

How a leading space agency is preparing their image archive for the future of analytics.

What is our country's estimated crop yield this year? How much food will we need to import? Will we have enough water for our nation's needs? How can we expect our cities to expand? What new utilities will our citizens need built?

These are the questions governments across the world grapple with; and there are no easy answers. But there is one thing these decisions have in common: satellite imagery. This data is a source of insight which helps governments and agencies make the right decisions.

However, there is a catch. It's often said in data science that 80% of your time and costs are spent preparing data for analysis. This means only 20% of your time is spent on the important part - the actual analysis of that data.

But what if you could automate the entire data preparation process, so that your satellite imagery is ready-to-go after it's been acquired? That's where Analysis Ready Data (ARD) comes in.



Getting the most out of satellite data

ARD is the result of converting satellite image pixels into highly-accurate interoperable scientific measurements. This allows for immediate analysis with minimal additional processing. Globally, governments and organisations are leveraging ARD to reduce the complexity involved with satellite data processing. This includes the South African National Space Agency's (SANSA) Earth Observation department.

"SANSA is a government agency, focused on unlocking the potential of space for the development and benefit of humanity," said Imraan Saloojee, Chief Sector and Business Developer at SANSA.

Andiswa Mlisa, Managing Director Earth Observations at SANSA, adds "One of the core aspects we need to deliver as part of the Earth Observation program is data and data access."

SANSA's Earth Observation department collects, processes, archives, and disseminates earth observation data (primarily from satellites) to support policy-making, decision-making, economic growth and sustainable development in South Africa.



“We have a huge archive of earth observation data,” Imraan explained. “We’ve been acquiring LANDSAT data since 1972, and SPOT data since the late 80s. This data is important; it’s used by our other government departments to make decisions around agricultural, water resource management, and human settlements.”

However, for the other government departments - leveraging this data was not always easy.

“Traditionally, it takes us a whole year to process the SPOT data into a SPOT mosaic. We copy the mosaic and underlying imagery onto two hard drives, and deliver these hard drives to the various departments or entities that want to use the data,” said Imraan. “But in today’s world this isn’t feasible anymore. We started investigating options to make data available to users as quickly as possible, so we can leverage new data – but also our archive of existing SPOT data.”

Streamlining satellite data processing workflows

In an industry first, PCI Geomatics and SANSA worked together to develop a fully automated ARD workflow for SANSA's SPOT satellite data processing. This was done through the CATALYST Enterprise product, a scalable production system for repeatable earth observation image processing workflows of any size.

“Creating ARD data is a complex process. It’s changing the way you traditionally process satellite data,” said Imraan. “This is because you’re taking multi-sensor data, bringing it all together, aligning it pixel by pixel, and normalising it, so that it makes sense to an end user.”

“To be able to do that you need new workflows. At the time, there were no existing ARD SPOT data workflows. What PCI did through CATALYST Enterprise, is they took our SPOT data and developed automated workflows to geometrically align, radiometrically normalise, and properly package the imagery to CARD4L ARD standards.”

SANSA's end goal is to eventually have this data in the Open Data Cube, an open source platform for satellite imagery. This will allow other government agencies in South Africa to access the data, under a multi-user Government licence that SANSA has with Airbus, and analyse it right away for their needs. No processing required.

“With this ARD workflow, users have access to atmospherically and geometrically corrected data - they don’t have to waste their time on processing,” said Andiswa. “It eases the burden on the users. They can simply go where the value lies – which is extracting information from the data.”

“This takes all the pain of data processing away from our end-users,” said Imraan. “They can focus on what matters to them.”

And once this workflow is fully operationalised, data will be available to Government end-users in a matter of weeks instead of annually. This is due to the automated workflows, but also because the system is deployed using cloud infrastructure.

“With the Open Data Cube and CATALYST Enterprise ARD processing, you have huge amounts of data on tap,” said Imraan.

“But you have the flexibility of using as much or as little of it as your application requires.”

Leading the industry with new workflows and standards

Another benefit for SANSA is that CATALYST Enterprise is processing their data to industry leading standards.

“The Committee on Earth Observation Satellites has put together standards [CARD4L] for ARD data. The CATALYST Enterprise software package has enabled us to produce data within these standards,” said Imraan. “PCI was able to apply industry-leading scientific rigour to the SPOT ARD data created.”

Analysis ready data accuracy assessment for a subset of 727 images from SANSA's SPOT Archive



This ensures that the data is interoperable across different platforms and systems, and will continue to be for decades to come.

“One of the greatest values in following a standard like this, is that we know our data is of the same quality,” adds Andiswa. “It buys credibility, but it also buys compatibility across platforms and systems.”

Overall, Imraan has felt this collaboration with PCI has showcased how governments and private organisations can work together to promote innovation.

“Before working together, there were no existing SPOT data processing workflows for ARD,” said Imraan. “This collaboration with PCI is a good example of how the capability sets within both private organisations

and government are complementary, and can help advance knowledge across industry.”

But it all really comes back to SANSA's mission statement. As our planet continues to rapidly change, fast and accurate analysis will become even more important.

“Our team has been trained by PCI on our new ARD workflows, and we're in the process of setting everything up,” said Imraan. “The goal will be to have all the SPOT data in one location where decision-makers can access the data, run their own scripts and algorithms right away, and use that information for whatever they need to be doing. It's about democratising access to satellite data for everyone, by lowering the barrier for entry.”

To learn more about CATALYST's Analysis Ready Data Solution visit <https://CATALYST.earth/technology/ard/>

About CATALYST

CATALYST is a PCI Geomatics brand, which has been introduced to put our leading edge technology into the hands of decision makers. CATALYST provides proven algorithms rooted in photogrammetry and remote sensing to offer engineers, environmental management, and other professionals accessible earth data measurements on a reliable basis derived with leading edge, scalable software solutions and platforms. We're a startup – with hundreds of algorithms, scalable solutions, and decades of experience.

To learn more visit www.CATALYST.earth