

Lockheed Martin RQ-170 Sentinel

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The **RQ-170 Sentinel** (colloquially known as **The Beast of Kandahar**) is an unmanned aerial vehicle (UAV) developed by Lockheed Martin and operated by the United States Air Force (USAF) for the Central Intelligence Agency. While the USAF has released few details on the UAV's design or capabilities, defense analysts believe that it is a stealth aircraft fitted with reconnaissance equipment.

RQ-170s have been reported as having operated in Afghanistan as part of Operation Enduring Freedom. It has been confirmed that the UAVs have operated over Pakistan and Iran; operations over Pakistan included sorties which collected intelligence before and during the operation which led to the death of Osama bin Laden in May 2011.^[2]

In December 2011, Iranian armed forces captured an RQ-170 flying over their country. The U.S. military has acknowledged losing an RQ-170 in the region. The UAV shown on Iranian television appears to be the missing American drone. On 13 December 2011, United States news outlets reported that a formal request for Iran to return the UAV had been issued from the United States to Iran. Iran denied the request and demanded an apology.^{[3][4]}

RQ-170 Sentinel



Artist's rendering

Role	Unmanned aerial vehicle
Manufacturer	Lockheed Martin
Designer	Lockheed Martin
Introduction	2007
Status	In service
Primary user	United States Air Force
Number built	~20 ^[1]

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Development

The RQ-170 Sentinel was developed by Lockheed Martin's Skunk Works as a stealth Unmanned Aerial Vehicle (UAV). Journalists have noted design similarities between the RQ-170 and previous stealth and UAV programs such as the RQ-3 DarkStar and Polecat.^{[5][6]} It is a tailless flying wing aircraft with pods, presumably for sensors or SATCOMs, built into the upper surface of each wing. Few details of the UAV's characteristics have

been released, but estimates of its wingspan range from approximately 65 feet (20 m)^[7] to 90 feet (27 m).^[8] In a December 2012 report, journalist David Axe stated that "20 or so" RQ-170s had been built.^[1]

The "RQ" designation indicates that the RQ-170 Sentinel does not carry weapons.^[9] *Aviation Week's* David A. Fulghum believes that the UAV is probably a "tactical, operations-oriented platform and not a strategic intelligence-gathering design".^[7]

The USAF confirmed the "grainy photos of a gray, flying-wing-typed unmanned airplane near Kandahar Airfield."^[10] Since then, this aircraft has been known as "The Beast of Kandahar" in relation to the discussion of the RQ-170 Sentinel on 4 December 2009.^{[7][11]} A USAF colonel subsequently commented that RQ-170 is separate from the MQ-X program, which has yet to determine stealth or powerplant requirements, and thus the Sentinel will not replace the MQ-1 Predator and MQ-9 Reaper drones.^[12] As of May 2011, the U.S. military had not released any statements concerning the Sentinel since December 2009.^[13]

Design

The RQ-170 is a flying wing design containing a single (as yet classified) engine and is estimated by *Aviation Week* as being approximately 66 feet (20 m) in wingspan.^[14] Its takeoff weight is estimated as being greater than the RQ-3 DarkStar's, which was 8,500 pounds (3,900 kg). The design lacks several elements common to stealth engineering, namely notched landing gear doors and sharp leading edges. It has a curved wing planform, and the exhaust is not shielded by the wing.^[14] *Aviation Week* postulates that these elements suggest the designers have avoided 'highly sensitive technologies' due to the near certainty of eventual operational loss inherent with a single engine design and a desire to avoid the risk of compromising leading edge technology.^[14] The publication also suggests that the medium-grey color implies a mid-altitude ceiling, unlikely to exceed 50,000 feet (15,000 m) since a higher ceiling would normally be painted darker for best concealment.^[14] The postulated weight and ceiling parameters suggests the possible use of a General Electric TF34 engine, or a variant, in the airframe.^[14]

On the basis of the few publicly available photographs of the RQ-170, aviation expert Bill Sweetman has assessed that the UAV is equipped with an electro-optical/infrared sensor and possibly an Active Electronically Scanned Array (AESA) radar mounted in its belly fairing. He has also speculated that the two undercarriage fairings over the UAV's wings may house datalinks and that the belly fairing could be designed for modular payloads, allowing the UAV to be used for strike missions and/or electronic warfare.^[15] The *New York Times* has reported that the RQ-170 is "almost certainly" equipped with communications intercept equipment as well as highly sensitive sensors capable of detecting very small amounts of radioactive isotopes and chemicals which may indicate the existence of nuclear weapons facilities.^[16]

Following Iranian claims of downing an RQ-170 near the Afghan border in December 2011, Iranian TV showed video footage of what appears to be an advanced unmanned U.S. aircraft that most closely resembles the RQ-170 UAV. In the footage, a member of the Iranian revolutionary guard released dimensions of the aircraft, including a wingspan of about 26 metres (85 ft), a height of 1.84 metres (6.0 ft), and a length of 4.5 metres (15 ft).^[17]

Operational history

The 30th Reconnaissance Squadron operates RQ-170 Sentinels. This squadron, which is based at Tonopah Test

Range Airport in Nevada, was activated on 1 September 2005. RQ-170 Sentinels have been deployed to Afghanistan, where one was sighted at Kandahar International Airport in late 2007.^[7] This sighting, and the Sentinel's secret status at the time, led Bill Sweetman to dub it the "Beast of Kandahar".^[19] The UAV being deployed to Afghanistan, despite the Taliban having no radar, led to speculation that the aircraft was used to spy on Pakistan or Iran: "Phil Finnegan, a UAV analyst at the Teal Group, an aerospace consulting firm, suggests the stealth capabilities are being used to fly in nearby countries. Neighboring Iran has an air force and air defense system that would require stealth technology to penetrate."^{[20][21]}

In December 2009, South Korea's *JoongAng Daily* newspaper reported that the RQ-170 Sentinel had been test-flown in South Korea for the past few months and that it was expected that they would be permanently deployed in 2010 to replace Lockheed U-2 reconnaissance aircraft operating from Osan Air Base.^[22] In response to this report, Bill Sweetman argued that the Sentinel's deployments to Afghanistan and South Korea were probably undertaken to monitor Pakistan and North Korea's ballistic missile programs.^[23]

In August 2010, Aviation Week reported that RQ-170s either had been or were about to be redeployed to Afghanistan and that the UAVs had been fitted with a full motion video capability.^[24] The missions performed by these aircraft included flying dozens of high-altitude sorties over Pakistan to monitor a compound in the town of Abbottabad where Osama bin Laden was believed to be living. On the night of 1/2 May 2011, at least one RQ-170 monitored the area while elements of the United States Naval Special Warfare Development Group launched an assault on the compound which resulted in bin Laden's death. The aircraft provided footage of the attack which was watched live by President Barack Obama and his senior national security advisors. The RQ-170 also monitored Pakistani military radio transmissions in the area to provide warning of the response to the attack.^[25] On 27 May the *Los Angeles Times* reported that Pakistani officials were "alarmed" by the use of the RQ-170 over their country as the drones are "designed to evade radar and other surveillance systems, and can be used as a spy plane".^[26]

Capture by Iran

Main article: Iran–U.S. RQ-170 incident

Four months prior to December 2011, there were reports that RQ-170s had been flying missions over Iran during 2011.^{[16][27]} On 4 December, media reports stated that the Iranian Army's electronic warfare unit^[28] ^{[29][30][31]} had downed an RQ-170 that violated Iranian airspace along its eastern border through overriding its controls, and had captured the lightly damaged UAV.^[32] The United States Department of Defense released a statement acknowledging that it had lost control of a UAV during the previous week, claiming that it was "flying a mission over



External images

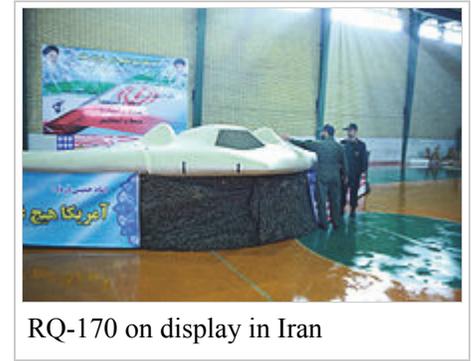
- An RQ-170 Sentinel operating over Afghanistan (<http://sitelife.aviationweek.com/ver1.0/Content/images/store/8/6/a82ab3ef-8d53-458d-86ad-01dff69de2b4.Large.jpg>)^[7]
- Left view of a taxiing Sentinel (<http://secretdefense.blogs.liberation.fr/.a/6a00e008d663eb8834012876199796970c-500wi>)^[18]
- Rear view of a Sentinel (<http://sitelife.aviationweek.com/ver1.0/Content/images/store/13/10/8d399cdb-4b48-4d53-aa62-33a6862bb118.Full.jpg>)^[8]
- Taxiing (<http://sitelife.aviationweek.com/ver1.0/Content/images/store/13/7/6d98f77a-df5f-4c6b-b7b2-2d4ada6051c5.Large.jpg>)



RQ-170 captured in Iran

western Afghanistan" when control was lost. The statement did not specify the model of the aircraft. The U.S. government also stated that it was still investigating the cause of the loss.^[33] On 6 December, U.S. officials acknowledged that a drone crashed in or near Iranian airspace and that it belonged to the CIA and not to ISAF as was earlier stated.^[34]

The Iranian government released footage of a captured RQ-170 on 8 December.^[35] The captured drone appeared to be largely intact, except for minor damage on its left wing. Dan Goure, an analyst at the Lexington Institute, stated the largely intact airframe ruled out the possibility of an engine or navigational malfunction: "Either this was a cyber/electronic warfare attack system that brought the system down or it was a glitch in the command-and-control system".^[36] On 8 December, a senior U.S. official, speaking on condition of anonymity, told the *Washington Post* that the U.S. cannot be certain the drone shown was real because the U.S. does not have access to it, but also stated that "We have no indication that it was brought down by hostile fire."^[33] A second senior U.S. military official said that a major question is how the drone could have remained "virtually intact," given the high altitude from which it is thought to have crashed. After examining the video on 8 Dec, US officials confirmed that the drone was genuine,^{[37][38]} even though some civilians had initially expressed doubt.^[37] Bill Sweetman, an author with an interest in military planes, speculated that the Iranians did not shoot down the plane (citing the lack of burn marks, holes, or outward damage) or hack into the system, postulating that a system failure downed the plane, and that the plane could be intact from what is known as a "flat spin" or "falling leaf departure".^[37]



RQ-170 on display in Iran

On 9 December, Iran lodged a formal complaint to the United Nations Security Council over the UAV entering its airspace. Iran's U.N. ambassador stated in the letter that "My government emphasizes that this blatant and unprovoked air violation by the United States government is tantamount to an act of hostility against the Islamic Republic of Iran in clear contravention of international law, in particular, the basic tenets of the United Nations Charter."^[39] The *New York Times* reported that the complaint "appeared to have been made more for its propaganda value than for any Iranian hope of Security Council action" and that it was "highly unlikely that the Council would punish the United States, one of the five permanent members with veto power".^[40]

On 13 December, American President Barack Obama stated in a press conference that his administration has delivered a formal request to Iran to return the captured RQ-170.^[41] On 18 December, Iranian defence minister Brigadier General Ahmad Vahidi asserted "the downed spy drone is now Iran's property, and our country will decide what steps to take about it."^[42]

In April 2012 General Amir Ali Hajizadeh, the commander of the Iranian Revolutionary Guards aerospace division, claimed that Iran had reversed-engineered the RQ-170, and was building a copy of the UAV. He also stated that data was being recovered from the captured RQ-170.^{[43][44]}

Operators

United States

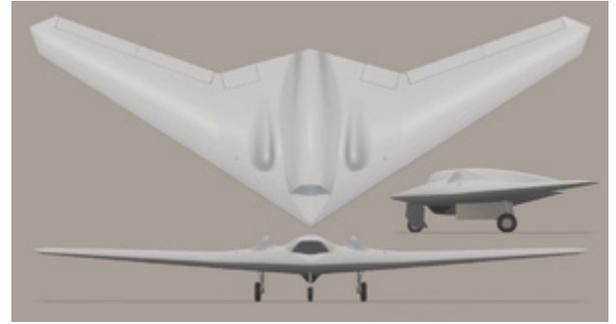
- **United States Air Force**
 - Air Combat Command
 - 432d Air Expeditionary Wing – Creech Air Force Base, Nevada
 - 30th Reconnaissance Squadron – Tonopah Test Range Airport, Nevada

Specifications (RQ-170)

Data from^[*citation needed*]

General characteristics

- **Crew:** 0
- **Length:** 4.5 m (14 ft 9 in)
- **Wingspan:** 12 m (39 ft 4 in) estimated
- **Height:** 2 m (6 ft) estimated
- **Powerplant:** 1 × Garrett TFE731 or General Electric TF34^[14] turbofan



Performance

- **Service ceiling:** 15,240 m (50,000 ft) (estimated)^[45]

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Notes

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External links

- RQ-170 Sentinel Fact Sheet (<http://www.af.mil/information/factsheets/factsheet.asp?id=16001>) from the U.S. Air Force
- "Black UAV Performs In Afghanistan" (<http://www.aviationweek.com/aw/generic/story.jsp?id=news/BEAST121409.xml&headline=Black%20UAV%20Performs%20In%20Afghanistan&channel=awst>) . *Aviation Week*. 11 December 2009. <http://www.aviationweek.com/aw/generic/story.jsp?id=news/BEAST121409.xml&headline=Black%20UAV%20Performs%20In%20Afghanistan&channel=awst>.
- RQ-170 Sentinel Pictures (<http://www.defencetalk.com/pictures/g5112-rq-170-sentinel.html>) from DefenceTalk.com

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