AIR&SPACE EVIDENCE

Annual Newsletter 2017

L-R: Jon Carver, Peter Hjerp, Ray Purdy (centre), Ray Harris, David Tellett.

Air and Space Evidence – the World's First Space Detective Agency – was founded in late 2014 to provide an investigatory service to clients by using Earth observation imagery from satellites, drones and aircraft as evidence. The Company's origins lie in academic research undertaken at University College London, and we have an unrivalled blend of academic and military intelligence expertise in the legal, security and technical fields of Earth observation. We have received case enquiries from individuals, companies and governments in over thirty countries to date.

The company designs satellite monitoring programmes, and our key specialism is monitoring environmental crime. We are currently helping governments tackle the €90 billion problem of waste crime by launching a new satellite detection service called 'Waste from Space.' As part of this service we have created a semi-automated model which can identify unlawful waste landfill sites. This service will enable successful early regulatory interventions (whilst problems are manageable), allowing Governments to catch criminals in the act and to drastically reduce costs and environmental hazards.

Fast Company listed us as one of their top 15 "World Changing Ideas" of 2015

AS SEEN IN:

BBC NewScientist WIRED sky NEWS
theguardian SCIENTIFIC AMERICAN THE TIMES

Awards

EARSC PROJECT AWARD

Air and Space Evidence were this year's winners of the European Earth Observation Product of the Year award. This award, given by the European Association of Remote Sensing Companies (EARSC) was for our Waste from Space product, and was received at a ceremony in Brussels on 4 July 2017. Our product was selected because it supported the implementation of some of the key United Nations sustainable development goals (and the monitoring and reporting of these against the global indicator framework), in the most innovative way. Winning was a huge surprise and we were really very honoured to have been selected.

2017 Product Award Plaque

Receiving the EARSC Product award: Jon Carver, Air and Space Evidence and Rob Postma, Airbus and event sponsor.

Investigations of note

Over the last year we've worked on investigations in four main areas:

ENVIRONMENTAL CASES

We have worked on numerous environmental cases in 2016/2017. These include identifying illegal deforestation in Fiji, and examining changes to a shoreline of a lake following dredging, in the United Kingdom. We also undertook a number of cases in several EU countries looking at the history behind some very serious illegal waste sites.

PLANNING DISPUTES

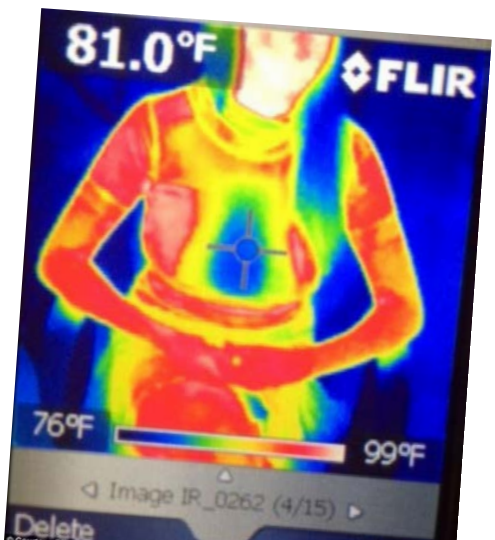
We worked on a number of planning disputes. These have included boundary dispute cases and enquiries about the dates when changes in size to a building actually occurred (i.e. changes to the footprint of a building over time). Many of these cases had successful outcomes (in one case, our client who was making the complaint dropped their action when they realised they were wrong, saving themselves a lot more legal costs). Some cases are still difficult to solve because of issues such as cloud cover, or shadows obscuring the view of the boundary line.

CRIMINAL INVESTIGATIONS

Our biggest number of enquiries related to criminal investigations. Many of these cases have highlighted that what remote sensing technology can offer is not always going to be compatible with investigatory needs. It can often be too imprecise to provide the specific legal data required (e.g. identifying people), or can be too inflexible or temporally unsuitable to react to specific events (e.g. an abduction). However, in a murder case in the U.S. we were able to show the potential for satellite technologies as an evidential tool in serious crime. In this case we could not find imagery of the murder location at the correct time, but we did find imagery of the suspect's house at the exact date and time of the murder, so his alibi (car on the driveway) could be checked. As newly launched satellite constellations improve the regularity with which images are taken, we expect the use of such evidence to become more common. Another interesting case concerned a large high-value vehicle, which had been stolen. When it turned up at auction the people selling it claimed they had only purchased it recently. Satellite imagery of their property was used to demonstrate that there was a very similar vehicle on their land between the time that the vehicle was stolen, and the time they claimed to have purchased the vehicle – and incidentally probably uncovered a large unlawful landfill close by.

CURIOUS CASE REQUESTS

The final category can probably be classified as the curious case requests. In one enquiry, a person wanted us to examine the whole of the Giza Plateau in Egypt because he wanted us to prove that there were "millions of enormous hidden proto Hebrew letters" written there. He dropped the need for our services because (he said) NASA, Homeland Security, and the CIA had subsequently taken on the case. A further enquiry related to the client wanting us to provide proof of aliens coming and going from a U.S. property. The most unusual was from a Canadian man wanting us to investigate with satellite technologies whether a woman was faking a pregnancy. He claimed to had got the inspiration for this idea from discovering an article in the media about a US woman named Jasmine Tridevil, who claimed to have a third breast, which was subsequently proved to be false by thermal imaging (pictured below). Essentially, he wanted us to 'point the satellite at the woman' and check if she was faking the pregnancy. We were tempted to invoice him with a note saying, "congratulations it's twins", but just about managed to resist.



AIR&SPACE EVIDENCE

Research Projects

Air and Space Evidence (ASE) have received funding for three projects in the last year – all focusing on the detection of waste crime:

1 Using Open Geospatial data for Detecting Unlawful Waste Dumping Sites'

(EUROPEAN OPEN DATA INCUBATOR, NOVEMBER 2016 – MAY 2017).

The ASE team developed a semi-automated detection model, using satellite and map data from open data sources to detect unlawful waste dumping sites. Three sets of trials were conducted in Northern Ireland, with the cooperation of the Northern Ireland Environment Agency, to determine the effectiveness of the detection model. The model had a 71% success rate in detecting illegal waste sites (that were previously unknown to us).

2 Smart Waste – Develop Innovative Remote Sensing Techniques, Pilot them and Produce Evaluation and Intelligence Reports

(SCOTTISH ENVIRONMENTAL PROTECTION AGENCY, EUROPEAN LIFE SMART FUNDING, DECEMBER 2016 – ONGOING (WITH CAMBRENSIS)).

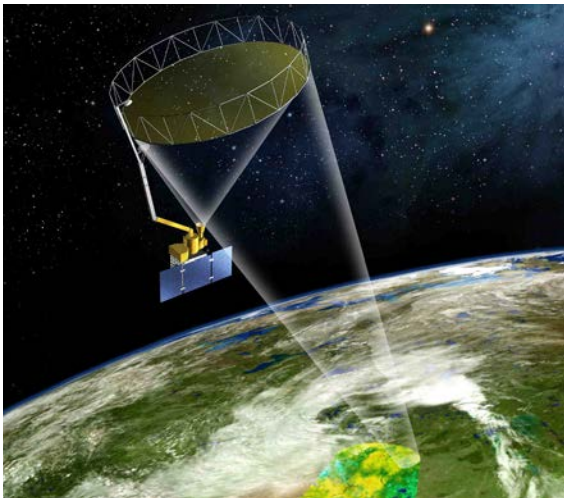
This project examined remote sensing technology developments and their potential to detect waste crime. The ASE team conducted an examination of the types of waste crime problems that were taking place, and undertook a detailed technical assessment of which ones might benefit from remote sensing evidence. This analysis was conducted with regulatory programmes in mind, including examining access to remote sensing data (archives and tasking), and the costs of remote sensing data. The ASE team are currently designing four trials which will test the usefulness of remote sensing data in practice for detecting waste crime at both licensed and unlicensed sites.

3 Space Based Support Service for Waste Management

(EUROPEAN SPACE AGENCY, JULY 2017 ONWARDS (WITH TELESPAZIO VEGA)).

ASE were part of a consortium that bid for ESA's open invitation to tender: "Space Based Support Services for Waste Management". ASE and Telespazio VEGA UK Ltd are the two primary contractors. The project will examine how a combination of space imaging, satellite tracking and monitoring technologies can be used to tackle and enhance two specific problems facing the waste management sector – the tracking of waste and the illegal dumping of waste.

"The project will examine how a combination of space imaging, satellite tracking and monitoring technologies can be used to tackle and enhance … the tracking of waste and the illegal dumping of waste"



Outreach

In 2017 Air and Space Evidence (ASE) gave a number of presentations on technological solutions to monitoring environmental crime:

HOUSES OF PARLIAMENT
PARLIAMENTARY OFFICE OF SCIENCE & TECHNOLOGY

Ray Purdy spoke at the **United Kingdom Houses of Parliament** in January this year, at an event organised by the Parliamentary Office of Science and Technology. This event was held for parliamentarians to discuss with academic, industry and government experts the impacts of environmental crime, the challenges involved in tackling it, and potential solutions to the issues involved. He talked about the potential for satellites to be used to provide evidence of environmental crimes being committed, and Air and Space Evidence's work on waste crime.

Telefonica

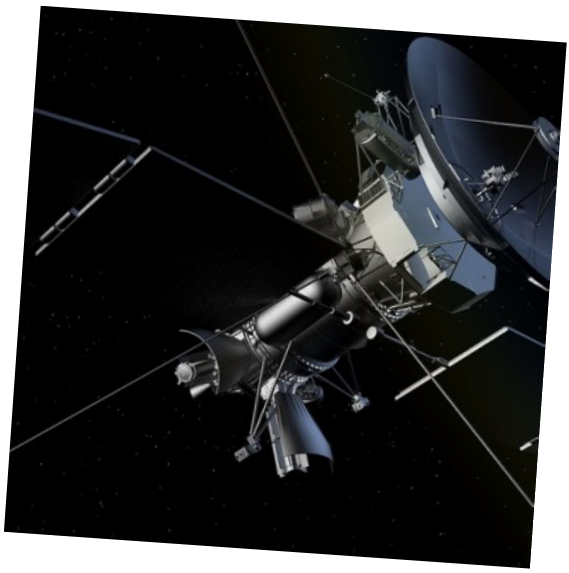
David Tellett, Jon Carver and Ray Purdy, presented the results of the ODINE project at a meeting organised by the ODINE team at the Telefonica campus in Madrid in May 2017.

IAP
International Association of Prosecutors

Ray Purdy spoke at the annual conference of the **International Association of Prosecutors** in Dublin in September 2016. He gave a presentation on satellite monitoring at the special interest group meeting on environmental crime. The conference attracted 544 prosecutors from 89 countries across the world.

#EUGreenWeek

Ray Harris spoke at **EU Green Week** in Brussels in June about the potential for remote sensing technologies to be used in an environmental enforcement and monitoring context. EU Green Week is an annual event where European environmental policy is debated and discussed. Organised by the European Commission's Directorate-General for Environment, it attracts policymakers, leading environmentalists, stakeholders and other interested parties from across Europe and the globe.



DOTCOM Waste
Development of tools to counter illegal management and trade of waste

Jon Carver and Ray Purdy presented a webinar entitled "Using Remote Sensing Technologies When Fighting Illegal Waste Crime", as part of the **DOTCOM waste** webinar series in May 2017 (their first webinar). It attracted 59 participants. The DOTCOM Waste initiative seeks to increase the capabilities of law enforcement agencies, customs and port authorities, environmental agencies and prosecutors to fight cross-border waste crime more cost-effectively. It is funded by the European Commission Directorate-General for Migration and Home Affairs.

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In the media

Air and Space Evidence (ASE) featured in a number of articles and programmes both in the UK and overseas:

BBC (U.K.) *The detectives watching you from space*
http://www.bbc.com/future/story/20160404-the-detectives-who-spy-from-space

The Outline (U.S.) *On Camera Forever*
https://theoutline.com/post/131/on-camera-forever

Wirtschafts Woche (Germany) *Das Geschäft mit dem Weltraum*
http://www.wiwo.de/technologie/forschung/weltall-weltraumdetektive-decken-verbrechen-auf/19305922-3.html

Newstalk Radio (Ireland) – *The Space Detectives*
http://www.newstalk.com/

EcoRéseau (France) *Nano – micro – et minisatellites: Embouteillage dans l'atmosphere*
http://www.ecoreseau.fr/tech/nouveaux-secteurs/2015/10/30/nano-micro-et-minisatellites-embouteillage-dans-atmosphere/

Guardian (U.K.) *Winners of the eighth ODINE call announced*
https://www.theguardian.com/odine-partner-zone/2016/nov/24/winners-of-eighth-odine-call-announced

The Guardian (U.K.) *The Open Data Entrepreneurs Helping Governments Catch Criminals*
https://www.theguardian.com/odine-partner-zone/2017/jun/13/the-open-data-entrepreneurs-helping-governments-catch-criminals

Scottish Daily Mail (Scotland) *Satellites to hunt for illegal landfills*
https://www.pressreader.com/uk/scottish-daily-mail/20170418/281749859227676

The Times (U.K.) *Satellites zoom in on flytippers*
https://www.thetimes.co.uk/article/satellites-zoom-in-on-flytippers-brz6fx8d9

Sky News (U.K.) Television interview (14 July 2017).
New satellite technology may mean fly tipping days are numbered
http://news.sky.com/story/new-satellite-technology-may-mean-fly-tipping-days-are-numbered-10949246

In June and July 2017, many waste and environmental magazines covered the launch of our new Waste from Space service. These included: Waste Management World, Inside Waste, Materials Waste Recycling, The ENDS Report, and Commercial Waste.

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