

Growth of commercial satellite imagery analysis raises ethical challenges

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The commercial availability of high-resolution satellite imagery raises ethical questions, with practitioners increasingly concerned about the lack of professional standards for open-source imagery analysts. Allison Puccioni and Neil Ashdown examine the evolving debate

Key Points

- The proliferation of commercial satellite imagery and advances in imagery resolution have outpaced efforts by governments and the open-source intelligence community to regulate industry tradecraft and ethics.
- Publishers face numerous ethical dilemmas surrounding the publication of satellite imagery analysis from reputable sources, while less reputable sources are prone to a lack of training, standards, peer review, or deliberate deception.
- Future solutions may include the creation of professional associations to standardise, review, and accredit imagery analysis outputs; wider recourse to conferences and workshops; or formal academic curricula and qualifications.

A session at the quadrennial International Atomic Energy Association Sanctions Symposium in November 2018 showcased the important role that high-resolution commercial satellite imagery analysis plays in monitoring nuclear proliferation. Open-source imagery analysis has enhanced public understanding of nuclear proliferation in territory where access has previously been denied. Moreover, briefings at the symposium highlighted the range of new applications for high-resolution imagery that are being developed by governmental organisations and academic institutes.

Nonetheless, in informal discussions on the sidelines of the symposium, many imagery intelligence (IMINT) practitioners lamented the challenges facing the discipline. These discussions centred on the recognition that – outside governments and militaries – imagery analysis is still at a nascent stage. Moreover, the participants noted that analysts working in open sources faced ethical questions around the publication of imagery analysis in the media that are not faced by analysts working in the classified space, and which therefore lack established bodies of practice that could be used to establish standards for open-source analysts.

Prompted by these concerns, non-profit organisations the Stanley Foundation and the One Earth Future Foundation held a follow-up summit, 'The Gray Spectrum: Ethical Decision-Making in Geospatial Analysis', in Boulder, Colorado, in July 2019. The event was attended by established open-source IMINT practitioners, many of whom also attended the symposium (see box). At this summit, stakeholders in commercial imagery analysis discussed hazards and potential ethical

dilemmas associated with the dissemination and publication of analysis of this still relatively new medium.

From secrecy to ubiquity

High-resolution imaging satellites were developed in the 1950s, but remained almost entirely inaccessible to the public until the 2000s. Imaging satellites were developed at extraordinary expense by the Soviet Union and the United States, which purposed them to collect technical information about each other's nuclear capabilities. These satellite systems and the imagery that they collected were restricted to the most highly classified intelligence and diplomatic channels.

The tradecraft of interpreting aerial and subsequently space-based reconnaissance imagery has evolved in similar secrecy. Imagery analysis as a practice was formalised along with the widespread systemisation of aerial photographic reconnaissance during the Second World War. Termed "photographic interpretation" in the US and the UK until the 1990s, analysis of remotely sensed images is taught to military and intelligence officials over the course of several months and is practised within a rigid structure of peer review.



Attendees view a Google Earth map of Sentinel Mesa in Monument Valley National Park, Utah, Arizona, as Google Earth unveils a revamped version of its application on 18 April 2017 at an event at New York's Whitney Museum of Art. Google Earth has democratised access to satellite imagery more than any other tool. (Timothy A Clary/AFP/Getty Images)

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Analysis is conducted generally under the auspices of a two-person integrity system in which imagery and geospatial intelligence can only be disseminated after a standardised process of quality control. Since the Second World War, most national militaries and intelligence agencies have collected, processed, analysed, and disseminated imagery analysis entirely through classified channels.

IMINT became a keystone of intelligence for the US military and intelligence communities, and demand continued after Cold War tensions waned in the 1990s. The US government began to solicit commercial solutions to its ever-increasing demand for imagery analysis, and – after decades of seeking to ensure that its satellite reconnaissance capabilities remained secret – facilitated the nascent commercial capability to launch and operate high-resolution satellites in the 1990s.

In 1999, the US company Space Imaging launched the first fully commercial high-resolution imaging satellite. In 2010, US and foreign companies operated five commercial high-resolution satellites. By 2019, there were nearly 50 satellites operated by commercial companies in China, France, Germany, Italy, South Korea, Spain, the UK, and the US, and this number is likely to rise to more than 200 in 2020–21.

Commercial satellite companies face legal restrictions including regulation of the resolution that their sensors can collect, limits on the areas of interest over which they can sell imagery, and some restrictions against image purchase from entities based in sanctioned nations. However, the increasing number of countries providing pay-for satellite imagery has diminished the ability of all governments to regulate these restrictions (see box).

Public awareness of this medium increased alongside the growing number of commercial satellite imagery providers, spurred on by the development of software such as Google Earth. By the late 2000s, the use of imagery was very common in media reporting, and a growing number of outlets provided imagery analysis on a range of military and national security topics. These included academic organisations and commercial entities, as well as non-profit groups and individual analysts.

Some of these open-source imagery analysts have less access to formalised training in imagery analysis, raising questions over the accuracy of some of their imagery analysis. Moreover, some analysts can anticipate fewer negative consequences from publishing incorrect information than others, compounding the challenge around a lack of formal training.

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