Chapter 1

Background

Unmanned aerial vehicles are not new to warfare or to the Air Force. The Firebee, later designated the BQM-34, became the standard jet target for scores of uses by the Air Force, Navy, and Canadian forces.[1] Over 6,500 of the versatile jets have been built, which became the basis for the evolution of UAVs.

During the 1950s, the US relied on manned reconnaissance flights near and behind the Iron Curtain to gather valuable intelligence information about the Soviet Union. The BQM-34 was demonstrated using existing photo reconnaissance cameras. Later, a BQM-34 with larger wings designed to fly at high altitude, was developed as the first UAV designed specifically intended for the reconnaissance mission.[2] This vehicle, the Ryan 147 B (AQM-34Q), was used operationally for intelligence collection against Cuba, and later in Vietnam.

Several demonstration programs used the unmanned aircraft in flak suppression, chaff dispensing, target designation, and weapons delivery roles, but these missions were never performed operationally. There were tests of unmanned drone aircraft in air-to-air combat roles. The AQM-34 demonstrated dropping 500 lb bombs, dropping the Stubby-Homing Bomb (HOBO), and launching the electro-optically guided Maverick missile. Although these demonstrations were successful, termination of the Vietnam conflict ended the expanded roles of UAVs. The end of the conflict was also marked by a massive drawdown of US military forces, including the elimination of Air Force UAV organizations in 1976.

After the Vietnam drawdown, the Air Force appeared to lose all interest in UAVs, with little activity until the initiation of the Tier 2 (Predator), Tier 2+ (Global Hawk), and Tier 3- (DarkStar) reconnaissance-surveillance programs. Suddenly, interest increased with the promise of a new generation of vehicles boasting automated flight, long endurance, and "modest" cost relative to manned reconnaissance aircraft. Table 1-1 provides data on the Air Force current/developmental UAVs.

All has not been successful in the UAV world. Many air vehicle crashes have marred its history, reducing confidence and programs. Many aircraft crashed on take-off and landing, perhaps due to the remoting of the pilot from the aircraft without providing sufficient situation awareness information and "seat-of-the-pants" feeling to perform the piloting operation. Other unmanned aerial vehicles were successful in flight, but achieved disfavor for reasons of program cost growth or system performance limitations. Yet other UAV programs were driven to their death by requirements growth or simply poor timing. The Aquila program is a prime example of the former.[3] Further detail on the history of UAVs is provided in Volume II, Chapter 1, Appendix C.
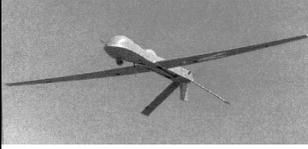
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[1] William Wagner: *Lightning Bugs*, Fallbrook, CA: Armed Forces Journal International, 1982.
[2] US Army Aviation Center: *Unmanned Aerial Vehicle Study*, Ft. Rucker AL, 1993.
[3] Brig Gen David R. Gust: *The Last Three Years of Aquila and How the Army Failed to Field New Technology.*

Table 1-1. *Air Force Unmanned Aerial Vehicles*

Air Vehicle Data		Payload	Status
Tier 2 Predator ($3.2M)	Gross Wt (lb) - 2,000 Altitude (ft) - 25,000 Endurance (hr) - 50+ Payload (lb) - 450 Wingspan (ft) - 49 Airspeed (kts) - 80	SAR - 3 m, 0.3 m EO/IR - NIIRS 6.5 Ku, UHF SATCOM CDL, UHF LOS Comm	Operational
Tier 2+ Global Hawk ($10M)	Gross Wt (lb) - 24,000 Altitude (ft) - 65,000 Endurance (hr) - 42 Payload (lb) - 2,000 Wingspan (ft) - 116 Airspeed (kts) - 300	SAR - 3 m, 0.3 m to 200 km EO/IR - NIIRS 6.5/5/5 Ku, UHF SATCOM CDL, UHF LOS Comm	In Build
Tier 3- DarkStar ($10M)	Gross Wt (lb) - 8,600 Altitude (ft) - 45,000 Endurance (hr) - >8 Payload (lb) - 1,000 Wingspan (ft) - 69 Airspeed (kts) - 350	SAR - 3 m, 0.3 m EO/IR - NIIRS 5 Ku, UHF SATCOM CDL, UHF LOS Comm	In Test (#1 Crashed)