

Possible Missile Attack on Malaysia Airlines Flight 17

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July 28, 2014 (IN10115)

On July 17, 2014, Malaysia Airlines Flight 17 (MH17), a Boeing 777 bound from Amsterdam to Kuala Lumpur, crashed in eastern Ukraine.

MH17's position was shown on [live aircraft tracking](#) websites using the airliner's automated dependent surveillance broadcast (ADS-B) signal. Its final reported position was near the Russia-Ukraine border at an altitude of 33,000 feet.

Initial reports from the crash scene indicated that the resulting debris field covered a large area. This is characteristic when an aircraft breaks up at high altitude (as opposed to diving into the ground or incidents on landing or takeoff, where the debris field is tightly confined around the point of impact). Inflight breakup can occur for a number of reasons, including metal fatigue (as in the case of two DeHavilland Comet jetliners in the 1950s); onboard explosions, whether caused by bombs or accidental combustion (such as TWA flight 800 in 1996); or external events like a missile attack (as was the case with Korean Air Lines 007 in 1983 and Iran Air 655 in 1988).

Because spontaneous inflight breakup of an airliner is a rare event, the crash's proximity to an active conflict zone where military aircraft [had recently been shot down](#) led to speculation that MH17's breakup may have been the result of a surface-to-air missile. This was reinforced when, almost immediately, [pictures appeared in social media](#) purporting to show Russian-built Buk anti-aircraft missile launchers near the crash site.

Man-portable air defense systems like the U.S. [Stinger and Russian SA-18](#) are known to have proliferated around the world. However, such systems lack the range to engage an airliner at 33,000 feet. The [Buk](#) (Russian for "Beech") is a road-mobile missile erector-launcher that, depending on model, carries SA-11 (NATO reporting name "Gadfly") or SA-17 (NATO "Grizzly") surface-to-air missiles. It normally operates as part of a complex with a separate radar and command post. However, the Buk [can fire autonomously](#), and reportedly has an automatic mode that engages any aircraft in a designated zone. The Buk operator does not necessarily have positive confirmation of whether [a given target is military or civilian](#).

Subsequently, a Ukrainian separatist commander gave an interview in which he claimed [the rebels possessed Buk systems](#), although whether they were captured from Ukrainian government depots or supplied by an outside party was unclear.

On July 20, Secretary of State John Kerry announced that U.S. intelligence had [detected a missile launch](#) from the area where the Buds had been observed at the time MH17 was passing overhead. The United States subsequently republished the social-media [images of the Buk systems](#) alleged to be in eastern Ukraine, along with sensor data, communications intercepts, [and other evidence](#) that MH17 was brought down by a missile.

Further evidence supporting the theory of a shootdown appeared with the [publication of pictures](#) of the crash site, in which apparent [shrapnel](#) holes [can be seen](#) in [parts of the aircraft's skin](#), including in the area of the cockpit. Such holes—particularly those where deformation of the metal indicates an object entered the aircraft from outside—are not typical of the damage seen in cases of airframe structural failure.

MH17's "black boxes," the flight data recorder and cockpit voice recorder, were [turned over to Dutch aviation authorities](#) on July 23. Although there has been considerable focus on locating and securing these devices, the data recorders are most useful when the cause of an incident is unknown. They can reveal to investigators what the pilots said to each other, their control inputs, and details of the aircraft's movements. However, they do not include external data (such as images that could show the airspace around the airliner and any missiles or aircraft in it). The flight data recorder could show the buffeting effect of a nearby external explosion like that of a missile; whether the sound of such an

explosion would appear on the voice recorder or be distinguishable from other breakup sounds is so far not known.

Dutch authorities have [enlisted the assistance of British experts](#) in analyzing MH17's crash. Analysis of the aircraft wreckage, if it is reasonably undisturbed, should be able to establish the actual cause of the breakup, as was achieved in the crashes cited above. If a missile brought down MH17, the size and patterns of shrapnel holes and any possible explosive residues should help distinguish what type of weapon was involved.