# Atlas LTA Advanced Technology, Ltd.

Peter Lobner, updated 2 June 2022

## 1. Introduction

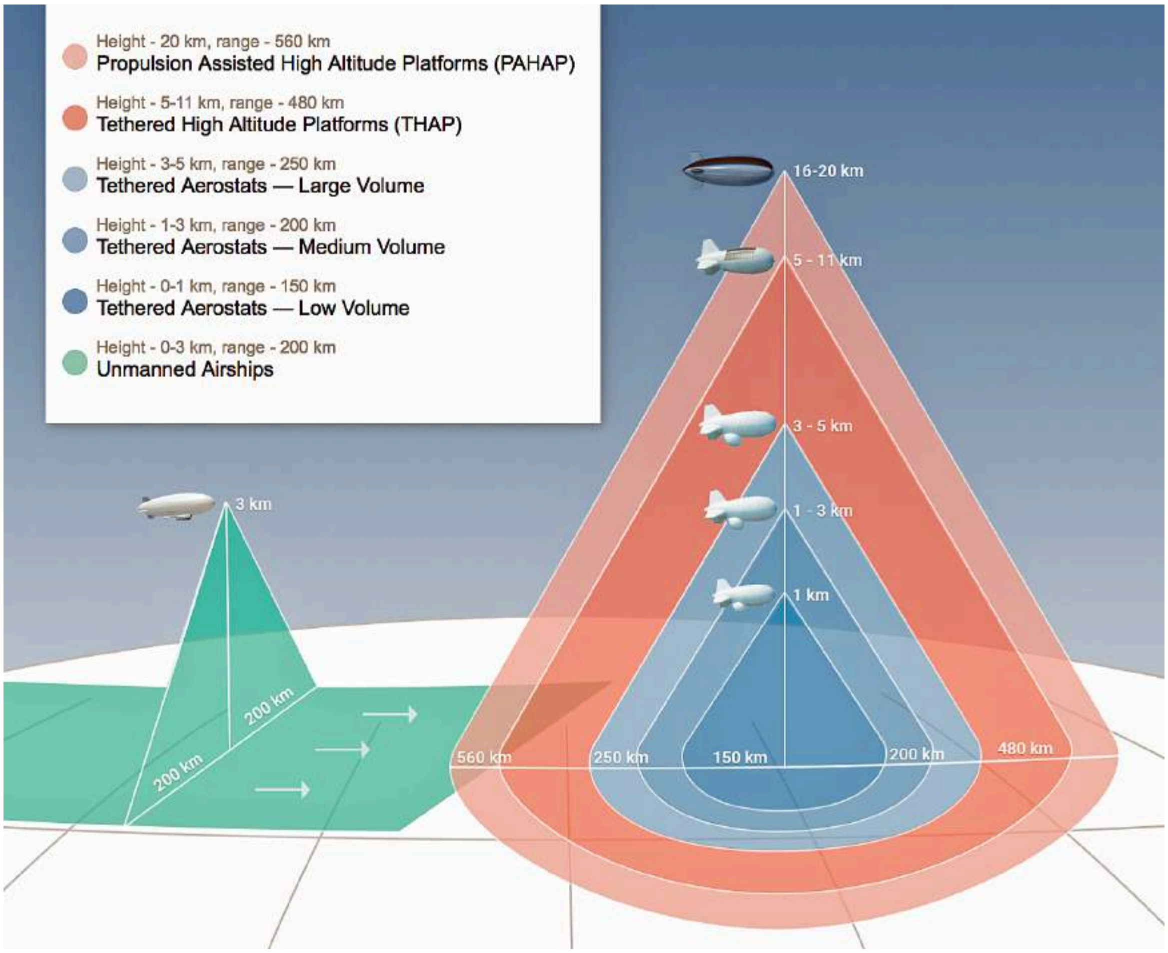
Atlas LTA Advanced Technology, Ltd, based in Rosh Ha'Ayin, Israel, was established in 2016 by Gennadiy Verba, then CEO of the Russian airship firm Augur RosAeroSystems (RAS). In 2018, Atlas acquired RAS, its product lines and intellectual property.

The Atlas website is here: https://atlas-lta.com.
Their LinkedIn site is here: https://www.linkedin.com/company/atlas-lta-advance-technology-ltd

Atlas has developed a network of local and international suppliers to support its growing list of lighter-than-air (LTA) products, which currently include the following:

- **ATLANT** (Autonomous Transport Long-range Aircraft of New Type): a family of rigid, heavy-lift, variable buoyancy airships with cargo capacities from 18 - 165 metric
- **Atlas**: a family of non-rigid, electric-powered blimps that are available in piloted configurations for 8 to 24 passengers, and in unmanned mission-specific configurations; battery electric or hybrid-electric power systems are available.
- **Tethered aerostats**: a family of low-to-medium altitude multi-mission conventional aerostats powered via the tether
- **THAP** (Tethered High Altitude Platforms): a self-powered tethered platform operating at altitudes above the conventional tethered aerostats and below a stratospheric high-altitude platform (HAP)
- **PAHAP** (Propulsion Assisted High Altitude Platform): a free-flying multi-mission stratospheric HAP
- **Skylift**: a tethered manned balloon, primarily for tourism.

Atlas' several ISR (Intelligence, Surveillance, Reconnaissance) platforms provide complementary coverage areas as shown in the following graphic.




*Source: Atlas*

In early-2022, Atlas transitioned the responsibility for developing a stratospheric HAP to a new startup firm, Strasa.Tech ([https://www.strasa.tech](https://www.strasa.tech)). Their HAP will replace the PAHAP in the above graphic.

Atlas has delivered tethered aerostats and the Skylift piloted balloon. Atlas has not announced schedules for the availability of their other LTA products.

In early-2022, Atlas announced that it had just finished the technology trials for a new family of low-permeability helium lifting gas cell materials based on multilayer advanced films and fibers. They reported that the demonstrated helium leak rates were 8 to 10 times lower than the best urethane based materials. In addition, the materials “demonstrated a great combination of lightness, tensile, tear, puncture and weather resistance.” Atlas expects that this family of materials will have a wide range of applications in HAPs, airships and aerostats.

*Atlas test articles. Source: P. Lobner photo, 3 May 2022*

On 18 May 2022, the Atlas quality management system was certified under ISO 9001:2015 / AS9100D for the production and integration of LTA aircraft and for the design and development of systems for LTA aircraft.

The following sections provide more details on ATLANT, the Atlas electric-powered manned and unmanned blimps, tethered conventional aerostats and THAP, the free-flying PAHAP and the Skylift piloted balloon.

The Augur RosAeroSystems’ pre-2018 airships and the Strasa.Tech HAP are addressed in separate articles.

## 2. ATLANT rigid, heavy lift airships

The ATLANT family of rigid, heavy-lift, variable buoyancy hybrid airships consists of three models with payload capacities ranging from 18 to 165 metric tons (19.8 to 181.5 tons). All three are being designed as multi-role, vertical takeoff and landing (VTOL), long range, heavy transport airships. Basic specifications for the ATLANT 30, 100 and 300 airships are summarized in the following table.


| ATLANT airship specifications | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **ATLANT 30** | | **ATLANT 100** | | **ATLANT 300** | |
| Length | 99 m | 325 ft | 140 m | 459 ft | 198 m | 650 ft |
| Width | 58 m | 190 ft | 67 m | 220 ft | 97 m | 317 ft |
| Height | 23.5 m | 77 ft | 33.4 m | 109.6 ft | 47 m | 154 ft |
| Total volume | 38,900 $m^3$ | 1374000 $ft^3$ | 110,000 $m^3$ | 3,885,000 $ft^3$ | 311,500 $m^3$ | 11,000,500 $ft^3$ |
| MDM thrust vectoring main cruise engines | 4 | | 4 | | 8 | |
| ALM lift fans | 8 | | 16 | | 32 | |
| Maximum payload | 18 metric tons | 19.8 tons | 60 metric tons | 66.1 tons | 165 metric tons | 181.9 tons |
| Maximum crane load | 10 metric tons | 11 tons | 30,000 kg | 33 tons | 65,000 kg | 71.7 tons |
| Nominal range | 2,000 km | 1,243 miles | 2,000 km | 1,243 miles | 2,000 km | 1,243 miles |
| Ferry range | 4,000 km | 2,485 miles | 4,000 km | 2,485 miles | 4,000 km | 2,485 miles |
| Cruise speed | 120 kph | 74.6 mph | 120 kph | 74.6 mph | 120 kph | 74.6 mph |
| Maximum speed | 140 kph | 87 mph | 145 kph | 90.1 mph | 150 kph | 93.2 mph |
| Hydrocarbon fuel consumption | 295 kg/h | 650 lb/h | 590 kg/h | 1,300 lb/h | 1,180 kg/h | 2,601 lb/hr |
| Cargo bay volume | 1,100 $m^3$ | 38,800 $ft^3$ | 2,800 $m^3$ | 98,900 $ft^3$ | 6,100 $m^3$ | 215,400 $ft^3$ |
| Cargo bay dimensions, L x W x H | 25.8 x 9 x 5 m | 84.6 x 29.5 x 16.4 ft | 36.5 x 11 x 7 m | 119.8 x 36.1 x.23 ft | 51.5 x 14 x 8.7 m | 169 x 45 x 28.5 ft |

*Source: Atlas*

ATLANT airships can be configured for a wide range of missions:

- Cargo transportation:
  - Vehicles, machinery, bulk and high volume cargo carried in the internal cargo bay.
  - Oversized cargo carried in an underside belly tray (i.e., wind turbine blades).

    - Large, indivisible load carried as a suspended load.
- Emergency response (essential product delivery, personnel evacuation, flying hospital, emergency power station, etc.)
- Firefighting, with the ability to replenish itself from a nearby water body.
- High-rise construction support (flying crane)
- Passenger ferry
- Luxury scenic air cruise vessel
- Special missions

ATLANT is being designed as a pilot-optional airship. However, for passenger, emergency response and special missions, the ATLANT will be piloted.

ATLANT's ability to takeoff and land vertically on almost any unprepared surface with no need for special infrastructure enables the airship to serve even very remote locations. The airship is designed to withstand extreme weather conditions in flight as well as on the ground, even in Arctic conditions without a hangar.

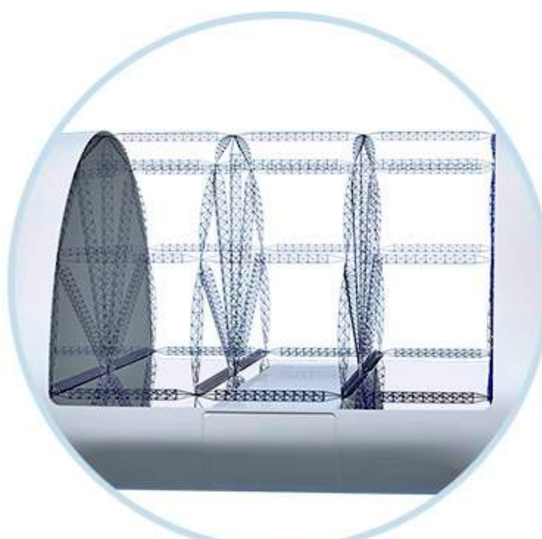

*Rendering of an ATLANT on the ground in the Arctic, unloading via the side cargo door. Source: Atlas*


*Rendering of an ATLANT flying in at low altitude. Source: Atlas*

**ATLANT key design features include:**

A. **Optimized aerodynamic shape:** Both computational fluid dynamics (CFD) analysis and wind tunnel tests have confirmed good stability and efficient aerodynamic characteristics in flight and safe handling on the ground at any wind direction without the need for permanent feathering. The lifting body hull shape generates aerodynamic lift in flight, which compensates for static heaviness that required propulsive lift during takeoff. In normal cruise trim, propulsive lift is not required.

B. **Rigid structure:** Rigid internal framework and hard outer panels are made of light, strong composite material that can withstand all loads in flight and on the ground, including strong side winds and heavy snow when parked outside in Arctic conditions. This feature makes possible hangar-less, autonomous operation of the airship in a wide range of weather conditions.



*Source: Atlas*

C. **Variable buoyancy control:** Aerostatic buoyancy is controlled by a variable buoyancy system that enables load exchanges to be conducted without exchanging external ballast at the pickup or delivery site as cargo is moved on or off the airship. The ATLANT's variable buoyancy control system is called the Active Ballasting System (ABS). It has two different modes of operation: air ballast control and helium lift gas control.

Air ballast control:
- On the ground, the ABS can partially compensate for the weight of unloaded cargo by taking on air ballast. This is done by pumping ambient air into high pressure air storage tanks aboard the airship.
- For takeoff, the high pressure air storage tanks are vented back to the atmosphere to achieve the desired overall buoyancy.

Helium lift gas control:
- In flight, the ABS controls the aerostatic buoyancy from helium as altitude changes. When required, buoyancy is reduced by pumping helium from the atmospheric pressure lift gas cells into smaller pressurized storage tanks. To increase buoyancy, helium is vented from the pressurized storage tanks back into the much larger helium lift gas cells. No helium is lost during this cycle.
- This part of the ABS is not used on the ground.

*High-pressure gas storage tank installation.*
*Source: Atlas*

D. **Hybrid airship designed for vertical takeoff and landing (VTOL) and hovering:** The total lift generated by the ATLANT is the aggregate of aerostatic lift from helium, aerodynamic lift from the hull and small aerosurfaces, and propulsive lift from the thrust vectoring main cruise engines (MDM) and the fixed "multicopter type" lift fans (ALM) installed along the flanks of the airship. The thrust vectoring main cruise engines are aligned to deliver forward thrust in cruise flight.

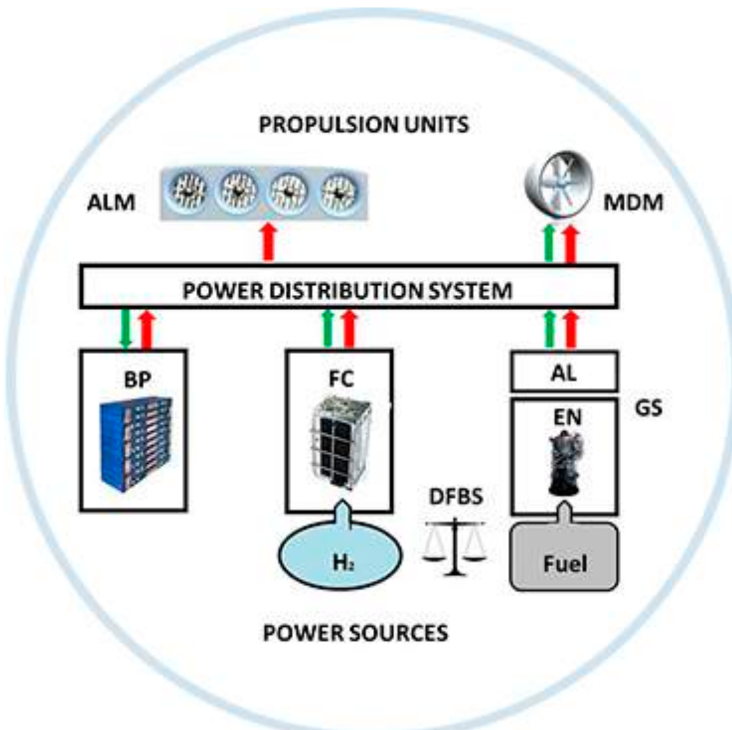
During VTOL operations, including hovering, total lift is the sum of aerostatic lift and propulsive lift. There is no aerodynamic lift during VTOL operations.

The ATLANT can takeoff and land vertically from a small landing space to deliver or pickup loads on the ground. With precise geo-positioning during hover, the ATLANT also can operate as a flying crane and pickup or deliver suspended cargo while hovering above the destination

*One of four MDM + ALM installations on an ATLANT-30. Source: Atlas*

The ABS controls aerostatic buoyancy during hovering and VTOL operations. This is an important factor when operating as a flying crane.

E. **Hybrid electric propulsion system (HEPS):** The Dual Fuel self-Ballasting System (DFBS) consists of diesel/turboshaft generator sets (GS) and hydrogen-oxygen fuel cells (FC) that provide power during all modes of flight. The battery packs (BP) are intended to boost available power during VTOL and hovering operations. The DFBS manages fuel consumption between lighter-than-air hydrogen and heavier-than-air hydrocarbon fuel to manage static heaviness (i.e. maintain near neutral buoyancy), while considerably reducing both the carbon footprint from airship operation and overall operating cost.




*ATLANT DFSB electric propulsion system. Source: Atlas*

F. **Adaptive mooring:** The "adaptive mooring system" consists of an air-cushion landing system (ACLS) and a supplementary "multi-tool anchoring system." For stability when parked on the ground, the ACLS fans operate in reverse and take a suction on the ground to hold the airship steady in significant winds. The ACLS and the supplementary anchoring system together enable the ATLANT to remain securely on the ground in side winds up to 45 knots without feathering (pointing into the wind) and head winds up to 90 knots.

*One of four ACLS pads under the hull. Source: Atlas*

G. **All-weather, year-round operation without traditional airship ground support equipment**
   - ACLS provides airship mobility after landing, enabling the airship to taxi by itself to a parking site.
   - Airship aerodynamic design and ACLS provide cross-wind stability, reducing the need to secure the airship immediately after landing.
   - No mooring mast is required. If needed, an onboard anchor can be deployed.
   - Designed for “hangarless” operation, with the airship secured outdoors.
   - Able to operate in Arctic conditions.
   - Able to fly in icing conditions.

H. **Pilot-optional operation:** The high level of flight control automation is a key factor for unmanned cargo operation, which removes flight endurance limitations, reduces operational cost, enables better utilization of the available airships and implementation of a fully optimized, AI (artificial intelligence) operated, autonomous cargo distribution network.

## Conducting a load exchange on the ground

ATLANT airships primarily make their load exchanges after the airship has made a vertical landing.  After landing, the ATLANT will be ballasted to be heavier-than-air. Using its ACLS and the main cruise engines, the airship can maneuver on the ground, ice or water to a designated loading / unloading site.

The Active Ballasting System (ABS) manages the airship’s aerostatic buoyancy during the load exchange, with air ballast being loaded as needed to compensate for the weight of cargo being removed. Loading and unloading the internal cargo bay takes place through large doors on the side of the airship.  Some long, slender cargo items (i.e., wind turbine bladed) can be carried in external trays under the airship.


*ATLANT 100 with external belly cargo trays carrying a set of wind turbine blades. Source: Atlas*

When cargo operations have been completed, the airship may remain parked or readied for takeoff.  The ABS adjusts the aerostatic buoyancy as required.

## Conducting an airborne load exchange (Flying Crane)

With precise geo-positioning during hover, the ATLANT can operate as a flying crane and pickup or deliver suspended cargo while hovering above the destination. When operating as a flying crane, the ATLANT carries a reduced payload and uses a rotating lifting platform to precisely align the suspended payload while the airship control systems are independently maintaining the airship's geo-position and compensating for any turbulence or wind gusts.


*ATLANT 100 with rotating load platform operating as a flying crane carrying a single suspended wind turbine blade. Source: Atlas*

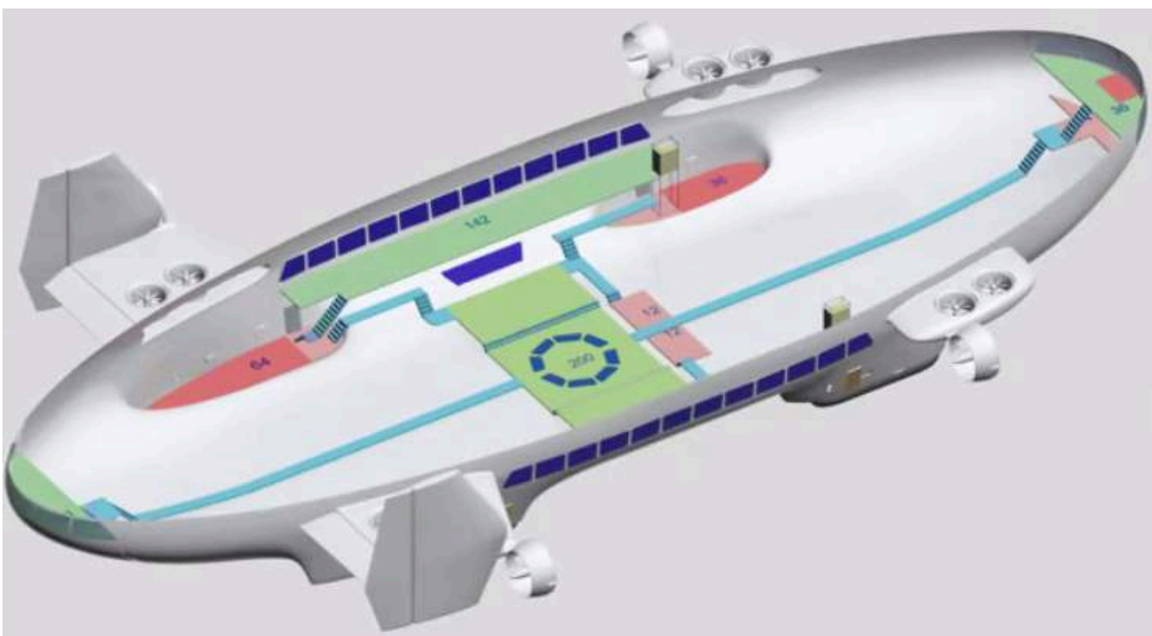
During delivery, the suspended load is lowered to the ground and the load exchange is accomplished by reducing overall lift to transfer the weight of the suspended load to the ground. The slack lift cables from the airship can be safely disconnected from the load and hauled up to the airship.  Then the airship can depart for its next assignment.

To pick up a load that will be carried externally, the ATLANT establishes a hover and extends the slack lift cables, which can be safely connected to the load on the ground.  Then the ATLANT picks up the load by increasing overall lift, first to take a tension on the cables and then to lift the load off the ground. When the load has been lifted and secured for flight, the ATLANT is ready to fly on to the delivery point.

## ATLANT configured for luxury scenic cruising

Atlas has developed a concept for an ATLANT airship configured as a luxury scenic air cruise vessel accommodating 20 passengers and 7 crew. About 6% of the interior volume is allocated for these accommodations, which provide 460 $m^2$ (4,951 $ft^2$) of deck area for large public spaces with several viewing areas (sides, panoramic bow & stern, and downward), and 12 private cabins.


*Two-view drawing of an ATLANT luxury cruising airship.*



*Interior layout of an ATLANT configured as a luxury scenic air cruise vessel. Passenger viewing areas are along the two rows of windows on the sides of the airship, at the circular downward viewing windows in the center of the public area, and at the bow and stern observation decks that are accessed via passageways from the central public space. Source, both graphics: Atlas*


*Rendering of an ATLANT configured as a luxury cruise airship.*
*Source: Atlas*

*Rendering of an ATLANT luxury cruise airship on a scenic cruise in the Arctic. Source: adapted from Atlas / OceanSky Cruises*

### 3. Atlas non-rigid, electric-powered, piloted airships

The Atlas electric-powered piloted airships are a significant evolution of the RAS Au-30 blimp. While retaining the basic envelope shape and cruciform tail, the Atlas blimps have incorporated a much larger passenger gondola and an advanced electric power and propulsion system.

There are two basic models, the Atlas-06 and the larger Atlas-11, both of which are designed primarily for aerial sightseeing services.

| Atlas electric-powered piloted airship specifications | | | | |
|---|---|---|---|---|
| **Parameter** | **Atlas-06E & -06H** | | **Atlas-11E17, -11H17 & -11H24** | |
| Length | 60.4 m | 198 ft | 72.5 m | 237.9 ft |
| Diameter, max. | 14.6 m | 48 ft | 17.4 m | 57 ft |
| Height | 18.3 m | 60 ft | 21.4 m | 70.2 ft |
| Total volume | 6,400 $m^3$ | 226,000 $ft^3$ | 10,800 $m^3$ | 381,400 $ft^3$ |
| Passenger capacity | 8 | | 17 (-11E17 & -11H17), 24 (-11H24) | |
| Crew | 2 | | 2 (-11E17 & -11H17), 3 (-11H24) | |
| Speed, max. | 110 kph | 68.3 mph | 110 kph | 68.3 mph |
| Speed, cruise | 80 kph | 49.7 mph | 80 kph | 49.7 mph |
| Endurance, cruise | 1.5 hr (-06E battery), 10 hr (-06H hybrid) | | 2.5 hr (-11E17 battery), 10 hr (-11H17 hybrid), 6 hr (-11H24 hybrid) | |

*Source: Atlas*

These airships are offered with two power system options. A battery-only electric propulsion system is optimized for shorter flights of 1.5 to 2.5 hours, with replaceable batteries for fast turn-around.  For longer flights, a hybrid-electric propulsion systems enables flights of up to 10 hours.

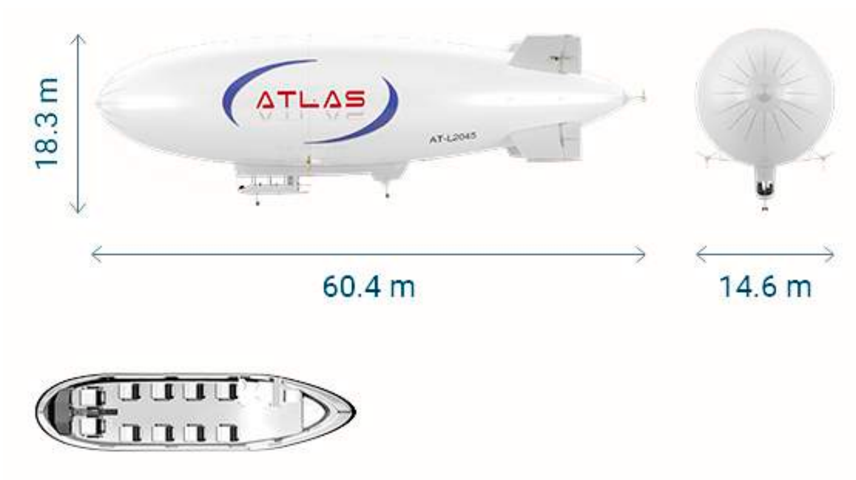
Both propulsion systems drive three light-weight electric motor-driven propellers: 2 x flank vectoring propellers attached to the envelope and 1 x stern vectoring propeller attached to the envelope at the tail.  The flank propellers are located aft of the passenger gondola to ensure low noise and vibration during flight.

*Rendering of Atlas-6 gondola & flank vectoring propellers (left) & the stern vectoring propeller (right). Source: Atlas*


*Elements of the Atlas hybrid-electric power system. Source: Atlas*

RED Aircraft GmbH of Adenau, Germany, produces the RED A03 aviation engine used in Atlas' hybrid-electric power system. The RED A03 is a lightweight, all-aluminum, compression-ignition, 6.1 liter (372 cubic inch), 12-cylinder, internal combustion engine, with two six-cylinder banks.


*Rendering of Atlas-6 in flight. Source, all three graphics: Atlas*




*Atlas-6 two-view drawing & 2-row seating layout.*

*Atlas-6 full-height 2-row cabin with large windows, lavatory & aft observation deck with glass floor and panoramic windows.*


*Rendering of Atlas-11 in flight. Source, all three graphics: Atlas*


*Atlas-11 two-view drawing & alternate 2- & 3-row seating layouts.*

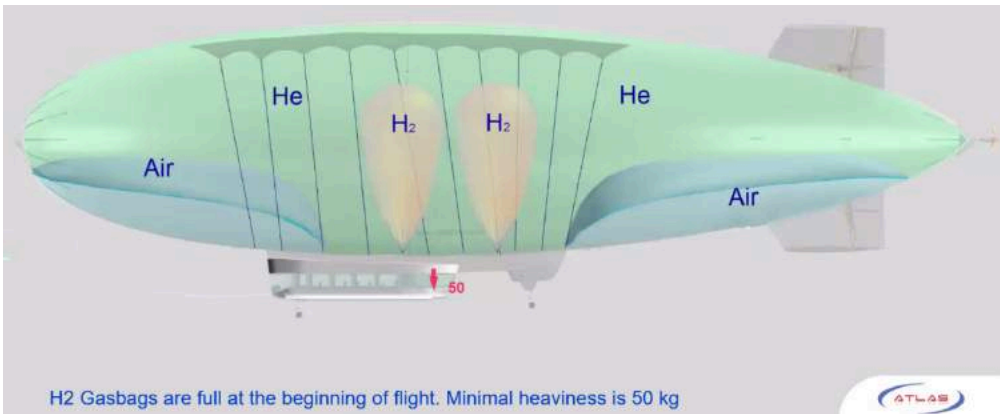
*Atlas-11 full-height 2- or 3-row cabin with large windows, lavatory & aft observation deck with glass floor and panoramic windows.*

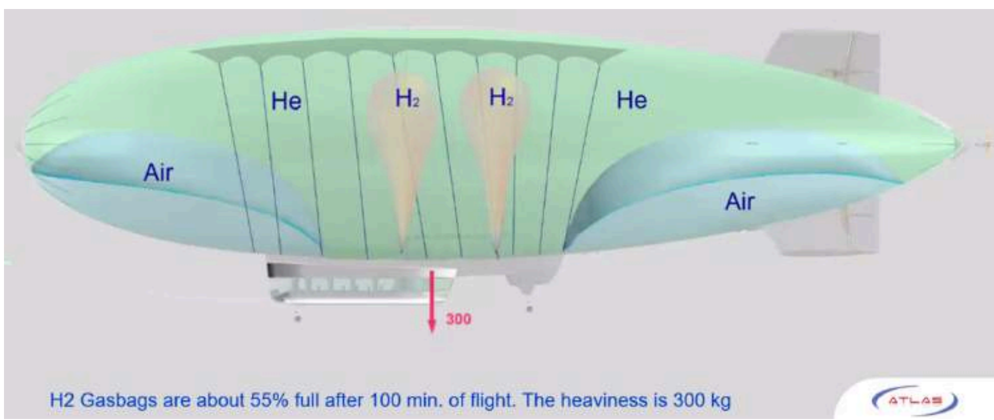


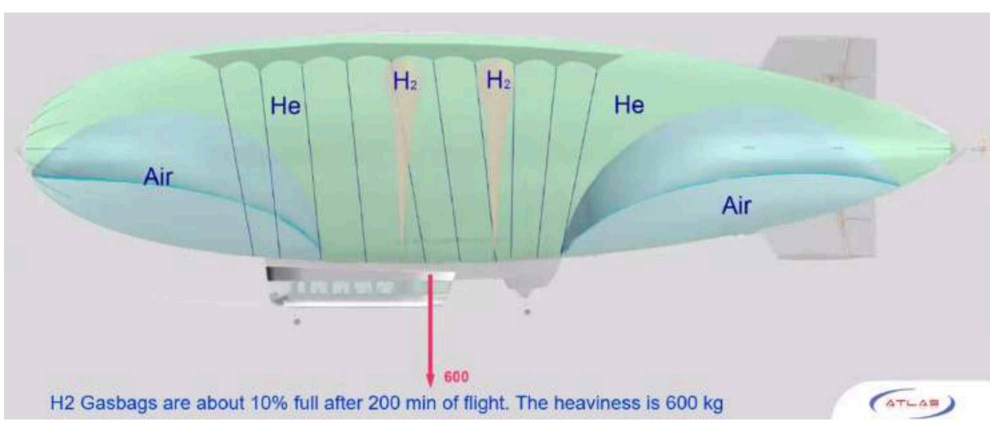
*Renderings of Atlas-6 (above) and Atlas-11(below) electric-powered airships on scenic tourist flights. Source, both graphics: Atlas*

As with many other aviation manufacturers, Atlas is investigating the possible use of a hydrogen-oxygen fuel cells in their airships. The gaseous hydrogen fuel would be carried buoyantly in separate gasbags within the helium cell of the airship (hydrogen accounting for about 20% of the helium cell volume). Oxygen for the fuel cell would be drawn from the atmosphere, and the water produced by the fuel cell would be discharged to the atmosphere. If a hydrogen leak occurs within the helium cell, safety is not compromised. A mixture of 80% helium and 20% hydrogen is not flammable.

Atlas notes that a “near equilibrium” airship typically can handle a static heaviness increase of about 10% of maximum takeoff weight (MTOW). For an Atlas-11 blimp, that would be about 900 kg (1,984 lb). In the following example, Atlas-11 static heaviness increases by 550 kg (1,213 lb) after 200 minutes of flight with hydrogen fuel. Longer flight duration is possible within the 10% MTOW limit. This would exceed the endurance with current high-capacity batteries.



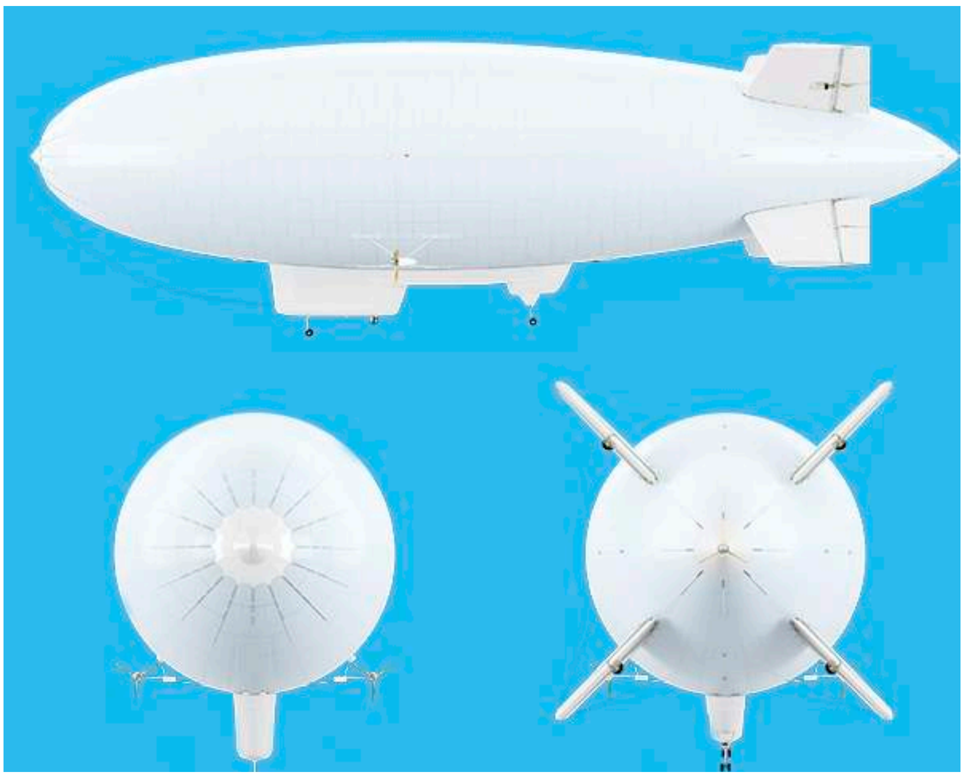




*Source, three graphics: Atlas*

## 4. Atlas non-rigid, electric-powered, unmanned airships

The Atlas non-rigid, electric-powered, unmanned airships are similar in design to their piloted Atlas counterparts, but with the ability to conduct longer duration missions and deploy over a much greater range. The designs are similar in the following areas:

- General layout
- Propulsion configuration, with 2 x flank vectoring electric-powered propellers attached to the envelope and 1 x stern vectoring electric propeller attached to the envelope at the tail.



*Unmanned electric-powered airship three-view drawing.*
*Source: Atlas*

All passenger accommodations have been removed, providing room in the gondola for mission payloads of up to 700 kg (1,543 lb) and fuel to support long duration missions of up to 100 hours and a range of up to 5,000 km (3,106 miles). The hybrid electric system can deliver up to 20 kW of power to mission payloads such as radars, radio relays, high-definition electro-optical (HD EO) equipment, laser scanners, gravimeters and other special missions payloads.

While the electric-powered piloted airships offer battery-only or hybrid electric propulsion systems, the unmanned airship designs are available with Atlas' Dual Fuel self-Ballasting System (DFBS), which enable the very long flight durations of up to 100 hours. As described previously for the ATLANT, the DFSB system optimizes the use of all electric power sources (hydrogen fuel cells, hydrocarbon-fueled diesel/turboshaft generator sets and storage batteries) in all modes of flight. The DFBS manages fuel consumption between lighter-than-air hydrogen and heavier-than-air hydrocarbon fuel to manage static heaviness (i.e. maintain near neutral buoyancy), while considerably reducing both the carbon footprint from airship operation and overall operating cost.

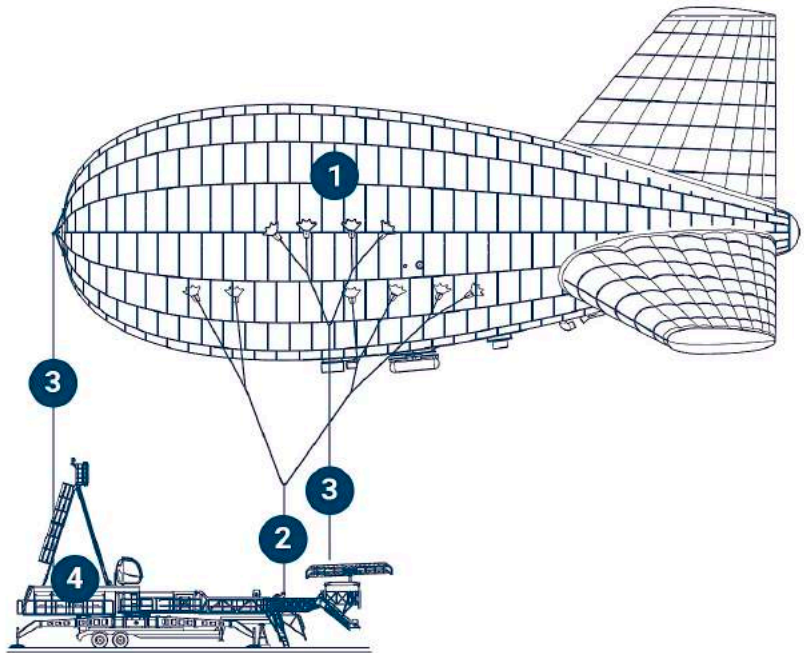
*Rendering of an Atlas electric powered unmanned airship.*
*Source: Atlas*

The Atlas unmanned airships are designed to conduct long duration, mobile surveillance missions at medium altitudes, up to 4,000 m (13,123 ft). These unmanned airships can be configured for a variety of missions, such as coast and border patrol, environmental monitoring, aerial photography and 3D mapping and special missions.

The free-flying unmanned airships are intended to complement the surveillance capabilities available on Atlas' low-to-medium altitude tethered aerostats and high altitude platforms.

## 5. Conventional Tethered Aerostats (TAs)

Atlas has developed a family of conventional tethered aerostats that are launched from an Integrated Ground Mooring System (IGMS) and, depending on model, operate at altitudes between 1,000 m (3,281 ft) and 5,000 m (16,404 ft). The integrated tether secures the aerostat to the IGMS and provides electric power and a fiberoptic high-speed data link for the aerostat payload. The general arrangement of an Atlas tethered aerostat is shown in the following diagram.




Legend: (1) aerostat, (2) high capacity winch & tether, (3) 3-point mooring rigging to secure the aerostat on the ground, and (4) the Integrated Ground Mooring System (IGMS).

| Parameter | Low Volume TA | Medium Volume TA | Large Volume TA |
|---|---|---|---|
| Volume | 100 - 1,000 m³ (3,531 - 35,310 $ft^3$) | 1,000 to 4,000 m³ (35,310 – 141,260 $ft^3$) | 4,000 to 20,000 m³ (141,260 – 760,300 $ft^3$) |
| Length | 12 - 27 m (39.4 – 88.6 ft) | 27 - 40 m (88.6 – 131.2 ft) | 40 - 73 m (131.2 – 240 ft) |
| Operational altitude | up to 1,000 m (3,281 ft) | up to 3,000 m (9,843 ft) | up to 5,000 m (16,404 ft) |
| Endurance, max | 15 days | 30 days | 45 days |
| Payload, max | 100 kg (220 lb) | 500 kg (1,102 lb) | 3,000 kg (6,614 lb) |
| Max. operational wind speed | 25 m/s (90 kph / 56 mph) | 35 m/s (126 kph / 78 mph) | 45 m/s (162 kph / 100.6 mph) |
| Power supply | up to 3 kW | up to 25 kW | up to 50 kW |

*Source: Atlas*

Low Volume TAs are mobile systems designed for rapid deployment from an unprepared site.  Military tactical uses include over-the-hill surveillance and radio relay. Civilian uses include event security and other support services for large events, and aerial advertising. In 2018, Atlas and RT Aerostat Systems formed a joint venture known as Aero-T to develop a family of Skyguard persistent surveillance aerostat systems. Their first product, SkyGuard-1, based on Atlas' Low Volume TA, flew in 2018.

Medium Volume TAs are larger mobile systems that can carry significantly larger, more powerful payloads, such as high-resolution, gyro-stabilized, day/night camera systems, multi-mode airborne radars, communication relays or other special mission payloads. Applications include border guard, marine fishery protection, forest fires detection, and industrial and governmental site security.

*Medium Volume TA. Source: Atlas*

Large Volume TAs are Atlas' most weather resistant platforms and carry payloads weighing up to 3,000 kg (6,614 lb) to altitudes up to 5,000 m (16,404 ft) for up to 45 days. These aerostats are designed to carry heavy, long-range surveillance or communication equipment intended for continuous duty. The IGMS can be either stationary or relocatable.

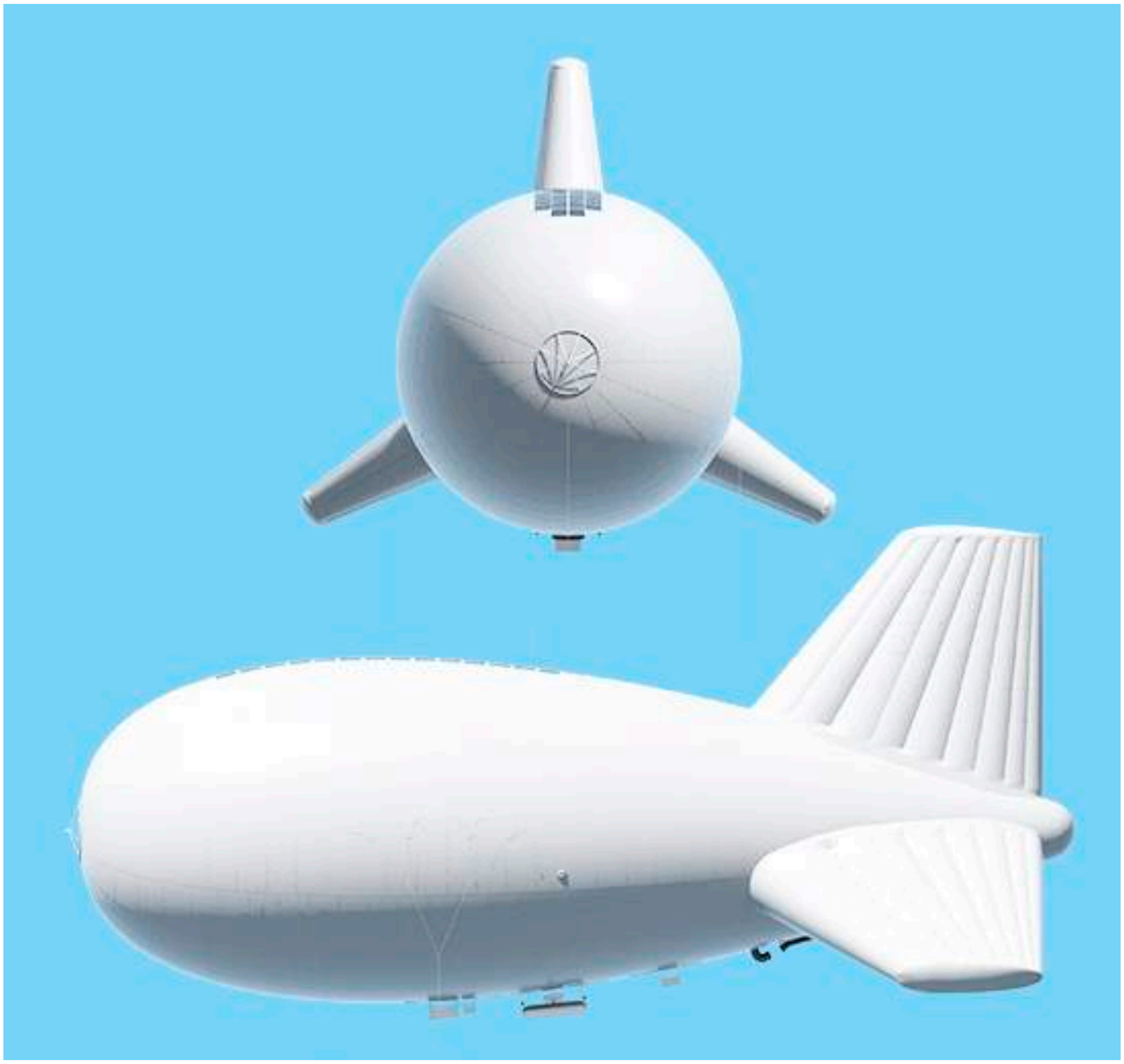
*Rendering of a Large Volume TA configured as a radar platform for an airborne early warning system. Source: Atlas*

## 6. Tethered High Altitude Platforms (THAP)

THAP is a large, self-powered, tethered aerostat that, at first glance, looks similar in basic layout to an Atlas conventional aerostat. A key design difference is that THAP has an onboard solar photovoltaic or hybrid electric power system that is optimized for the particular needs of the mission payload. This eliminates the need for power delivery from the ground via the tether and enables the use of a lighter-weight, high-strength tether that does not include an electric power cable.

With the lighter-weight tether, THAP can operate at altitudes between 5,000 and 11,000 meters (16,404 to 36,089 ft), well above the altitude range of Atlas' conventional aerostats. This higher altitude capability fills a gap between conventional aerostats and stratospheric HAPs, making THAP well suited for applications such as long-range radio relay and various types of broad-area monitoring missions.

*Rendering of a THAP at altitude. Source: Atlas*



*THAP two-view drawing.*
*Note solar panels on top of the envelope and*
*mission equipment attached under the envelope. Source: Atlas*

**General characteristics of the THAP**

| Parameter | THAP |
|---|---|
| Volume | 7,000 to 12,000 m$^3$ (247,200 to 423,800 ft$^3$) |
| Payload weight | 300 kg (661 lb) |
| Payload power | 3 kW |
| Operational altitude | 5,000 to 11,000 m (16,404 to 36,089 ft) |
| Max wind at working altitude | 50 m/s (180 kph / 112 mph) |
| Endurance | 50 to 100 days |

*Source: Atlas*

## 7. Propulsion Assisted High Altitude Platform (PAHAP)

The PAHAP was Atlas' design for a scaleable, solar-powered, propelled, high altitude platform (HAP). In early 2022, Atlas transitioned the responsibility for developing a stratospheric HAP to a new startup firm, Strasa.Tech (https://www.strasa.tech), which is addressed in a separate article.

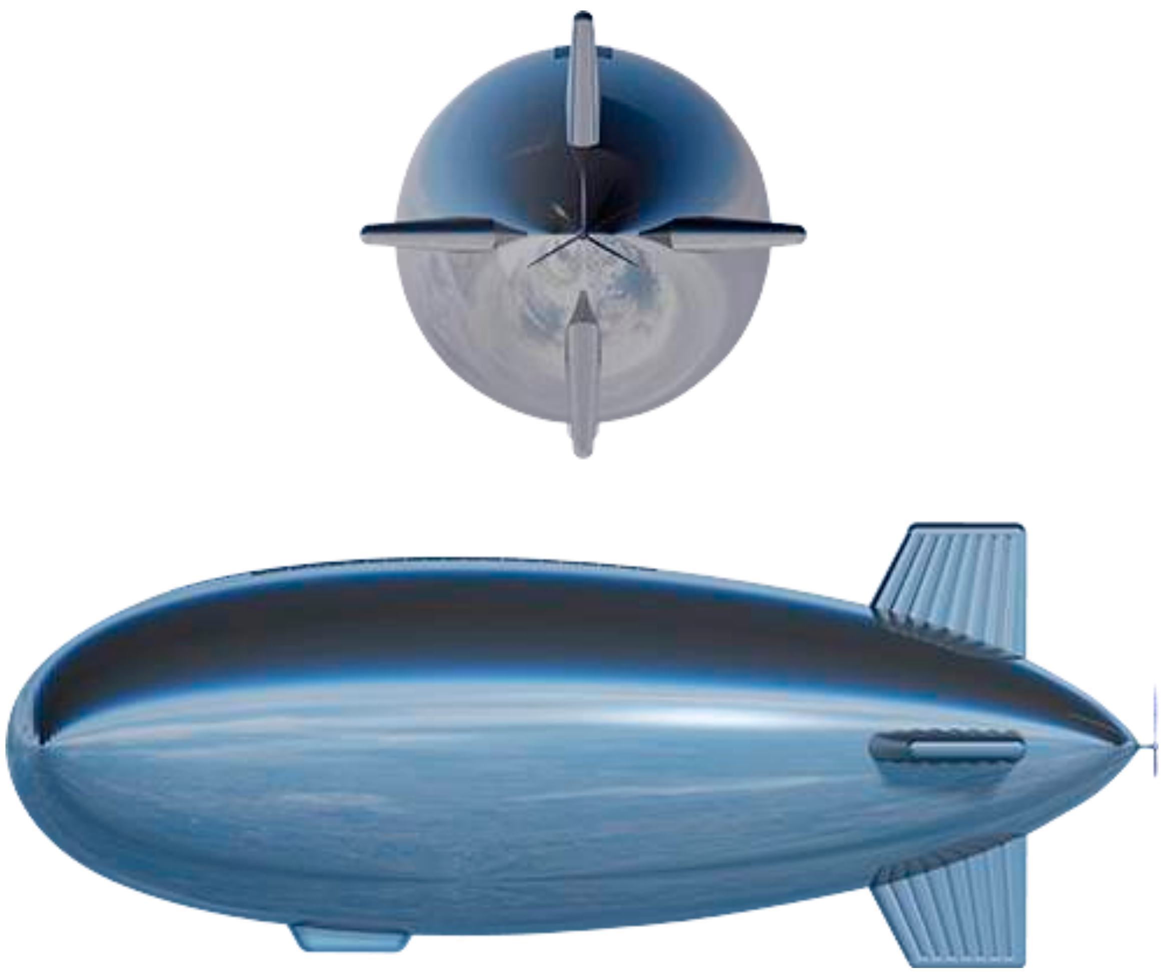
While the development of the PAHAP was discontinued in early 2022, the design concept for this stratospheric HAP is described below.

*Rendering of a PAHAP flying in the stratosphere. Source: Atlas*

Atlas intended that the same basic PAHAP design could be built in various sizes, with gas envelope volumes ranging from 10,000 to 50,000 $m^3$ (353,000 to 1,766,000 $ft^3$) and a payload capacity of up to 500 kg (1,102 lb) on the largest of these platforms.

PAHAP was designed to operate in the relatively low wind region commonly found at stratospheric altitudes between 16 and 22 km (49,200 to 72,200 ft). The hybrid solar electric power system enabled the PAHAP to maintain station keeping above a precise geo-location 24/7 in wind speeds up to 20 meters/sec (72 kph / 45 mph), which should be adequate for 99% of the time on station. In stronger wind conditions, the PAHAP would change altitude in the range from 16 to 22 km, seeking more favorable wind conditions at its assigned geo-location. If needed, the PAHAP could temporarily reposition to a geo-location with better wind conditions.

In addition to powering the propulsion system, the hybrid solar electric power system could deliver 3 kW of power to the payload. The airship was designed to conduct missions of up to one year, making it well suited for persistent surveillance and communications relay missions.



*PAHAP two-view drawing. Source: Atlas*

## 8. Skylift tethered manned balloons

The Skylift is a tethered, piloted helium balloon originally designed and developed by Atlas' predecessor, Aeronautical Center Augur Ltd. It is designed as a sightseeing platform to lift up to 18 occupants (including pilot) in an annular gondola to an altitude of 150 meters (490 feet). The balloon has a mass of 2,446 kg (5,348 lb).

The 18 m (59 ft) diameter balloon has a helium volume of 3,200 $m^3$ (113,000 $ft^3$), with a 480 $m^3$ (16,950 $ft^3$) air ballonet pressurized by an electric fan. The envelope is equipped with six automatic / electric-controlled gas valves and a relief overpressure gas valve. A rip panel is also installed on the top of the envelope for emergency deflation.

Tourist flights typically last about 15 minutes and can be conducted in winds up to 19 knots (35 kph / 22 mph). While moored on the ground, the Skylift is designed for a maximum wind speed of 58 knots (107 kph / 67 mph). If higher wind speeds were predicted, the balloon likely would be deflated and secured in advance.

The tether system requires 50 kW of electric power. The steel tether cable is designed for a maximum cable force of 2,600 kg (5,732 lb).

Skylift was granted European Aviation Safety Agency (EASA) Type Certificate TCDS BA.007 in 2005.

## 9. For more information

- "The Rise of Airships in Israel," Atlas press release, 3 September 2020: https://atlas-lta.com/the-rise-of-airships-in-israel/
- "New Airship production in Israel," CISION PRWeb, 8 September 2020: https://www.prweb.com/releases/new_airship_production_in_israel/prweb17371088.htm
- "Atlas develops autonomous heavy cargo airships," Atlas press release, 17 November 2020: https://atlas-lta.com/atlas-develops-autonomous-heavy-cargo-airships/
- Brigitte Gledhill, "Is it a UFO? No, it's an ATLANT cargo airship!," Cargo Forwarder Global, 3 January 2021: https://www.cargoforwarder.eu/2021/01/03/is-it-a-ufo-no-it-s-an-atlant-cargo-airship/
- Brian Blum, "A ride in a luxury helium-lifted airship is in your future," Israel21c, 3 March 2021: https://www.israel21c.org/a-ride-in-a-luxury-helium-lifted-airship-is-in-your-future/
- "RED A03," RED aircraft GmbH, https://www.ila-berlin.de/sites/default/files/2020-06/RED%20A03%20Utility%20%26amp%3B%20Agricutural.pdf

### Type Certificates

- European Aviation Safety Agency (EASA) Type Certificate TCDS BA.007, Issue 01, 10 June 2005, "AL-30 tethered gas balloon," Original type certificate holder: Aeronautical Center Augur Ltd., Moscow, Russia (Type certificate acquired by Atlas in 2018): https://www.caa.co.uk/Documents/Download/3936/5530fc38-100d-4d0c-9883-5e78f0a41d10/1022

### Other *Modern Airships* articles

- *Modern Airships - Part 1*: https://lynceans.org/all-posts/modern-airships-part-1/
- *Modern Airships - Part 2*: https://lynceans.org/all-posts/modern-airships-part-2/

    - Augur RosAeroSystems
    - Strasa.Tech
- *Modern Airships - Part 3*: https://lynceans.org/all-posts/modern-airships-part-3/