

# Mapping from the skies



Getty Images

Using imaging technology to provide landscape and terrestrial mapping has become more affordable than ever before, and Teledyne DALSA is playing its part in reducing costs via its multispectral imaging cameras and sensors.

## From terrain to urban mapping

Teledyne DALSA's JP Luevano, International Sales Manager, says that image-based mapping has multiple applications, from agriculture through to town planning.

'In the jungle, for example, where it might take months to explore for the best banana-growing locations on foot, using imaging can remove the guesswork from the process and tell farmers where to cut into the jungle for the best results,' he says. 'The same goes for rice paddies, which need good irrigation. Imaging can help identify water basins so that farmers know the best places to create artificial lakes to support an irrigation infrastructure.'

In urban scenarios, it used to be surveyors on the ground that had to take measurements in order to

ascertain the viability of a new road or new building. 'Today, it's much easier to look at satellite imagery,' continues Luevano, 'satellites can provide high resolution images down to a matter of centimetres. The degree of accuracy is so high that it can be used to inform the basis for construction decisions without the need for ground measurements.'

Over time, mapping imagery can also track the spread of arid or vegetation areas in certain parts of the world, for example, which can help inform major governmental investment decisions.

## The technology

The vast majority of image-based mapping is achieved by the following two methods: UAVs (unmanned aerial vehicles) and earth observation satellites. The choice of which to use comes down to a variety of factors, including price, resolution and the size of the area to be mapped.

Cameras and detectors used with UAVs tend to be relatively inexpensive, and applications tend to be very

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- ▶ local. For example, for wine growers, a UAV can be used to fly over vineyards to monitor moisture in the soil, and use that information to make irrigation decisions.

In satellite imagery, the focal plane array (i.e. the camera itself) is much more expensive, largely down to the environment in which that equipment will need to operate. 'In space, without the protection of the earth's atmosphere, the equipment is being irradiated all the time,' says Luevano. 'The equipment also has to withstand a huge amount of shock and vibration during the initial launch. Finally, the cameras and sensors have to cope with vast differences in temperature – sometimes the satellite will be pointed directly at the sun, and other times it will be completely hidden.'

A satellite-based imager might be on an orbit some 400 to 600km from the earth's surface, meaning that at any one time, it can image several hundred square kilometres at once. There are also geosynchronous satellites at 25,000km from the earth, which have to withstand even larger amounts of radiation.

'A satellite does have data restrictions though,' points out Luevano. 'There's no cable from the satellite to a PC on earth, so data has to be downloaded every time the satellite passes over the satellite station where the data is being collected. You then have to wait for the next rotation of the satellite before you can continue that data transfer.'

'On a UAV, you can have onboard storage via SD storage or hard drive, which can be removed at the end of each run and plugged into a PC, or you might have RF transmission for low resolution, low data rate applications.'

## The Teledyne DALSA solution

Teledyne DALSA has been operating in the field of multispectral imaging for space applications for more than 20 years. Moreover, what sets the company apart from its competitors is its ability to offer several multispectral devices in one package, using its TDI detectors.

'Each of these devices can be fitted with different filters according to customer needs,' says Luevano. 'The filters allow the devices to ignore clouds or vegetation, for example, and provide the customer with only what they need to see.'

While other vendors might need to provide several different sensors or cameras to achieve the same results, Teledyne DALSA's ability to combine multiple TDI devices in one package offers a huge cost saving. 'For a satellite application, where space and weight are major considerations, reducing the amount of kit that you need to send up saves a great deal of money and calibration time,' continues Luevano.

Teledyne DALSA's technology has been used by major space agencies and satellite suppliers around the world, including SSTL (and its recently launched DCM3 satellite), NASA, the Canadian Space Agency and the South African Space Agency.

With satellite imagery now more affordable than ever, whether that be sending up a nano-satellite for a specific purpose, or purchasing data from a satellite operator that is serving a customer's particular niche, Teledyne DALSA is well placed to provide the imaging technology to serve this ever-growing market. ●



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