



EYES IN THE SKIES

Matthew Borie explores the significance of the US shooting down a Chinese 'spy balloon'

High-altitude balloon (HABs) have many civilian uses outside of intelligence, surveillance and reconnaissance (ISR) missions, and are commonly used for scientific research and imagery collection, typically flying at altitudes of FL600-FL999. China has historically utilised HABs in legitimate civilian applications, as well as military ISR roles. US private sector use of HABs is frequent and typically well deconflicted with civil aviation activities. In addition, the US military does operate HABs for various ISR roles and has done so for decades. Recent events in the

US, China and Taiwan regarding HABs highlight the need for aviation entities and governments to evaluate the airspace operating environment to ensure deconfliction between legal flights and military air and air defence operations.

UNITED STATES

On 4 February, the FAA closed a large portion of the US airspace over and off the coast of South Carolina and a US Air Force (USAF) F-22A fighter aircraft was then launched to shoot down a Chinese HAB over the Atlantic Ocean via AIM-9X infrared-guided (IR-guided) air-to-air

missile (AAM) employment. China's Foreign Ministry has confirmed that the downed HAB was Chinese and stated that it was a "civilian airship used for research, mainly meteorological, purposes". In response to this incident, the US secretary of state postponed a planned visit to China set for 5-6 February.

Three additional shoot downs occurred from 10-12 February. On 12 February at c.18:28 UTC, a USAF F-16C fighter jet reportedly employed two AIM-9X IR-guided AAMs to shoot down a high-altitude airborne object over Lake Huron along the Canadian border. The high-altitude airborne object was reportedly flying at approximately FL200, posing a hazard to civilian air traffic. On 11 February at c.21:55 UTC, a USAF F-22A fighter jet employed an AIM-9X IR-guided AAM to shoot down a high-altitude airborne object at FL400 over northern Canada. On 10 February at 18:45 UTC, a USAF F-22A fighter jet employed an AIM-9X IR-guided AAM to shoot down a high-altitude airborne object over Alaska. The US Defense Department stated that: "the object was flying at an altitude of 40,000 feet and posed a reasonable threat to the safety of civilian flight".

On 16 February, the US president stated that there are no indications that the downed objects on 10-12 February were related to China and/or HAB activity.

CHINA

On 16 February, four flights diverted due to suspension of operations at Shijiazhuang Zhengding International Airport (ZBSJ/SJW) in China because of a suspected balloon sighting. No additional information has been released on the origin and/or operator of the suspected balloon. Previously, on 12 February, Chinese state media reported that a high-altitude airborne object had been detected off the coast of Shandong over the Yellow Sea and the authorities were preparing to down the object, though there are no indications it was subsequently downed nor who the operator of the object was.

On 13 February, the Chinese Foreign Ministry stated that: "since last year alone, American high-altitude balloons have illegally crossed China airspace more than 10 times without the approval of relevant Chinese authorities". The US National Security Council spokesman has refuted the Chinese claims in a follow-up statement to international media outlets.

TAIWAN

On 16 February, the Taiwanese armed forces reported finding the remnants of a crashed suspected Chinese weather balloon on the shooting range at a military base on Dongyin Island. Previously, an additional suspected Chinese HAB was detected by the Taiwanese armed forces as recently as 10 February, and officials in Taiwan have said dozens of such incidents have occurred in recent years. On 15 February, a Taiwanese armed forces official confirmed the previous incidents involving suspected Chinese HABs were related to weather research and did not pose a threat to national security; however, the official stated that any airborne target threatening the island of Taiwan could be downed by military air and air-defence units under the auspices of homeland defence.

HABs' value for ISR missions are likely minimal when compared with existing assets known to be operating at low-earth orbit (LEO), but offer a more persistent collection capability than LEO assets and greater capability than continuous geosynchronous orbit (GEO) assets. HABs

likely have a higher fidelity geospatial ISR capability than LEO assets due to physically being closer to targets, but a signals intelligence (SIGINT) collection mission is likely less capable than LEO assets, and could probably be similarly achieved by an asset on the ground operating from distance that would not raise suspicion.

There is no publicly available information to corroborate either the Chinese accusation of US HAB overflights of its territory or the US denials of the activity occurring. Of note, in September 2019, a Chinese Air Force J-10C fighter jet employed a PL-10 IR-guided AAM to shoot down a HAB, operated by an unspecified entity, over central China near Shuangchengzi. In addition, in July, international media outlets noted that the US was planning to use HAB technology for ISR purposes related to collection on China and Russia.

CHINA CLAIMED IT WAS A CIVILIAN AIRSHIP USED MAINLY FOR: "RESEARCH PURPOSES"

As previously mentioned, the US has used HABs in contemporary ISR applications (electro-optical/infrared cameras and advanced signals intelligence collection suites) in conflict zones for decades. In 2022, DOD budget documents revealed the US had spent a combined \$3.8-million on projects related to HABs in military and defence efforts in FY21 & FY22, with an expectation to increase that to \$27-million in FY23. With the substantial increase in budget, existing US HAB capability, increased tensions with China, strategically advantageous bases in the Asia-Pacific region and global reach of US Navy platforms, it is likely that the US is currently deploying HABs in ISR roles from those positions, or at least heavily researching a capability to do so.

Osprey has tracked publicly announced Chinese utilisation of HABs since 2018, and has identified at least 35 instances of their use. Since 2017, Chinese HABs have been identified in US airspace over Texas, Florida, Hawaii and Guam. During February, Japan indicated that a review of dozens of high-altitude airborne object incidents in recent years indicated that the majority were likely related to Chinese HAB activity. In mid February, Japanese lawmakers stated they were considering easing rules around the engagement of airborne targets threatening the national security of Japan by allowing military air and air-defence units to down such objects under the auspices of homeland defence. In 2020-2021, Japan identified Chinese HABs operating in Japanese airspace over Miyagi and Aomori prefectures. In addition to the above, during 2021-2022, Taiwan identified Chinese HABs operating in Taiwanese airspace above Taipei and Songshan Airport (RCSS/TSA).

In February, US defence officials stated that detection of HABs is difficult due to: "gating" on US radars. Early warning radars are a widely proliferated capability that provides a detection capability of hundreds of miles, even beyond radar horizon with an over-the-horizon radar against air-based or maritime threats. To filter out unwanted detections, parameters for detected signals are set, which is known as gating. Adjusting a radar's gating to detect HABs is possible, but would likely result in a lot of radar noise that would require manual

Images taken of the Chinese balloon shot down on 4 February this year by a US Air Force F-22A aircraft

filtering by a proficient operator. Chinese radars are likely running into the same issues detecting HABs that the US has faced. It is also likely that because the Chinese were also conducting intelligence collection with HABs, they did not want to publicly acknowledge US HAB collection efforts.

Osprey assesses that both the US and China will continue the use of HABs in ISR roles, and will likely bolster future HABs with more advanced intelligence collection technology, potentially rivaling conventional intelligence-gathering aircraft capabilities. It is also possible that both US and Chinese HAB activity is part of proof of concept for ISR operations or exercises for an intelligence-collection capability in the event of a conflict that results in a contested, degraded and operationally limited (CDO) air and space environment. While

THE CHINESE CLAIM US BALLOONS HAVE CROSSED ITS AIRSPACE MORE THAN 10 TIMES IN THE LAST YEAR

the high-visibility incident over the US and now the allegations made by China may have had an immediate negative impact on diplomatic relations between the two countries, and both the US and China may limit the use of HABs in the near term, it is unlikely that either of them will altogether halt the use of HABs over the North American and/or Asia-Pacific theatres in the long term. Additionally, the US and Chinese use of HABs for ISR operations and intelligence collection in other areas around the world is very likely to

continue, especially as part of CDO environment concept of operations planning.

China, Taiwan, Japan and the US all have all-altitude-capable air assets and air-defence systems deployed to defend their respective airspaces. While there are no indications that these countries intend to kinetically target legal civil aviation flights, Osprey assesses there is a nascent potential for miscalculation and/or misidentification. As a precaution, conduct operational risk-based identification of divert and alternate airports for flight schedules with planned stops at aerodromes in the US, Japan, Taiwan and China and/or with overflight of the airspace controlled by any countries. Operators are advised to ensure flight plans are correctly filed, attain proper special approvals for flight operations to sensitive locations and obtain relevant overflight permits prior to departure. In addition, ensure crews scheduled to operate to or over the US, Japan, Taiwan and China in the near term are fully aware of the latest security situation.

Operators should remain prepared for short-notice, temporary partial airspace closures in the weeks ahead as additional military interdiction of HABs could be announced with little advance warning. Increased military air operations have the potential to cause airspace congestion and impact the safety of civil aviation flights. Any significant increase in the amount of air operations over the US, Japan, Taiwan and China may impact the availability of airports along with access to the airspace. Any significant increase in the amount of air operations over the country may impact the availability of airports along with access to the airspace in these countries. Aviation operators should monitor airport/airspace-specific notices, bulletins, circulars, advisories, prohibitions and restrictions prior to departure to avoid flight schedule disruption ●

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