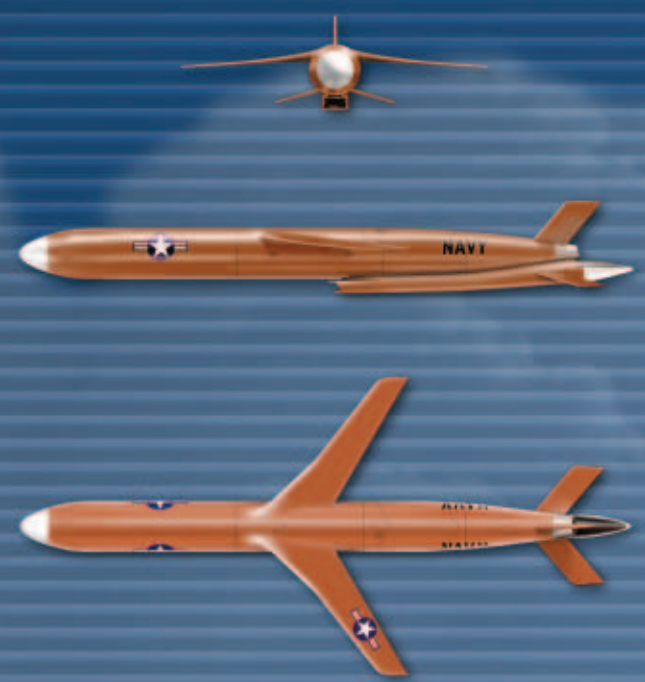


BQM-74F
The Next Generation – Offering New Dimensions in Target Performance and Capability



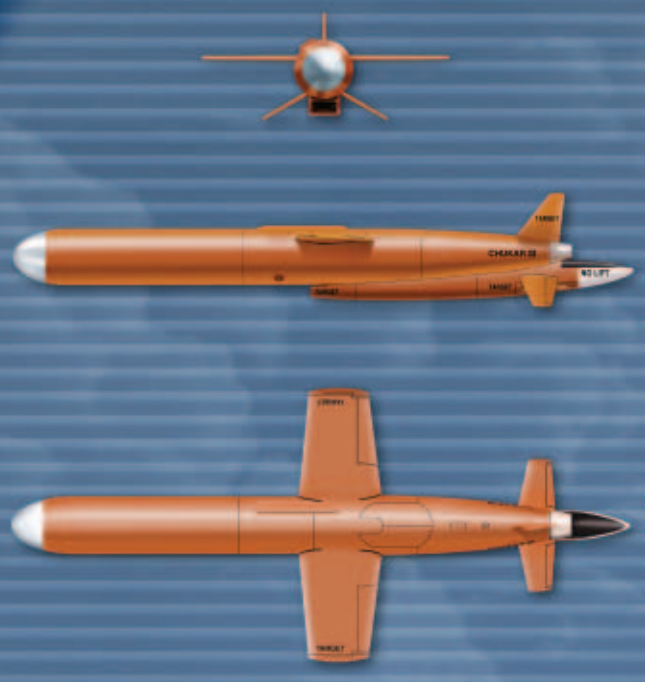
Specifications
Air Vehicle

Length 15 ft (4.5 m)
Wingspan 7 ft (2.1 m)
Range 500 nm (926 km)
Altitude
Low 7 ft (2.1 m)
High 40,000 ft (12.2 km)
Speed > 600 Knots at Sea Level
Weight 620 lbs (281 kg)
Endurance >115 Minutes
Navigation GPS/IMU
Fuel Jet Fuel
(JP-5, JP-8, or Jet A-1)

Payloads

- Passive or Active Radar Augmentation
- Seeker Simulators
- Infrared Augmentation
- Tow System
- Scoring Systems
- IFF
- Electronic Countermeasures

Chukar III
Fighter Aircraft and Cruise Missile Emulation for Weapon Systems Testing, Evaluation, and Training



Specifications
Air Vehicle

Length 12.95 ft (4.0 m)
Wingspan 5.78 ft (1.8 m)
Range > 350 nm (648.6 km)
Altitude
Low 15 ft (4.6 m)
High 40,000 ft (12.2 km)
Speed > 525 Knots at Sea Level
Weight 455 lbs (206.4 kg)
Endurance 78 Minutes
Navigation GPS Way Point
Fuel Jet Fuel
(JP-4, JP-5, or JP-8)

Payloads

- Passive or Active Radar Augmentation
- Seeker Simulators
- Infrared Augmentation
- Tow Systems
- Scoring Systems
- Decoy and Chaff Dispensers



Typical augmentation systems depicted on BQM-34 Firebee for illustrative purposes.

Weapons Systems Experience

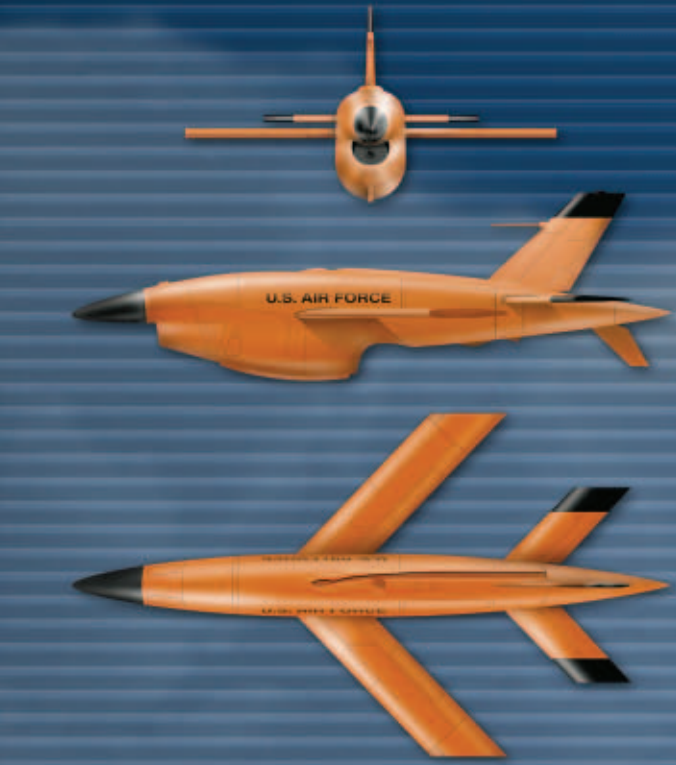


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Unmanned Systems
Targets
High Performance Aerial Target Systems
BQM-34 Firebee, BQM-74E, BQM-74F
and Chukar III



BQM-34 Firebee
The World's Most Capable and Reliable High Performance Aerial Target System



Specifications
Air Vehicle

Length 22.9 ft (6.9 m)
Wingspan 12.9 ft (3.9 m)
Height 6.7 ft (2.1 m)
Normal Gross Weight 2,150 lbs (975.3 kg)
Max Gross Weight 3,100 lbs (1,406.2 kg)
Speed (Max) Mach 0.97*
Service Ceiling 60,000 ft (18.3 km)*
Endurance Up to 115 Minutes*
Engine GE J-85-100
2850 lbs (1292.7 kg) Thrust

* Dependent on configuration and flight scenarios.

Payloads

- Wing Tip Infrared or 100-Pound ECM Pods
- Vector Scoring with Telemetry
- Chaff Dispensing (Internal or Underwing Capabilities)
- IFF and Locator Beacons
- Internal/External Radar Augmentation

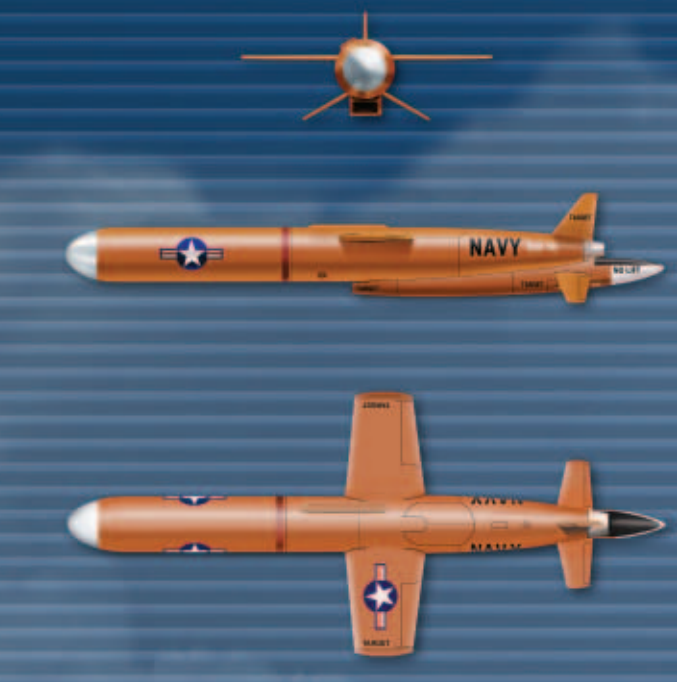
Special Operations

- Easily modified to support unique payload and mission requirements. Capable of autonomous waypoint navigation in both air and ground launch configurations.



Note: Air vehicle illustrations are not to scale.

BQM-74E
Delivering High Performance at Low-Cost and Supporting More Than 80% of the U.S. Navy's Target Missions



Specifications
Air Vehicle

Length 12.95 ft (4.0 m)
Wingspan 5.78 ft (1.8 m)
Range > 350 nm (648.6 km)
Altitude
Low 7 ft (2.1 m)
High 40,000 ft (12.2 km)
Speed > 515 Knots at Sea Level
Weight 455 lbs (206.4 kg)
Endurance 78 Minutes
Navigation GPS/IMU
Fuel Jet Fuel
(JP-5, JP-8, or Jet A-1)

Payloads

- Passive or Active Radar Augmentation
- Seeker Simulators
- Infrared Augmentation
- Tow System
- Scoring Systems
- IFF
- Electronic Countermeasures



BQM-34A Firebee • BQM-74E • BQM-74F • Chukar III
High Performance Aerial Target Systems

The Northrop Grumman Corporation's aerial targets legacy stretches back to 1935 when the first subscale target drone, a radio-controlled balsa-and-plywood air vehicle, was demonstrated in the United States for Army observers. This flight gave birth to the Radioplane Company, which



subsequently became the Ventura Division of Northrop Grumman.

Since then, Northrop Grumman has become the undisputed world leader in the design, development, production, modification, and support of high-performance subsonic, subscale aerial targets. Company products are continually evolving to keep pace with advances in the performance of modern aircraft and missile threats.



Bolstered by incorporation of the latest developments in supportability, navigation, and control, Northrop Grumman targets still provide both U.S. and international military customers the ultimate test for weapons systems and personnel.

BQM-34 Firebee
The World's Most Capable and Reliable High Performance Subsonic Aerial Target System

The primary mission of Firebee is to simulate tactical threats by enemy aircraft

demonstrated using Global Positioning System (GPS) waypoint navigation. With its high-thrust engine, advanced microprocessor flight control system, rugged airframe, and wide assortment of mission augmentation systems, the BQM-34 Firebee is the premier high performance subsonic aerial target system in use today. It can be readily modified to meet other special tactical unmanned aerial vehicle mission needs.

Such performance, combined with its ability to survive the hits and near misses of repeated missions and return to fly again, explains why the Firebee has been in constant use with the American military services for more than five decades. Today, the BQM-34 Firebee remains "The User's Choice," successfully meeting the most challenging test, evaluation and training mission requirements while continually demonstrating new tactical versatility.

BQM-74E
Delivering High Performance at Low Cost and Supporting More Than 80% of the U.S. Navy's Target Missions

The BQM-74E is a turbojet-powered aerial target with high performance capabilities.



and missiles for defense readiness training, air-to-air combat training, and the development and evaluation of weapons systems. It can fly as fast as Mach 0.97 and operate from altitudes as low as 10 feet above the surface of the sea to as high as 60,000 feet. It is capable of performing seven-g turns while maintaining high airspeeds for realistic threat presentations.

Maneuverability, reliability, and payload flexibility make Firebee the target of choice for DOD test and evaluation activity.

The robust airframe can be configured for a variety of mission options and has demonstrated the ability to support missions requiring extended endurance. Precision payload delivery has been



While emulation of enemy anti-ship cruise missiles for shipboard crew training is its primary mission, it is also used widely to simulate hostile aircraft for training naval aviators in air-to-air combat and to support the test and evaluation of new air-launched and ship-based weapon systems.

As the Navy's premier aerial target, the BQM-74E has been the linchpin in RDT&E and training operations since 1978.

The BQM-74E and its ground support system are highly portable. This attribute enables

shipboard operations in support of deployed naval combatants where maximum flexibility and rapid turnaround are required. The BQM-74E can carry a variety of internal and wing tip-mounted payloads in support of mission requirements. Payloads include passive and active radar augmentation, infrared (IR) flares, electronic countermeasures (ECM), seeker simulators, scoring units, identification friend or foe (IFF) systems,



and dual wing tip-mounted tow bodies. The Integrated Avionics Unit, with its integral Inertial Measurement Unit (IMU), Air Data Computer, and GPS, provides a highly accurate navigation solution. Recently incorporated Low Altitude Control Enhancement (LACE II) software allows the vehicle to perform complex, programmable, three-dimensional maneuvers and operate down to altitudes as low as seven feet. An upgraded IAU recently tested successfully and will significantly reduce unit cost while increasing performance and reliability.

The BQM-74E can be used with multiple command and control systems, including the Integrated Target Control System (ITCS),

Multiple Aircraft GPS Integrated Command Control (MAGIC2), Vega, and System for Naval Target Control (SNTC). It can be employed in either a manual mode or a pre-programmed (hands off) mode. Since 1968, the MQM/BQM-74 series of aerial targets has been the workhorse in the Navy's subsonic aerial target inventory. Due to its exceptional performance and mission reliability, the BQM-74E has provided over 80 percent of all U.S. Navy target presentations.

BQM-74F
The Next Generation – Offering New Dimensions in Target Performance and Capability

The BQM-74F is being developed by Northrop Grumman under a U.S. Navy System Development and Demonstration (SDD) contract. Building on the proven success of the BQM-74E, the BQM-74F improves on its predecessor's speed, range, maneuverability, and endurance while increasing target payload capability and modernizing the system's support equipment. In spite of these substantial improvements, the BQM-74F still retains all the utility of a portable, deployable system.



A new airframe with swept wings and tails coupled with an upgrade in the thrust of the BQM-74 engine from 240 to 300 pounds pushes the target's speed to 0.92M at sea level while increasing maneuverability to eight-g instantaneous (five-g sustained). Aggressive all-axis weave maneuvers down to seven feet above surface level enable the BQM-74F to perform challenging, threat-representative ingress maneuvers that take realism to a new dimension.

Waypoint navigation is a standard operating mode for the BQM-74F using the integrated IMU/GPS avionics system. Mission planning capability integrated into the PC-based support equipment provides detailed mission plans verified with imbedded six-degree-of-freedom simulation capability for pre-flight verification. Six linkable missions of up to 70 waypoints each can be pre-programmed and

selected either pre- or post-launch. Mission profiles may be changed and or reloaded via the command and control data link. The weave capability includes pre-programmed fixed circular and flat weave maneuvers and user programmable weaves. PC-based field test equipment provides real time simulation of programmable weaves prior to download into the air vehicle avionics, and any pre-loaded weave maneuvers may be selected after launch. These features make the BQM-74F the foremost cruise missile replicator available.

Work on this contract began in March 2002 and will be completed in 2005, with the first vehicle deliveries scheduled to phase in shortly thereafter. The first flight is currently scheduled for 2005.



The legend continues with increased speed, maneuverability, range and payload capacity.

The BQM-74F is the next generation in threat simulation.

Chukar III
Fighter Aircraft and Cruise Missile Emulation for Weapon Systems Testing, Evaluation and Training

The Chukar III is a turbojet-powered aerial target with high performance capabilities. Used by multiple customers for realistic aerial defense exercises, the target and its ground support system are highly portable. This enables the Chukar III to be operated from remote land sites or deployed for shipboard operations where maximum flexibility and rapid turnaround are required.

The primary mission of the Chukar III aerial target is to emulate enemy tactical cruise missiles or fighter/strike aircraft. It can be fitted with a variety of augmentation devices to enhance its use as a threat simulator for weapons training. Systems employed against the Chukar III include anti-aircraft guns, surface-to-air missiles, and air-to-air missiles employing active or semi-active radar homing, IR seekers, and visual guidance systems. Flying as low as fifteen feet and at speeds up to 525 knots, the Chukar III can execute six-g maneuvers, pop-up profiles, and high-g escape, either autonomously or under manual control.

The Chukar III target system includes all of the elements necessary to provide a total training solution. The command and control system enables simultaneous multiple target engagements using waypoint navigation with GPS accuracy. Target payloads include passive and active augmentation, infrared (IR) flares and plumers, chaff, scoring, IFF systems and dual deployable tow bodies. Tow body payloads include active augmentation, IR flares, and scoring.

Fielded in eleven countries around the world, the Chukar III is based on the U.S. Navy's BQM-74 which has been used for over 80% of the Navy's target missions since 1978. With a high degree of operational availability and demonstrated reliability, the Chukar III provides a cost effective system solution unrivaled by other products.



Chukar III provides the ultimate test of weapon systems and personnel performance, emulating a broad range of threats.



The Future

In addition to development of the BQM-74F, the Northrop Grumman Targets Team is implementing company-funded research initiatives to further improve product versatility and ease of support while keeping pace with known and anticipated advances in the threats being replicated. We continue to investigate alternative uses for our proven target air vehicles and closely examine customer needs in multiple areas to lay the groundwork for new products and services.

