DRS TECHNOLOGIES

Neptune II

Unmanned Aircraft System

Offered by:

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Unmanned Systems
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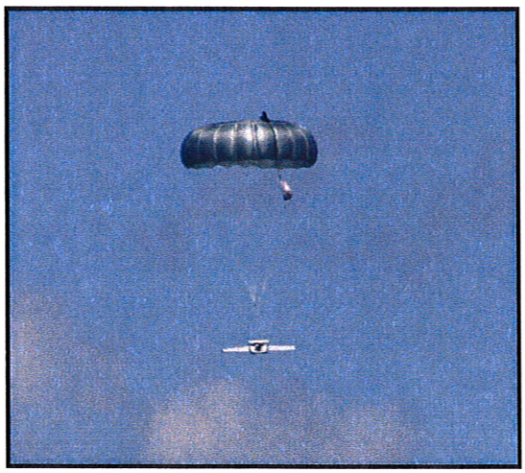
Neptune II UAS

1.0 OVERVIEW

DRS is proud to present the Neptune II Unmanned Aircraft System (UAS). The Neptune is specifically designed to address tactical operations over land or water, providing the capability of a Tactical UAS in a very small UAS footprint. The Neptune is able to fly fully autonomously (without the need for a highly skilled operator), but has the flexibility to easily change / modify the mission plan during flight. The Neptune Air Vehicle (AV) is launched from a six foot pneumatic launcher, giving the system an effective zero-length launch capability, allowing it to operate from utility land vehicles or small surface vessels and recovered by parachute onto unobstructed land or into water.



2.0 NEPTUNE II UNMANNED AIRCRAFT SYSTEM

The Neptune II UAS is nominally defined as three Neptune Air Vehicles, two mission payloads, two Ground Control Stations, one Launcher Container, and Ancillary Equipment.

Basic NEPTUNE II System Contents	
Description	**Qty**
Neptune Air Vehicle	**3 ea**
Neptune EO/IR Sensor (GS 207)	**2 ea**
Neptune Container / Launcher	**1 ea**
Neptune Ground Control Station	**2 ea**
Neptune Field Kit	**1 ea**

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Remote Video Terminal (Optional)	

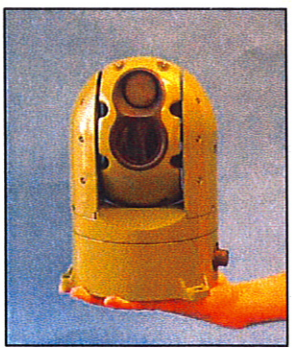
1.1 The Neptune Air Vehicle

The Neptune AV is built from carbon fiber composite material and is 5.9 feet (1.8m) long with a 7 foot (2.15m) wingspan. The AV disassembles into three major components: the fuselage and two wings. These three sections are designed to fit inside the Launcher/Transport Case for ease of mobility, with the fuselage stowed on the launch rails of the case, and the two wings stowed in sleeves in the lid to the container. Thus, the entire AV fits inside the six foot long, thirty inch wide, twenty inch high Launcher Transporter Case.

The Neptune AV uses a 15 HP, 150cc two cylinder, two stroke engine. This engine drives an alternator that provides 28 VDC to the aircraft power system to operate the avionics, payload, and servos.

2.2 Payload

The Neptune standard payload is the DRS GS-207 stabilized EO/IR camera turret. This system provides a low light camera capable of 25 times zoom, as well as an uncooled IR focal plane array. To enhance mission flexibility, the payload bay is designed to be modular to accommodate any payload with the proper interface control on a "plug-and-play" basis. The form factor for this payload is a seven inch (17.9 cm) diameter, ten and half inch long (26.9 cm) cylinder weighing fifteen pounds (6.8 kg).



2.3 Ground Control Station (GCS)

The Neptune GCS Computer is a DRS Appliqué 330 Rugged Notebook Computer. The GCS software is a Windows™ based program, which

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allows intuitive operation to most users. The system can be operated in a purely autonomous mode, with the AV flying GPS waypoints, or in a semi-autonomous mode where the operator is controlling the AV parameters of altitude, airspeed, and heading through the GCS computer's key board.

The GCS incorporates FalconView™ mission planning software package. The user has the ability to control the AV mode III/C transponder and lighting, either directly or by waypoint. The AV lighting can further be controlled to operate in either visible or infrared strobe modes. The GCS automatically creates a log file of the mission and records all downlinked flight data; the GCS computer has the ability to output streaming video of the mission for recording on a standard video cassette recorder or digital video recorder. The GCS can export any down linked data video in standard formats through use of standard land lines.

The Neptune incorporates the Enerlinks II data link. This data link operates in the L- and S-Bands. The AV can downlink location, flight parameters, operating status, AV health, imagery, and payload data to the GCS in real time.

2.4 Launcher/Container

The Neptune AV is launched using a pneumatic launching system integral to the six foot long Launcher / Container. This launch system provides effectively a zero launch capability. The detachable wings for the Neptune AV are stored in two sleeves in the lid to the Launcher / Container, providing a complete AV and launcher in a two person portable stowed package that is 6 feet (1.85m) long, 30 inches (0.77m) wide, and 20 inches (0.51m) high.

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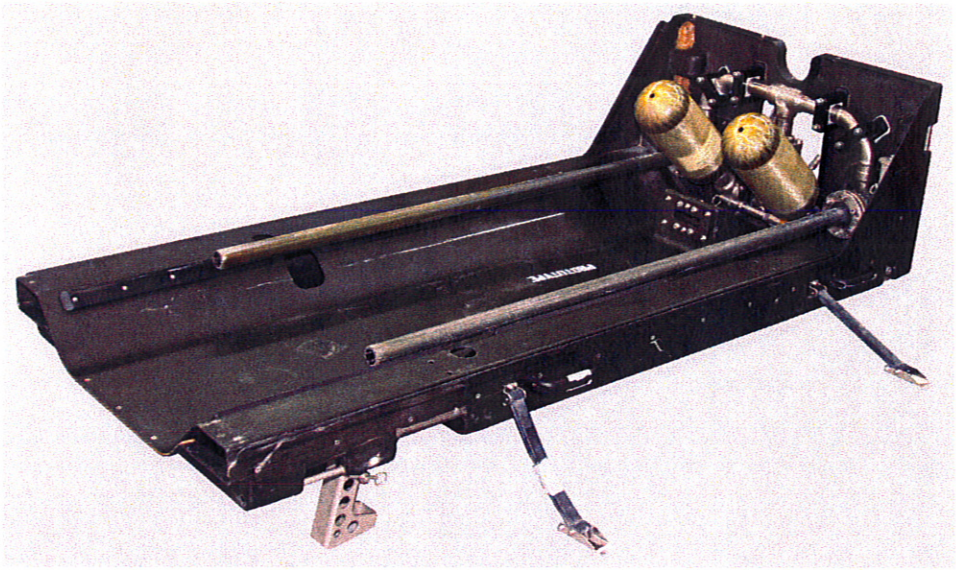

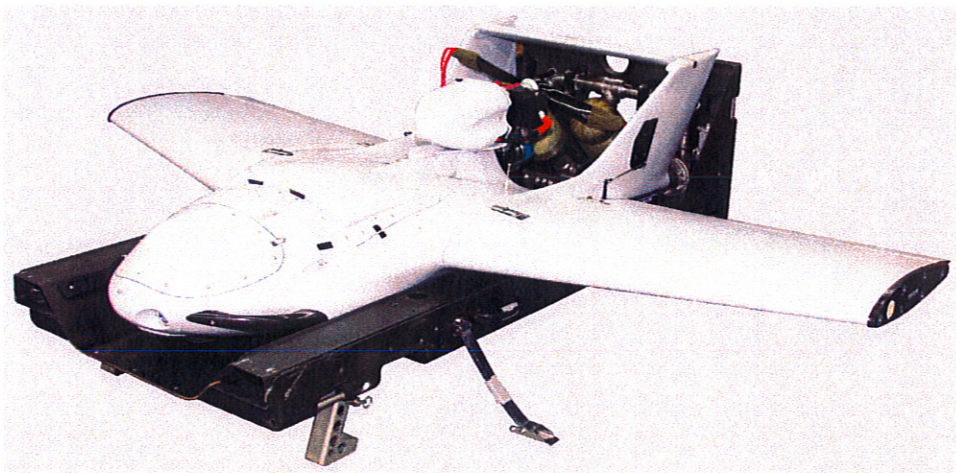

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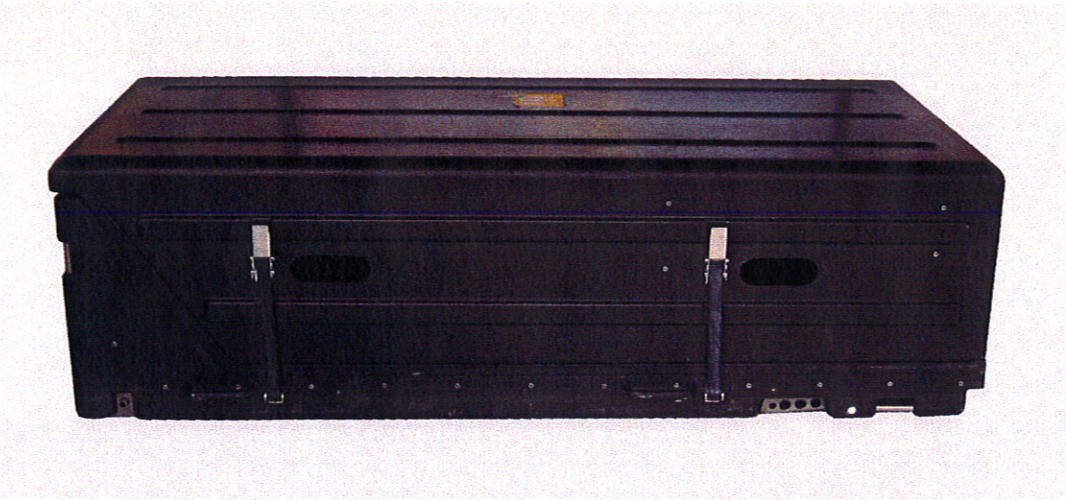

2.5 Remote Video Terminal (Optional)

In addition to transmitting data to the GCS, the Neptune is capable of transmitting to an optional Remote Video Terminal (RVT). The RVT receives the same video and telemetry downlink information as the GCS, but can be located at an alternate location within the line of sight (LOS) link range. This allows other authorized users to monitor the mission status without risk of interfering with flight operations. Since the RVT is a receive only unit, the user can get the downlinked video without compromising their location through radio transmission.

2.6 Ancillary Equipment

The Neptune UAS has a Field Support Kit which includes an engine starter and fuel / defuel kit. The System also comes with a set of carrying cases for the system components that are the same form factor as the Launcher / Container.

3.0 OPERATION

The Neptune UAS provides an organic Intelligence, Surveillance and Reconnaissance (ISR) capability to platforms or locations that would not otherwise be able to support a UAS, or as a relatively inexpensive compliment to larger manned and unmanned assets. These characteristics lend the Neptune to two broad roles as an Expeditionary and First Responder UAS.

3.1 Logistics

The Neptune UAS breaks down into elements that do not require special or oversized transportation. The Neptune system is easily transportable to the operational area by standard

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military or civilian utility vehicles. The footprint for a system is small and two people can move, setup, and stow the system with ease.

3.2 Flight Crew

Two people can launch and recover the Neptune AV. The system is designed to launch and recover fully autonomously, and operate in autonomous or semiautonomous mode.

3.3 Flight Limitations

Restrictions for the Neptune's pneumatic launch are a headwind of 30 knots (55 km/hr) and a 5 knot (9 km/hr) crosswind component. Operation within areas of expected downdrafts or with moderate or greater turbulence is not recommended. The AV can fly in areas of light precipitation. "At sea" launch is limited to Sea State Three. This limitation is also used as a recovery limit.

3.4 Launch

The Neptune system is designed to be launched from a very small footprint, such as small ocean-going vessels, combat vehicles, utility vehicles, or forward, unimproved areas within 15 minutes. It is designed to pneumatically launch in the six foot length (1.85 meters) of its Launcher/Container. The launch system is charged from a compressed air source such as a SCUBA tank or air compressor. The launch is completely autonomous, eliminating the requirement for a skilled operator. The system can either be launched with a prepared mission plan, or launched to meet immediate time-critical targets in a Launch-and-Loiter Mode.

3.5 Flight Performance / Payload Capacity

The endurance of the Neptune AV is approximately 2 - 4.5 hours. However, DRS remains committed to further evolving the flight characteristics / endurance of the AV through (1) light-weight manufacturing processes / materials, (2) alternative (high endurance) wing geometries, and (3) more fuel efficient propulsion assemblies. These improvements to the existing baseline system are anticipated to extend the endurance to six-seven hours. It has a maximum speed of 90 knots (165km/hr), cruise speed of 65 knots (120 km/hr), and loiter speed over targets at 60 knots (110 km/hr). The payload capacity is approximately 15 - 22 lbs.

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3.6 Recovery

The Neptune recovery system consists of the parachute and deployment mechanism for water and unimproved surface landings. The parachute is deployed autonomously as low as 200 feet (60 meters) AGL. The Neptune is designed to parachute recover directly into water or onto land.

3.7 Turn Time and Maintenance

The Neptune UAS is designed for quick turn-around inspection and maintenance. Prior to the first flight of the day a detailed preflight inspection is performed. Between flights, a 10-minute thru-flight inspection is performed using the checklist. While the thru-flight inspection is being conducted the air vehicle is refueled. The Neptune AV are designed and manufactured for ease of maintenance. Maintenance is performed with minimal steps and basic, commonly available tools to facilitate quick removal and replacement of line replaceable units (LRU). The system has a high reliability rate due to the extensive and thorough inspection and preventive maintenance concept. The turnaround time between missions for the Neptune system can usually be performed within a one-hour window.

3.8 Training and Documentation

Training a new operator consists of both classroom and hands-on instruction. It can be accomplished in as little as 4 weeks depending on class size and training weather and does not require prior piloting skills. The Neptune Operator's Manual consists of straight forward procedures to prepare the AV and launcher along with checklist instructions on operating the Windows based control system from autonomous launch through the autonomous landing sequence. The Neptune Maintenance Manual likewise steps the user through the routine maintenance and inspection procedures, as well as LRU replacement, making extensive use of diagrams and pictures to ensure users clearly understands the instructions. All of the documentation is internally controlled and approved through our ISO 9001:2000 audit system.

4.0 CONTACT INFORMATION

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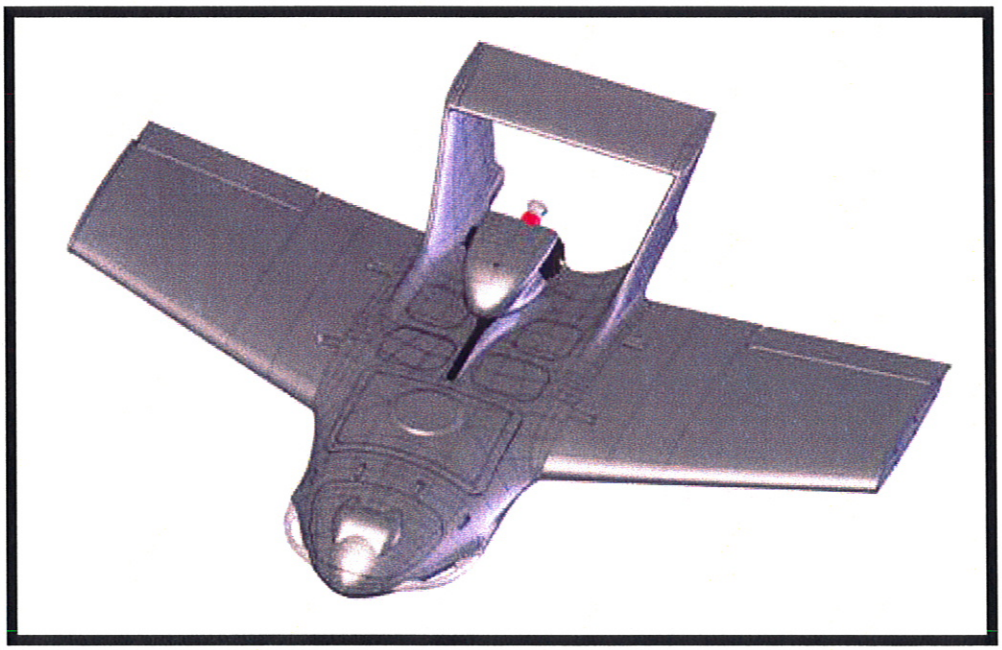

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