

ACSM BULLETIN INTERVIEW

WITH RICHARD W. COOKE

—by Ilse Genovese

ENVI EX AND THE SHIFT IN THE GEOSPATIAL DATA INDUSTRY

For a long time, raster-based imagery and vector-based GIS have been treated as two totally different worlds. But that has changed. Satellite imagery has become much more important to GIS users—and to remote sensing professionals as well. About five years ago we began working aggressively to align ITT with the new paradigm shift emerging in our industry. The idea of developing an integrated, easy-to-use imagery + GIS application peaked ESRI's interest—and ITT and ESRI developers started working on a prototype solution. It took only two years to build a powerful yet user-friendly imagery processing and analysis application—ENVI EX. At this year's ESRI User Conference in San Diego, ENVI EX was given a boost by a strategic partnership between ITT Visual Information Solutions and ESRI to make this software widely available to GIS users.

YOU SAID ENVI EX'S PROGENY IS BOTH OLD AND RICH. WHAT EXACTLY DOES THIS MEAN?

It's the technical expertise that both ITT Visual Information Solutions and ESRI have brought to bear on ENVI EX. If you look at the structure of our parent company, ITT Corporation, it's easy to see where this progeny comes from. One of ITT's three major divisions—Defense Electronics and Services—includes ITT Visual Information Solution as a part of Space Systems Division. ITT Visual Information Solutions had been involved in processing satellite imagery since the late 1970s. Today, ITT Visual Information Solutions is an integral part of the Space Systems Division's mission to build high-resolution satellites and satellite imagery payloads—such as those onboard GeoEye and Digital Globe satellites—and provide solutions for processing and analyzing the imagery after capture for a variety of applications.

HOW DID YOUR COMPANY COME TO FOCUS ON IMAGERY PROCESSING SOFTWARE? WAS IT SATELLITES ALL ALONG?

For us it wasn't. We were founded by a scientist who was working on the Mars Mariner space mission in the late 1970s. He was all about the imagery and the data coming

off the satellite. But he was frustrated because he couldn't find software which would allow him to manipulate and analyze the imagery the way he needed this to be done. So, he invented IDL, a programming language that allows scientists to quickly and easily visualize and analyze data and images. Years later, ENVI®, a suite of image processing and analysis tools was built using the IDL language for scientists in defense and intelligence and other disciplines to analyze remotely sensed imagery and data. Currently, both IDL and ENVI are comprehensive, thriving product lines sold by ITT Visual Information Solutions,

WHAT WAS THE IMPETUS FOR EXTENDING THE IMAGE PROCESSING CAPABILITIES TO NON-SCIENTISTS?

The primary impetus was the growth in the use of imagery by non-scientists. Suddenly there were people in urban and infrastructure planning, geology, surveying, and all the other earth and space sciences who needed to be able to get quick, accurate answers from imagery. They needed to be able to read, explore, analyze, and share information from imagery using simple workflows. Both ITT Visual Information Solutions and ESRI anticipated this demand. We had a growing number of common customers who were asking for imagery that was easy to get, easy to use, and did not require costly investment. We realized that to meet these parameters, GIS technology would need to support remotely sensed imagery, and imagery processing and analysis would need to trade complex processes for easy-to-use workflows that could be used by a variety of users and still deliver highly accurate results.

HOW WOULD YOU DESCRIBE ENVI EX—AS AN EXTENSION OF ANOTHER PRODUCT?

It's interesting that you ask this question. Initially, our discussions with ESRI were within the context of creating a traditional extension to ArcGIS. We set out to learn how to build new objects, new algorithms. But, three or four months down the road of development we realized that we had to go beyond product extension. Anything we designed needed to "be native" within the ArcGIS environment; yet, we needed to deliver an application that's not



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Richard Cooke is president of ITT Visual Information Solutions, a subsidiary of ITT Corporation based in Boulder, Colorado. Its parent company, ITT, is a global multinational asset corporation engaged in fluid technology, defense electronics, and motion and flow control systems.



just an extension. This requirement necessitated developing a fully integrated suite of imagery analysis tools—and that's effectively what ENVI EX is, a suite of high-end image processing and analysis tools integrated with the ArcGIS platform.

ONE TERM KEPT CROPPING UP IN THE PLENARY OF THIS YEAR'S ESRI USER CONFERENCE—IMAGERY ANALYSIS WORKSTATION. CAN YOU ELABORATE ON THIS?

ESRI has invested quite a bit of effort in tuning the ArcGIS environment to meet the growing demand for imagery by GIS users, and simultaneously they have been working toward making ArcGIS users more "imagery aware." Imagery analysis workstation is ESRI's definition of the integration of imagery processing and analysis with GIS mapping. The term denotes a new architecture for manipulating remotely sensed imagery within the ArcGIS platform. ENVI EX is the first step in our partnership with ESRI to advance image analysis for GIS users. The second step will be ENVI EX v. 2.0, which will be released in late spring of 2010. This version of ENVI EX will be a suite of imagery geoprocessing tools that are native within the ArcGIS environment, specifically that Imagery Analysis Workstation. Then, by the fall of 2010, the tools and workflows in ENVI EX will be exposed within the ArcGIS server environment as well.

WHO DO YOU EXPECT TO BENEFIT MOST FROM THIS TECHNICAL INTEGRATION?

We expect many of our traditional customers to be interested in ENVI EX but, we see our primary customers to be GIS users who are incorporating imagery into their applications. ENVI EX goes beyond the two-dimensional view. It provides a contextually rich, multi-dimensional view of geography, and that's a powerful inducement for GIS users. To illustrate this, let's take a map served up on my wireless. It's a nice map, and I can read all the spatial coordinates, but more and more, people want to know not only "where am I," they are also asking, "what's going on" at the place I see on the map. ESRI anticipated this type of question years ago and created the "geodatabase"—a platform for storing multiple layers of contextual information about specific geographies. It's no longer enough to

know where something is. Depending on their work or research or some other interest, users may want to know about land cover, for instance, whether the plot is suitable for construction, whether there are any mineral deposits in the soil, what type of soil it is, and things of that nature. In short, people want to get much more from a map than they used to five, ten years ago. Extracting information from imagery can now add this important layer of information to the geodatabase.

GIVEN THE NEW DEMANDS, HOW HAS THE USE OF IMAGERY AND IMAGE PROCESSING CHANGED IN RELATION TO GIS?

I would say the increased use of image analysis is one of the most important and interesting changes we are witnessing. The other is incorporating time in the analysis and use of satellite imagery. Take, for instance, Landsat. We now have, publicly available for free, Landsat imagery series going back 20 years, which the user can access and obtain a time-based analysis of the changes taking place in the topography or vegetation of a remotely sensed landscape. Incorporating this information into a GIS will make the map more dynamic and more useful for making decisions. But it's not only about bringing time into GIS; it works the other way too. Feeding information from the geodatabase back into image analysis workflows will give analysts a better source of training data to use in subsequent analyses.

ARE WE AT THE POINT OF USING IMAGERY IN REAL TIME? IS GOOGLE EARTH REAL TIME?

No, it's not, but we are getting there. In the past 15 years we have made huge strides in eliminating such problems as the limitation of coverage, and wireless communications have become pervasive. The geospatial awareness of our society will drive demand for more accurate, timely information. Imagery post-processing and dissemination are the next bottlenecks, and that's where we're trying to have an impact with a new user interface between satellite imagery and GIS. Google Earth has raised the awareness of the location-based capabilities of image science, and we're now at the brink of exploiting those capabilities to improve other things we do.