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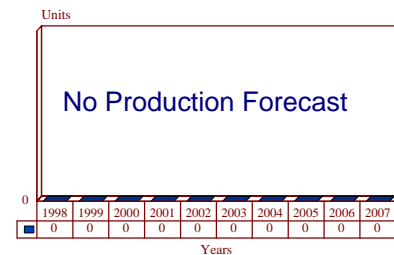
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E-Systems/Grob Egrett - Archived 8/99

Outlook

- Program completed, although Grob reports some interest from civil, military prospects
- Several completed aircraft carrying out climate research and related tasks

10 Year Unit Production Forecast
1998-2007



Orientation

Description. Single-seat, very high-altitude, single-turboprop-powered reconnaissance/special-purpose aircraft.

Sponsor. The Egrett was sponsored by the German Ministry of Defense, German Air Force, and by E-Systems and Burkhart Grob.

Contractors. E-Systems Inc, Greenville, TX, USA, and Burkhart Grob Luft-und Raumfahrt GmbH & Co KG, Mindelheim, Germany.

Status. German Air Force program canceled; two-seat variant received German certification in December 1993 and launch customer being sought.

Total Produced. Five single-seat Egrett aircraft produced, plus one two-seat G 520T variant.

Application. High-altitude environmental research, earth resources survey, environmental monitoring and mapping, search and rescue, drug interdiction, border surveillance, commercial and military radio communications including microwave and conventional signals relay, signal intelligence and electronic intelligence gathering, tactical and strategic reconnaissance using infrared sensors, photographic equipment and radar, and disarmament verification. Other missions for the Germany's Lapas-1 were to include crisis management/reconnaissance for national, Western European Union, NATO, and various other peacekeeping missions as required by international agreement.

Price Range. Estimated unit flyaway for German Air Force version is \$25 million, with program unit price of approximately \$100 million.

Technical Data

Design Features. Cantilever mid-wing monoplane of composite materials with carbon, fiberglass and Kevlar the primary non-metallic materials. Very high-aspect ratio wing is a three-spar design with split flaps on outboard trailing-edges. D-500 has 5 meter extended

span. Fuselage of the Egrett-1 is unpressurized with a deep section to house a variety of sensor packages. D-500 fuselage is a modified stepped rear fuselage and is pressurized. Very tall single vertical stabilizer incorporates a large rudder with trim tab (D-500).

Egrett-1 main landing gear is fixed, while that of the D-500 is retractable for improved signal transmission and reception. Nose gear in both aircraft IS retractable. Single pilot cockpit is air conditioned and heated; pressurized in D-500, and includes a large faired area

aft of the pilot seat for mission equipment or a second officer. Basic avionics include dual VHF radios, ADF, magnetic compass and vertical gyroscopes, dual VOR/ILS receivers. Optional equipment includes TACAN, UHF communication systems.

	<u>Metric</u>	<u>US</u>
Dimensions (Egrett D-500)		
Wing span	33 m	108.27 ft
Overall length	12 m	39.37 ft
Overall height	6 m	19.7 ft
Weight (D-500)		
MTOW	4,200 kg	9,259 lb
Payload (est)	907 kg	2,000 lb
Fuel load	887 kg	1,956 lb
Capacities		
Cockpit volume	2.83 cu m	100 cu ft
Fuel	1,105 liters	292 gal

Accommodation

Single seat with provision for second seat in aft, faired portion of the pressurized cockpit.

Performance (D-500)

Maximum level speed (est)	360 km/h	195 kt
Normal high-altitude cruise speed	300 km/h	162 kt
Maximum SL climb rate (est)	533 m/min	1,750 ft/min
Maximum altitude	17,679 m	58,000 ft
Maximum payload TO roll	670 m	2,200 ft
Endurance	6-9 h	6-9 h
Range, full payload (est)	3,164 km	1,710 nm

Propulsion

Egrett-1/D-500 (1) Allied-Signal (Garrett) Propulsion Engines TPE 331-14F single-shaft, centrifugal flow, turboprop engine thermodynamically rated approximately 1,119 kW (1,500 shp) and flat-rated to 596.5 kW (800 shp); driving a Hartzell 9+ foot constant-speed, full-feathering and reversible, composite, four-bladed propeller with electric de-icing.

Variants/Upgrades

Egrett-1. Proof-of-concept air vehicle that first flew on June 24, 1987, this nearly all-composite aircraft has a wing span of just under 92 feet. It has set various world records for its class including maximum altitude, sustained level flight altitude, and time to climb to 15,000 meters. Aircraft conducted operations for NASA and the German Stratolab program between 1987 and 1989.

D-500 Egrett-2. Modified Egrett-1 with longer span wing to accommodate additional communications antennas, stepped underside of rear fuselage, pressurized cockpit, and retractable main landing gear. Forms the basis for German Lapas-1 program. Lapas-1

aircraft was to be fitted with E-Systems passive sensors and radar. First flight in April 1989; second aircraft, an integration prototype, flew in September 1990.

PRISMA. Also known as Lapas-1, PRISMA is the project name for dedicated radar-equipped D-500. The acronym is an abbreviation for Primary Imaging Sensors for Multiple Applications and implies ongoing and future testing and deployment with an imaging radar, synthetic aperture radar, moving target indicator, electro-optics, and real-time air-ground datalink. The United States and NATO previously identified a requirement for as many as 20 aircraft with PRISMA-type performance to verify arms control agreements.

G 520T. Two-seat version of Egrett, received German certification in December 1993 and its FAA ticket one year later. Intended to serve as trainer in addition to performing Lapas mission. Awaiting launch customer.

Strato 2. Designation of a twin-engined, four-place derivative in preliminary studies by Grob. This aircraft

would cruise at more than 59,000 feet and would be powered by twin turbosupercharged Teledyne Continental GT-550 piston engines serving as the basis for a compound propulsion system in pusher configuration. First flight took place in spring of 1995. Aircraft developed under contract from German Ministry of Technology's DLR research establishment.

Program Review

Background. E-Systems, Grob and Garrett launched the Egrett in the late 1980s on the strength of a secret German development contract that has progressively grown in scope and importance. GM-Hughes was added to the team in 1989 and brought its radar technology to the table in the hopes of securing a major German Air Force contract for 15 aircraft. These would perform arms verification duties.

The military wasn't the only target market for the Egrett, which flew in proof-of-concept form for the first time in 1987. Growing worldwide environmental activism was providing a unique opportunity for a high-altitude, long-endurance aircraft that could perform low-cost research and pollution monitoring. On top of this green mission is commercial data communications for disaster relief and supplementation of existing space-based SATCOMs.

When the Egrett was revealed for the first time by E-Systems, the source of funding was unknown. Money was first funneled to E-Systems through the DLR, Germany's advanced technology research and development agency. Later on, funding was provided by the German Ministry of Defense as the Egrett progressed through the proof-of-concept phase.

In 1988, the Egrett-1 set three class records for maximum altitude, sustained altitude and climb rate. A second aircraft began flight test in 1989, this being the improved Egrett-2 D-500 with greater wing span, modified fuselage and landing gear, cockpit pressurization and greater take-off weight and payload.

The program is currently dormant, although Grob has periodically reported strong interest from overseas sales prospects.

Funding

Prior to German cancellation of the Lapas-1 program in February 1993, approximately \$1 billion was set aside for the development and production programs, the latter including nine air vehicles and sensor packages. An estimated \$510 million had been spent on the Lapas-1 at time of cancellation. Earlier, the Luftwaffe planned to expend \$532 million in 1989 dollars for 15 D-500 reconnaissance aircraft fitted with Hughes SAR/MTI radar with datalink.

Recent Contracts

None noted.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Jun	1987	First flight of Egrett-1
Sep	1988	Three class records established by Egrett-1
Apr	1989	First flight of D-500
Late	1989	GM Hughes, Deutsche Aerospace MBB, Elekluft, and Telefunken joint program
May	1990	E-Systems contracted for development of airborne imaging equipment
Mar	1991	German basic type certificate granted
Apr	1991	Grob contracted to design and develop a two-seat trainer
Dec	1992	Germany MoD approves Lapas-1/Egrett program
Feb	1993	Germany cancels Lapas-1

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Apr	1993	First flight of G 520T
Dec	1993	German certification of G 520T
	1994	First flight of G 520T
	1997	Grob seeking launch customer(s)

Worldwide Distribution

Germany	4
US	1

Forecast Rationale

Although Grob reports periodic interest in the G 520 and its derivatives, and the German company has found customers for several of the completed units, there will be no production restart. Several of the G 520s are

being used in climate, geophysical and atmospheric research work around the world.

We will continue to track this program, but at this time we are not forecasting a restart of the Egrett line.

Ten-Year Outlook

No production forecast.

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