

Space Power

Legalities of Spying From Satellites and High Altitude Balloons

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Information derived from overt intelligence collection methods or covert spying operations is considered a key element of national power. Here, I aim to shed some general light across three aspects of intelligence collection in the air and space domain. I first identify the value of intelligence for States and discuss some methods of how intelligence information is collected. I then discuss the key aspects of international law applicable to air and space-based intelligence collection drawing upon recent incidents. Leading on to the consequences of breaching the international rules, I highlight examples of historical airspace incursions drawing upon recently declassified information on spy plane shoot downs during the Cold War. This article confirms that the legal limitations of intelligence collection from aircraft and possible catastrophic consequences of unlawful airspace incursions make space-based intelligence capabilities a more desirable prospect for those countries that can afford it. As such, it is curious, from a national security perspective, that the Australian Government chose not to invest in its own geospatial imaging satellites that could also be used for intelligence collection.

1. Introduction

In 2023, Australian Defence Force (ADF) Exercises TALISMAN SABRE and MALABAR were closely watched (from afar) by Chinese geostationary and low earth orbit satellites (Greene, 2023). The reporting of intelligence collection from Chinese satellites during the exercises echoed reports early that year of a high altitude balloon equipped with a 'large payload of electronics' that flew over the United States (US). The balloon that was ultimately spectacularly shot down by an AIM-9X Sidewinder missile fired from an F-22 Raptor (Garamone, 2023). For the record, it should be acknowledged that China maintains that the high altitude balloon was not spying, a claim that was later confirmed by the Pentagon (Reuters, 2023).

Nonetheless, the two incidents bring to the fore the lack of international intelligence regulation and the roundabout way that activities are caught by the law. In the absence of express rules for intelligence collection, whether an intelligence activity is permitted or not will depend on where the collection is occurring from, rather than the nature of the activity itself. As will be discussed, the rules are mainly focused on protecting territorial sovereignty of States, not protecting information. Aircraft, including high altitude balloons, present an issue in terms of violating territorial sovereignty of other States. Not so for satellites though. Accordingly, if a State has access to space-based intelligence collection capabilities, then they have a clear advantage in the intelligence game. This concept itself is not new. What is relatively new is the speed at which space-based capabilities are emerging in other States.

Australia does not have any sovereign space capability for intelligence collection – it is reliant on sharing of information by other 'Five Eyes' States under the multinational signals intelligence alliance (Australian Signals Directorate, 2022). Sharing is not the same as directing and controlling your own assets. While the Australian Government announced the development of a range of space capabilities in March 2022 that would have provided Australia with a sovereign earth observation capability, the decision to defund this program in May 2023 will likely be to the detriment of its overall intelligence capability as well as its sovereign space capabilities more broadly (Shepherd, 2023). Other countries are clearly ahead of the game.

While Australia does not have a space-based intelligence capability, other States do. I therefore aim to shed some general light across three aspects of intelligence collection in the air and space domain. First, I will identify the value countries place on intelligence. Second, I will discuss some intelligence collection methods using air and space platforms. Last, I will consider the legal dimension. Bringing these three elements together, I discuss how aerial or space-based intelligence products provide critical information to government decision makers on matters of national security. I also discuss how intelligence from aircraft and satellites are broadly comparable and that it is the international legal limitations imposed on aircraft and not on satellites, which provide an advantage for space-based intelligence capabilities.

2. The value of intelligence information

First things first – what is 'intelligence' and is it the same as 'spying'? Intelligence is the 'collection ... of avail-

able information concerning foreign nations, hostile or potentially hostile forces or elements, or areas of actual or potential operations' (US DOD, 2021, p. 107). Intelligence is collected overtly – through open-source data and human interviews, or covertly – using clandestine methods including signals intelligence and human intelligence (US Naval War College, 2023). Information about other countries gathered from air and space platforms is intelligence. If the information is gathered covertly, it can be described as spying or espionage (Gooch & Williams, 2015), whereas if it is gathered openly or overtly, it is described as intelligence collection. Nonetheless, both forms are considered intelligence.

Countries depend on information, or intelligence, as a form of national power to pursue their objectives and advance their own interests (Air and Space Power Centre, 2022, pp. 1–7). The national power model of 'DIME', used in military doctrines, describes Information as one of four principal instruments – the others being Diplomatic, Military and Economic (ASPC, 2022, pp. 1–7). But what exactly is intelligence used for? Richelson (2015, p. 9) explains that 'intelligence can be useful to national decision-makers in five distinct areas: policymaking, planning, managing conflict situations (ranging from negotiations to war), warning, and monitoring treaty compliance'.

First, national policymaking benefits from intelligence information by identifying the actual conditions upon which policy needs to effectively respond (Richelson, 2015). Second, intelligence also informs planning decisions which, for Defence considerations, might involve the development of new weapon systems (Richelson, 2015) or, on the other hand, save money by avoiding unnecessary research and development (Poisel, 2013, p. 1). Third, intelligence is fundamental to both conflict and non-conflict military operations. Such is its importance, the US Clinton administration 'designated "support to military operations" ... the first priority of US intelligence' (Richelson, 2015, p. 11). Fourth, are threat warnings, where information is gathered about imminent threats to military forces and national interests. Strategic warning of 'upcoming hostile or unfavourable military, terrorist, or other actions' via intelligence information provides advance notice to take action in response (Richelson, 2015). Last, intelligence is used to check whether other States are complying with international law obligations such as arms control agreements, and nuclear non-proliferation and testing requirements (Richelson, 2015). In this way, spying on other countries can actually be seen to 'enhance mutual understanding and confidence' with regard to international agreements (Lubin, 2020).

In short, intelligence aims to provide the means for nations to act in a timely manner to mitigate threats and to posture for security and national well-being. This is particularly pertinent now owing to significant geostrategic challenges and uncertainty. For Australia, this is acutely relevant for addressing the challenges in the Indo-Pacific region.

3. Intelligence collection from air and space

While intelligence is collected in all domains and utilising many methods, this discussion is focused on how it is collected from aircraft and satellites. Aircraft, including high altitude balloons, are differentiated from satellites by virtue of their flight resulting from their reaction with the atmosphere (*Convention on International Civil Aviation*, 1944, Annexes 2, 6, 7 and 10). Satellites on the other hand, 'follow an orbital path in space, influenced by the pull of gravity' (US Space Force, 2022, p. 7). This distinction is relevant when considering whether intelligence collection from these platforms breaches any international obligations, discussed below.

3.1. Collection sensors

Regardless of whether information is collected from aircraft or satellites, it will predominately be done through electromagnetic (EM) waves as information carriers or as active probes. When used as probes, such EM sensors 'sense' energy in either the radio frequency (RF), infrared or visible part of the EM spectrum (which can then be processed into images or other useful information). EM waves also act as information carriers where data is transmitted to/from aircraft or satellites, which can be intercepted by collection sensors. Intelligence from these platforms can also be gathered using cyber means, however cyber collection is considered a separate method and not addressed in this article.

The sensors used to collect information are either active or passive. Active sensors, such as radars, 'actively' transmit EM energy towards objects and then sense the reflected energy from them to determine distance, velocity, size and shape of objects (Skolnik, 2001). Synthetic Aperture Radars (SAR) and Inverse Synthetic Aperture Radars (ISAR) are types of radars used in aircraft and on satellites that provide imaging, similar to optical imaging (Skolnik, 2001). Passive sensors, on the other hand, do not transmit EM energy, but detect ambient EM energy emanating from the targets or reflected from other sources. Passive sensors are used for eavesdropping by detecting energy from RF waves that serve as information carriers for radio, mobile phone, or other data communications. The data or information carried by EM waves is referred to as signal internals. In contrast, the EM carrier information which includes 'strength, frequency and modulation of the signal' is referred to as signal externals (Weinbaum et al., 2017). In other cases, passive sensors detect EM energy in the optical frequencies, such as for geospatial imaging (US Naval War College, 2023) and space situational surveillance (USAF Space Command, 2017).

3.2. Intelligence categories

The collection of information derived from electronic signals is called Signals Intelligence (SIGINT) (US National Security Agency, n.d.-b). Subsets of SIGINT that may be collected from aircraft or satellites are: (1) Communications Intelligence (COMINT), relating to the interception of for-

eign communications; (2) Electronic Intelligence (ELINT), relating to the collection of foreign non-communications radiation that might come from other sensors; (3) Geospatial Intelligence (GEOINT), relating to information predominately from satellite imagery; and (4) Foreign Instrumentation Signals Intelligence (FISINT), relating to the technical information detected from foreign electromagnetic emissions from missiles, launch vehicles and other operational systems (US DOD, 2021).

3.3. Platforms

The first airborne electronic intelligence collector is in some sources credited to the German airship Graf Zeppelin, which in 1939 flew along the British coast ‘secretly gathering intelligence on whether Britain was using the electromagnetic spectrum (EMS) for communications, navigation and radar’ (Thales, 2020). Yet, aerial intelligence more broadly dates back much further. As an example, the use of balloons on the battlefield for the simple purpose of being able to see further than is possible on the ground dates back to 1794 during the French Revolutionary Wars (US National Park Service, 2021). Today, various military aircraft and satellites are used to collect both imaging and signal intelligence (Adamy, 2020, p. 4). Despite the use of satellites, aircraft and balloons continue to be used.

4. Legal considerations

Having explained why and how States collect intelligence from aircraft and satellites, I will now address the substantive issue on where and when it is permitted under international law. To begin, it is worth acknowledging that intelligence collection activities are not *directly* regulated under international law. On the other hand, the domestic laws of States are a different matter, and most States regulate the conduct of intelligence collection activities within their territory. For example, individuals found guilty of spying contrary to domestic laws of a State will be dealt with under their criminal law system. International law does not have equivalent rules restricting intelligence collection, though the absence of express international law prohibiting an act is not the same as saying that it is lawful. To assess whether spying is permitted under international law, we must consider whether the particular conduct of States when collecting intelligence violates any international obligation (Navarrete & Buchan, 2019).

4.1. Territorial sovereignty

International obligations of States relating to intelligence activities exist within a patchwork of principles and specialised international legal regimes (Navarrete & Buchan, 2019, p. 902). The principle of sovereign equality (Article 2(1) of the *Charter of the United Nations, 1945*) and the specific rules flowing from it that ascribe rights and obligations on States will determine whether such acts will be permitted. In this sense, sovereignty means independence, both territorially and politically (*Island of Palmas (Netherlands v United States)*, 1928), though in terms of aer-

ial intelligence, territorial sovereignty is the key aspect. Within the geographical bounds of its sovereign territory, international law provides States the right to exercise the functions of their State to the exclusion of others (*Island of Palmas (Netherlands v United States)*, 1928). This area generally extends from the land out to 12 nm seaward (per Articles 3 and 4 of the *United Nations Convention on the Law of the Sea*), (or along the land border with another country), and upwards to an altitude of around 100 km (Bartsch, 2018).

4.2. Restrictions on State aircraft

According to both customary law and Article 3 of the *International Convention on Civil Aviation*, State aircraft, defined as ‘aircraft use in military, customs and police services’, must obtain permission prior to entering sovereign airspace of a foreign State (*Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States)*, 1986, paras. 251–252). Clearly, military aircraft that are painted grey or camouflage fall into this category. But what about non-military aircraft or high altitude balloons that are used for intelligence collection? This very question was anticipated and addressed in a Bilateral Legal Memo by lawyers from the Australian Headquarters Joint Operations Command Legal and US Indo-Pacific Command Staff Judge Advocate (Flatt & Mullins, 2022), which was released before the 2023 high altitude balloon overflight of the US. The 2022 Memo confirmed publicly that high altitude balloons conducting intelligence collection on another country would be categorised as *State aircraft* and as such, must not enter that country’s sovereign airspace without permission. Covert intelligence collecting aircraft that are not clearly military or identified as State aircraft would similarly violate this international legal obligation if they entered sovereign airspace without permission. Whereas aircraft conducting intelligence collection activities from outside the sovereign territory of another State will not breach this rule.

4.3. Satellites

Satellites, which by virtue of being in orbit, operate *above* territorial airspace. This means that even though they may (and will often intend to) ‘fly’ over another State to collect intelligence, they will not be violating territorial sovereignty. Importantly, this only applies to satellites that are in orbit above 100 km. This principle does not apply to high altitude pseudo satellites, which are an emerging technology designed to operate below the upper limit of airspace (at around 50 km). Accordingly, high altitude pseudo satellites and any object operating below 100 km in altitude will be subject to requirements for entering sovereign territory according to international law. Further confirmation is found in Navarrete and Buchan’s research (2019), which agrees that ‘the use of satellites to conduct remote sensing is widely regarded as compliant with international law’. This is the case even though countries are unlikely to be compliant with earlier non-legally binding declarations such as the United Nations General Assembly

Resolution (1986) on *Principles Relating to Remote Sensing of the Earth from Outer Space* requiring States engaging in 'sensing' operations to provide their acquired data to the State being probed.

4.4. Overflight permissions to collect intelligence

Notwithstanding the international rules that operate to protect the sovereignty of States, countries have accepted the value in openly collecting intelligence on each other (for specific purposes) and so over the years have created several bilateral and multilateral agreements that essentially permit aerial intelligence collection in sovereign airspace. The most notable examples are the Anti-Ballistic Missile Treaty (ABM Treaty, 1972) and associated agreements, which arose from Strategic Arms Limitation Talks between the United States and the Soviet Union during the Cold War in 1969 (SALT I) and in 1972 (SALT II). These bilateral treaties provided 'an affirmative right to spy in the territorial airspace of members while setting strong limitations on their ability to interfere with that right' (Lubin, 2020). Introduced in these treaties was the concept of 'national technical means of verification' – a euphemism for the collection of electronic signals intelligence including telemetry intelligence (now called FISINT) and imagery intelligence by the use of photo-reconnaissance satellites (Bernard, 2016).

Some 30 years after these initial agreements, a multilateral version called the *Treaty on Open Skies* (1992) expanded permissions to conduct surveillance flights in other States' territories beyond just the Cold War agreements between the US and Soviet Union. This treaty was seen to provide an important mechanism for States to alleviate security concerns in relation to other States, particularly for those that did not possess satellite capabilities. Though for States with satellite capabilities, 'most analysts agreed' that surveillance from an aircraft 'would provide little information not already available from observation satellites' (Woolf 2021:2). The *Treaty on Open Skies* (1992) arguably lost much of its effect with the US and Russia's withdrawal in 2020 and 2021, respectively, leaving just 32 member States. Nonetheless, these agreements highlight the acceptance of aerial intelligence collection among countries at an international and public level.

4.5. Airspace violations and consequences

History has shown, however, that States will violate the territorial sovereignty of other States if it is in their interests to do so. In some cases, covertly, in other cases, less covertly. This raises the question: What are the legal and practical consequences of aircraft (i.e. spy planes, high altitude balloons, and high altitude pseudo satellites) violating a State's territorial sovereignty?

As with most things, it depends on the circumstances. For instance, where a violation of territorial sovereignty by foreign military aircraft is viewed as an armed attack, the victim State may use force against that aircraft in self-defence in accordance with customary law and Article 51 of the *Charter of the United Nations*. The threat of or use of

force against another State is otherwise prohibited unless one of very few exceptions apply (Article 2(4) of the *Charter of the United Nations*). One of those exceptions is self-defence (Article 51). In circumstances that fall below this threshold that permits force in self-defence, a State may legally take measures, not using force, that would otherwise be unlawful, to bring about the cessation of the sovereignty violation (International Law Commission, 2001, Article 49). Where damage is incurred from the violation of territorial sovereignty, a State can also seek compensation from the offending State (International Law Commission 2001, Articles 34–39).

Accordingly, there is a range of possible consequences that may arise out of a violation of territorial sovereignty by a foreign State aircraft. At the low end, a covert activity will likely result in no consequences when the violation has gone unnoticed. A mid-range consequence might be public comments by State officials calling out the violation of international law, or bringing the matter to the International Court of Justice (ICJ) for an order of compensation where damage has resulted. At the high end, consequences may include the shooting down of the offending aircraft, either itself a breach of international law, or by lawful means where it is viewed as an armed attack – resulting in the destruction of the aircraft and loss of life.

Examples of airspace violations with minor consequences are evident in the multiple unauthorised overflights of Nicaragua by US reconnaissance (spy) aircraft (Lockheed SR-71 *Blackbird*) during the 1980s (McCartney, 1984). These flights, the US stated, were for the purposes of safeguarding the security of the US and of other States threatened by the Nicaraguan Government at the time (*Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States)*, 1986, para. 88). Despite the rationale presented to the international community, following complaints by Nicaragua, the ICJ ruled that the US had breached Nicaragua's territorial sovereignty under customary international law and owed compensation to Nicaragua (*Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States)*, 1986, para 250). The effect of the ICJ's decision is however limited due to the US not accepting the jurisdiction of the ICJ as well as the Court not setting an amount for compensation. Nonetheless, the US has paid separate aid money to Nicaragua (Reuters, 2008).

On the other hand, there are also many examples of airspace violations that have resulted in catastrophic consequences, particularly for the pilots and aircraft involved. Instances include the shooting down of:

- a Russian jet in Turkey (Galeotti, 2015)
- a Turkish jet in Syria (Borger et al., 2012)
- US U-2 planes flown by Taiwanese pilots in China during the Cold War (Lendon & Chang, 2023; Republic of China Air Force, 2023).

Additionally, there have been 'more than 40 reconnaissance aircraft [that] were shot down' during the Cold War period from 1945 to 1977 as revealed in declassified US NSA documents (US NSA, n.d.-a). Most of these incidents were kept secret at the time, however, the shooting down of a

US U-2 aircraft piloted by Francis Gary Powers while flying through Soviet airspace in 1960 was, in stark contrast, very public and was later made into several films (Mann, 1976; Spielberg, 2015).

Whether the States conducting the shoot downs deemed the presence of the offending aircraft to be an 'armed attack', permitting force to be used as self-defence, is unclear. According to international law though, while a violation of sovereignty may *also* amount to a threat of or use of force, it does not mean that a violation of sovereignty will be considered a use of force.

5. Conclusion

In summary, States indeed place a high value on understanding what other countries are doing. This information, whether it is derived from overt intelligence collection methods or covert spying operations, is considered a key element of national power. The power of this particular element stems from its usefulness to inform national decision-makers about a range of issues from policymaking to early threat warning. Accordingly, countries engage in intelligence collection however they can, including by air and space as discussed here. The kind of information that can be gathered from air and space platforms is comparable and includes imagery, as detected from electro-optical sensors, SAR and ISAR; as well as communications and other signals information intercepted and detected by radio-frequency sensors.

In general, if the collection of intelligence is done from outside another State's sovereign territory, such as from a satellite in space, it will likely not breach any international obligations. On the other hand, if the collection of intelligence is done from aircraft, including high altitude bal-

loons, without authorisation, it would violate clear international legal obligations that States owe to each other. As was noted, there have been some international agreements where countries have authorised other States to perform aerial surveillance within their airspace. However, this article has also highlighted the many instances where foreign military aircraft were shot down after entering sovereign airspace without permission.

The take-away is that countries depend on information gathered from air and space intelligence collection platforms and in some cases have demonstrated a willingness to breach international legal obligations to do so. However, if collection activities are done from outside sovereign airspace, they do not likely violate any international legal obligations. Though lawful, such acts may still be viewed as unfriendly. Importantly, satellites have comparable sensors to aircraft but are immune from issues of airspace and sovereignty. This means satellites can essentially spy with impunity. As countries become more overt with observing military exercises as well as collecting other intelligence, it is worth noting that it is territorial sovereignty that is protected under the international legal system, and not the valuable information contained within it. From an international law point of view, satellites therefore provide a clear advantage for intelligence collection over aircraft because they operate above the legal boundary of States' territorial sovereignty. Moreover, Australia's decision not to pursue a sovereign earth observation capability means it will not benefit from such advantages, at least from its own capabilities any time soon.

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