products—and thus the value that can be extracted from those products. The number of users interested in GIS-ready products far exceeds the number of traditional scientific users.

Current Situation. No-cost access to the vast data stores of remotely sensed data has been gradually increasing. All NASA EOS data, starting with that coming from the Terra spacecraft, have been freely available, at no cost, since the first data reached the ground in 2000. Creation and availability of the Landsat Global Land Survey (GLS) products in 2000 was another big step forward. Eliminating user charges for the entire Landsat archive, which USGS did in 2008, was another (very) big step forward for open access. Brazil and China now provide greater access to the images in the CBERS archive, and India recently updated their data policy so that all images coarser than 1m are now accessible. Although this is an excellent trend, in most or all of these examples the products offered are very large, multi-band datasets that require users to select and combine some of the bands if they need an image. That step blocks access by the huge number of users needing a smaller, simpler, derived product—a GIS-ready product such as an image layer. TerraLook, a NASA-USGS effort, addresses this problem by making images of the GLS and ASTER (Advanced Spaceborne Thermal Emission and Reflection) archives available as georeferenced jpegs—but this approach needs to become more widespread. To summarize, there is still much room for progress on two fronts: 1) increasing the amount of no (or very low) cost data available and 2) increasing the usability of data by offering derived, GIS-ready products. These two activities may be related, as explained in the next paragraph.

What Happened with ASTER. Although the Earth Remote Sensing Data Analysis Center (ERSDAC), which oversees the ASTER dataset, charges for the full multi-band product, TerraLook encouraged ERSDAC to allow their products to be made available at no cost as TerraLook's simple georeferenced jpeg format. This opened up the entire ASTER archive, currently about two million images, to everyone; ASTER is now available to a much broader range of users than the highly specialized scientific audience that is the primary target for most

sensors. Because GIS-ready products cater to a different audience than the specialized scientific one, the increased access provided by GIS-ready products does not decrease the sales of the full product; in fact, it may increase sales by increasing visibility and interest. Perhaps the approach taken by ASTER can act as a model for other data providers and encourage them to make simple GIS-ready products available at minimal or no cost.

Guidelines. As more GIS-ready data products become available there is the possibility that they will be offered in a multitude of formats or with incomplete or parochial metadata. Such a divergence would stymie accessibility and decrease the value to users as well as the value extracted from the data. This scenario can be avoided by simple coordination among data providers to make GIS-ready products more consistent. Once a data provider has decided to offer GIS-ready products, consistency does not impose any incremental costs.

Compared to the target audience for full scientific products, the users for GIS-ready products have a much narrower range of product requirements—this fact makes convergence towards a limited number of formats possible. But since such convergence is unlikely to emerge on its own, as a first step forward it may be wise to propose a set of guidelines. These guidelines could cover basic issues such as format (eg, jpeg with World file, tiff with World file, or geotiff), metadata format, and metadata content, and they could include information to limit the number of, for example, coordinate systems used so as to enhance compatibility with common software. Note that the goal here is not to create a new standard, but rather to coordinate formats and metadata, using existing standards.

Regardless of the details, however, the key goal is to increase access to more datasets for a broader range of users. Simple, GIS-ready products are an excellent way to do that, and perhaps TerraLook and ASTER provide a useful model as a starting point.