Modern Airships Part 2

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ZEPPELIN

Cover photo: Zeppelin NT Photo by author, June 2017

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Record of revisions to Part 2

- Original *Modern Airships* post, 26 August 2016: addressed 14 airships in a single post.
- Expanded the *Modern Airships* post and split it into three parts, 18 August 2019: Part 2 included 25 linked articles
- Part 2, Revision 1, 21 December 2020: Added 2 new articles on Walden Aerospace. Part 2 now had 27 linked articles
- Part 2, Revision 2, 3 April 2021: Added 35 new articles, split the original variable buoyancy propulsion article into three articles, and updated all of the original articles. Also updated and reformatted the summary graphic table. Part 2 now had 64 linked articles.
- Part 2, Revision 3, 9 September 2021: Updated 7 articles. Added category for "thermal (hot air) airships" and added pages for them in the summary graphic table. Part 2 still had 64 linked articles.
- Part 2, Revision 4, 11 February 2022: Added 26 new articles, expanded the graphic tables and updated 12 existing articles. Part 2 now had 90 linked articles.
- Part 2, Revision 5, 10 March 2022: Added 1 new article, split rigid & semi-rigid airships in the graphic tables, and updated 52 existing articles. With this revision, all Part 2 linked articles have been updated in February or March 2022. Part 2 now has 91 linked articles.
- Part 2, Revision 6, 17 March 2024: This revision includes a major reorganization of Parts 1 & 2 to better aggregate airships and unpowered aerostats by type, with a corresponding reorganization of the graphic tables. Over the past two years, 28 new articles were added to Part 2 and 27 articles were updated. In the final changes for Rev. 6, several articles were moved between Parts 1 & 2. Part 2 now has 117 articles.

1. Introduction

Modern Airships is a three-part document that contains an overview of modern airship technology in Part 1 and links in Parts 1, 2 and 3 to more than 275 individual articles on historic and advanced airship and aerostat designs. This is Part 2. Here are the links to the other two parts:

- Modern Airships Part 1: <u>https://lynceans.org/all-posts/modern-airships-part-1/</u>
- Modern Airships Part 3: <u>https://lynceans.org/all-posts/modern-airships-part-3/</u>

To help you navigate the large volume of material in these three documents, please refer to following indexes. The first index simply lists the article titles in alphabetic order within each Part.

• Modern Airships – Part 1, 2 & 3 – Article title alphabetic index

Parts 1 & 2 address similar types of airships and unpowered aerostats. The following airship type index enables you to see all of the airships and aerostats addressed in Parts 1 & 2, grouped by type, with direct links to the relevant articles.

• Modern Airships – Parts 1 & 2 – Airship type index

The airships described in Part 3 are relatively exotic concepts in comparison to the more utilitarian and heavy-lift airships that dominate Parts 1 and 2. As shown in the following index, the airships in Part 3 are organized by function rather than airship type, which sometimes is difficult to determine with the information available.

• Modern Airships – Part 3 – Airship functional index

Modern Airships – Part 2 begins with a set of graphic tables that identify the airships addressed in this part, and concludes by providing links to more than 115 individual articles on those airships.

If you have any comments or wish to identify errors in these documents, please send me an e-mail to: <u>PL31416@cox.net</u>.

I hope you'll find the Modern Airships series to be informative, useful, and different from any other single document on this subject.

Best regards,

Peter Lobner

17 March 2024

2. Graphic tables

The airships reviewed in *Modern Airships - Part 2* are summarized in the following set of graphic tables that are organized into the categories listed below:

- Conventional airships
 - Rigid airships
 - Semi-rigid airships
 - Non-rigid airships (blimps)
- Variable buoyancy airships
 - Variable buoyancy, fixed volume airships
 - Variable buoyancy, fixed volume, variable vacuum airships
 - Variable buoyancy, variable volume airships
 - Variable buoyancy, hybrid thermal-gas (Rozière) airships
 - Variable buoyancy propulsion airships / aircraft
- Semi-buoyant hybrid air vehicles
 - Semi-buoyant, hybrid airships
 - Semi-buoyant, airplane / airship hybrids (Dynairship, Dynalifter, Megalifter)
 - Semi-buoyant, helicopter / airship hybrids (helistats, Dynastats, rotostats)
- Stratospheric airships / High-Altitude Platform Stations (HAPS)
- Personal gas airships
- Thermal (hot air) airships
- Electro-kinetically (EK) propelled airships
- LTA drones
- Unpowered aerostats
 - Tethered aerostats (kite balloons)
 - Tethered manned aerostats
 - Tethered LTA wind turbines
 - o Tethered heavy lift balloons
 - Free-flying high-altitude balloons

Within each category, each page of the table is titled with the name of the airship type category and is numbered (P2.x), where P2 = Modern Airships - Part 2 and x = the sequential number of the page in that category. For example, "Conventional, rigid airships (P2.2)" is

the page title for the second page in the "Conventional, rigid airships" category in Part 2. There also are conventional, rigid airships addressed in Modern Airships - Part 1. Within a category, the airships are listed in the graphic tables in approximate chronological order.

Links to the individual Part 2 articles on these airships are provided in Section 10. Some individual articles cover more than one particular airship. Have fun exploring!

Airship	Country	Airship type	Lift control	Graphic	Status
Leningrad OKB Heavy-lift rigid airships	Soviet Union	Conventional, rigid	Ballast + helium vent		Design concepts, circa 1964: L-100 single hull, L-200 twin hull, L-300 triple hull, TsM-100 metal clad. None developed.
Lightspeed USA Inc. Lightships LS-12 & -60	USA	Conventional, rigid	Vector thrust + aero lift + water ballast + helium vent	LS-60 LGHISHD LH	LS-60 preliminary design completed in May 1976. Geodesic rigid hull. Not developed
Solar Flight Sunship	USA	Conventional, rigid	Aero lift + water ballast + helium vent		Concept, circa 1990. Solar powered. Not developed.
The Hamilton Airship Company (THAC) HA-44 prototype	South Africa	Conventional, rigid	Vector thrust + aero lift + air ballast system + helium vent		Tested novel rigid frame with central spine. 1 st flight in 1998, 50 hours of test flights.

Conventional, rigid airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
The Hamilton Airship Company (THAC) HA-80 & -140	South Africa	Conventional, rigid	Vector thrust + aero lift + air ballast system + helium vent		Company went bankrupt in May 1999 due to lack of funding for the large airships.
Augur RosAeroSystems (RAS) DZ-N1	Russia	Conventional, rigid	Lift gas temperature control + aero lift + vector thrust + water ballast + helium vent		Heavy lift zeppelin- type airship design concept 2001 – 2009. Development discontinued.
Augur RosAeroSystems (RAS) MD-900	Russia	Conventional, rigid	Vector thrust + aero lift + water ballast + helium vent	POCKOMCEBEP POCCUU	Modular gondola design concept, early 2000s. Development discontinued.
Aerostatica / RosAeroSystems A-06	Russia	Conventional, rigid	Vector thrust + aero lift + ballast + helium vent	A Description of the second se	Concept, circa mid-to-late 2000s. Not developed.

Conventional, rigid airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Gibbens & Associates AirLighter 2	USA	Conventional, rigid	Vector thrust + aero lift+ ballast + helium vent		Cycloidal propeller design concept by Roy P. Gibbens, circa 2009.
TP Aerospace Atlas 80	USA	Conventional, rigid (inflated air beam primary structures)	Vector thrust + aero lift+ ballast + helium vent		Concept, development discontinued circa 2018. Assets acquired by Global Airships.
Buoyant Aircraft Systems International (BASI) MB-310	Canada	Conventional, rigid	Vector thrust + aero lift + water ballast + helium vent		Concept circa 2016, intended for fixed base operations, discontinued in favor of MB-30T.
Buoyant Aircraft Systems International (BASI) MB-30T, MB-100T	Canada	Conventional, rigid	Vector thrust + aero lift + water ballast + helium vent		MB-30T design phase started in 2017, intended for fixed base operations. MB-100T for intercontinental routes.

Conventional, rigid airships (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
FlyWin Demonstrator airship	Belgium	Conventional, rigid (H₂ lifting gas)	H ₂ lifting gas charge + aero lift + vector thrust + H ₂ vent	FEJUIN	2019 unmanned system float tests. Awaiting funds for mods & flight tests. Future unmanned cargo airship.
Flying Whales LCA60T	France	Conventional, rigid	Vector thrust + Aero lift + water ballast + helium vent	IT IT IT WEATER	Under development and well funded. Prototype 1 st flight expected in 2023 - 2024.
Transoceans Léilo	France	Conventional, rigid	Vector thrust + aero lift + ballast + helium vent	koesio and	75 m (246 ft) manned, all- electric airship absolute speed record challenger. 1 st flight 8 June 2023.
Transoceans Trans- Mediterranean airship	France	Conventional, rigid (H ₂ lifting gas)	Vector thrust + aero lift + ballast + helium vent		Concept circa 2012 for a manned, all- electric airship to cross from Monaco to Corsica.

Conventional, rigid airships (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Transoceans Trans-Atlantic airship	France	Conventional, rigid (H₂ lifting gas)	Vector thrust + aero lift + ballast + helium vent		Concept circa 2012 for manned, all- electric airship to make New York-to- Paris crossing.

Conventional, rigid airships (P2.5)

Airship	Country	Airship type	Lift control	Graphic	Status
Airstar Alpha	France	Conventional, semi-rigid (lenticular)	Vector thrust + aero lift + ballast + helium vent		Pierre Balaskovic remotely-piloted experimental lenticular airship, flew 1999 to 2002.
LTA Corp. Alizé	France	Conventional, semi-rigid (lenticular)	Vector thrust + aero lift + ballast + helium vent		Pierre Balaskovic experimental lenticular airship, flew 2005 to 2008, disassembled & in storage.
SolarAirShip High-Speed Solar Airship (HSSA)	USA	Conventional, semi-rigid	Vector thrust + aero lift + ballast + helium vent		Concept, circa 2010. Solar powered. Not developed.
Skylifter Ltd. Flying Crane, SL150, SL50, SL25 & SL20	UK	Conventional, semi-rigid (lenticular)	Helium volume control + aero lift + vector thrust + ballast + helium vent		Concept designs circa 2010. Validated with Betty and Vikki proof-of-concept demonstrators.

Conventional, semi-rigid airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Altran Aerospace Sun Cloud	France	Conventional, semi-rigid	Vector thrust + aero lift + ballast + helium vent		Concept circa 2013, Solar powered unmanned cargo airship for long- range routes. Not developed.
Aere Airships Wanderer	Turkey	Conventional, semi-rigid	Vector thrust + aero lift + ballast + helium vent	AERE	Concept unveiled 2022. Multi-role, scaleable design under development.

Conventional, semi-rigid airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
21 st Century Airships Voyager prototype	Canada	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Hokan Colting original patent circa 1992. Prototype flew 2007 - 08 as C-FJUI.
21 st Century Airships Voyager	Canada	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	Ist Century Airships Team ha.	Voyager sightseeing blimp design by Hokan Colting circa 2007. Not developed.
E-Green Technologies (EGT) Bullet 125	USA	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Reconfigured Voyager prototype, C-FJUI, flew 2008 - 10.
E-Green Technologies (EGT) Bullet 580	USA	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Based on 21 st Century Voyager. 1 st inflation test Nov 2010, then inflated at Moffett Field in Mar 2011, but not completed & flown.

Conventional, non-rigid airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
21st Century Airships & Techsphere Spherical airships	USA	Conventional, non-rigid (spherical)	Vector thrust + ballast + helium vent		Design by Hokan Colting, set world record altitude in 2003, licensed to Techsphere in 2002. Several models flew, but no orders.
Aérial Concept Group & Transoceans IRIS Challenger I & II	France	Conventional, non-rigid	Initial helium charge + ballast + helium vent		Two-place ultralight airship made 1 st solar- powered airship crossing of the English Channel in 2013.
Aerostatica A-01 & A-02	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	CONTROLING	A-01 has single- seat, 1 st flight in 1994; A-02 is similar, larger two seater, 1 st flight 1995.
Aerostatica A-300	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	TEXUNA INTERNATIONAL	Concept, circa late 1990s, three engines, nine- seats.

Conventional, non-rigid airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Augur RosAeroSystems (RAS) MA-55 & PD-300	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	RA BZD42 PocAspoCrietemal PocAspoCrietemal	Single-seat Augur MA-55 designed in 1997. PD-300 scale- up by RAS. Neither was built.
Augur RosAeroSystems (RAS) Au-11 & Au-12M	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Single seat -11 first flew in 2001. No longer in production. Two-seat -12M in production since 2004.
Augur RosAeroSystems (RAS) Au-30	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Introduced in 2006. Two crew plus up to eight passengers.
Augur RosAeroSystems (RAS) SOKOL	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Concept, circa 2015, medium altitude unmanned surveillance airship.

Conventional, non-rigid airships (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
Ural OKBD (Bimbat) Cargo blimp	Soviet Union	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Concept, circa 1980s, 2,000 kg cargo capacity. Not developed.
DKBA / Myasishchev 2DP blimp	Soviet Union	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent		Based on Airship Industries Skyship. Myasishchev to manufacture circa 1990, none built.
DKBA DP-6000 blimp	Soviet Union	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	BATA35	Concept circa late 1980s. 2-level gondola with replaceable pax / cargo modules on lower level.
Myasishchev Experimental Design Bureau (OKB-23) 2AB	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	ввс россии	Concept, circa 1990s, for a multi- mission blimp based on 2DP. Not developed.

Conventional, non-rigid airships (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Myasishchev Experimental Design Bureau (OKB-23) Cruise-1	Russia	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	Safari 	Concept, circa 1990s, for tourist airship. Not developed.
Voliris V900	France	Conventional, non-rigid	Aero lift + ballast + helium vent		First flight June 2003. Only one built. Engineering development vehicle.
Vantage Airship Manufacturing Co., Ltd. CA-80, -150, -180 & -300	China	Conventional, non-rigid	Aero lift + ballast + helium vent		Family of manned blimps from 42 – 65 m (138 – 213 ft) in length. Current products.
Aviation Industry Corporation of China (AVIC) AS700	China	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	AS700 Samaringens	Development started in 2018. Chinese type certificate issued Dec 2023.

Conventional, non-rigid airships (P2.5)

Airship	Country	Airship type	Lift control	Graphic	Status
Atlas LTA Advanced Technology Atlas-6 & -11	Israel	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	ATLAS	Currently under development. Unmanned electric variant also will be available.
Aerovehicles Inc. (AVI) AV-10	Argentina	Conventional, non-rigid	Vector thrust + aero lift + ballast + helium vent	Ori	Pax, cargo or mix in reconfigurable gondola. Design complies with existing blimp regs. Awaiting funding.

Conventional, non-rigid airships (P2.6)

Airship	Country	Airship type	Lift control	Graphic	Status
Varialift Airships Plc. ARH-PT, ARH 50 & ARH 250	UK	Rigid, variable buoyancy, fixed volume	Lift gas pressurization / release + vector thrust + aero lift		Test rig validated design circa 2011. Manufacturing facility being built. Prototype ARH-PT being built.
Euro Airship 10T (formerly Corsair)	France	Rigid, variable buoyancy, fixed volume	Air ballast pressurization / release + vector thrust + aero lift		Partially solar powered. Construction-ready plans.
Euro Airship 50T (formerly DGPAtt)	France	Rigid, variable buoyancy, fixed volume	Air ballast pressurization / release + vector thrust + aero lift		Construction-ready plans.
Skylite Aeronautics GeoShip	USA	Rigid, variable buoyancy, fixed volume	Air ballast pressurization / release + aero lift		Conceptual design circa 2011. Solar powered. Not developed.

Variable buoyancy, fixed volume airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Aerovehicles Inc. (AVI) Minicat & Aerocat R-12 & R-40	Argentina	Rigid, variable buoyancy, fixed volume	Lift gas pressurization / release + vector thrust + aero lift		Development on temporary hold in 2022, with work refocused on AV-10 large blimp.
LTA Aerostructures LTA-10 & LTA-70	Canada	Rigid, variable buoyancy, fixed volume, lenticular	Lift gas pressurization / release + vector thrust + aero lift		Conceptual design phase 2014-2015. Company failed circa 2018. Assets acquired by Global Airships.
Global Airships Atlas	USA	Rigid, likely variable buoyancy, fixed volume	Proprietary variable buoyancy system + vector thrust + aero lift	GLOBAL AIRSHIPS	Conceptual design circa 2019.
Imaginactive Alert, Invitation & Kugaaruk	Canada	Rigid, variable buoyancy, fixed volume	Lift gas pressurization / release + vector thrust + aero lift	*	Conceptual designs, similar configuration, circa 2014 - 2018, intended for Arctic use.

Variable buoyancy, fixed volume airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Kiev OKBV D-1	Russia	Rigid, variable buoyancy, fixed volume	Air ballast pressurization / release + vector thrust + aero lift		Concept, circa mid-1960s, 14 MT payload. D-1M1 & larger D-2, D-4 & D- 4 airships planned. Not developed.
Krylo Design Bureau (Shalaev) SHa-2000	Russia	Rigid, variable buoyancy, fixed volume	Proprietary variable buoyancy system + vector thrust + aero lift		Concept pre-2013 for very heavy cargo carrier, payload 2,000 MT.
Third Dimension Project SHa-3500 RVK	Russia	Rigid, variable buoyancy, fixed volume	Proprietary variable buoyancy system + vector thrust + aero lift	24 м 24 м 150 м 150 м 150 м 150 м 150 м 250 тонн 250 тонн 250 тонн 250 тонн	Optionally manned concept circa 2013, adaptation of Shalaev design for New Silk Road, payload 3,500 MT.
Augur RosAeroSystems (RAS) ATLANT 30 & 100	Russia	Rigid, variable buoyancy, fixed volume	Air ballast & lift gas pressurization / release + vector thrust + aero lift		Development started in early 2000s. Israeli firm Atlas LTA acquired RAS circa 2018 and is continuing development.

Variable buoyancy, fixed volume airships (P2.3)

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Airship	Country	Airship type	Lift control	Graphic	Status
Airship-GP "Super Hybrid" AeroTruck, AeroBoat & AeroYacht	Russia	Rigid, variable buoyancy, fixed volume	Lift gas pressurization / release + vector thrust + aero lift	(RP-100)	Conceptual "super hybrid" designs circa 2011, also available as a simpler hybrid airship w/o variable buoyancy control.
Atlas LTA Advanced Technology ATLANT 30, 100 & 300	Israel	Rigid, variable buoyancy, fixed volume	Air ballast & lift gas pressurization / release + vector thrust + aero lift	AT-LIZOLE ST LANTA	Conceptual design phase. Atlas LTA acquired Augur RAS circa 2018.
H2 Clipper, Inc. H2 Clipper hydrogen transport	USA	Rigid, variable buoyancy, fixed volume (H ₂ lifting gas)	H₂ variable buoyancy control system + vector thrust + aero lift	Clipper *	Patented & under development since 2008. Sub-scale prototype by 2025. Full-scale by 2029.
Euro Airship Solar Airship One	France	Rigid, variable buoyancy, fixed volume	Air ballast pressurization / release + vector thrust + aero lift	SOLAR AIRSHIP DNE	Announced in Jan 2023. Plans 1 st around-the-world, non-stop, solar- powered flight in 2026.

Variable buoyancy, fixed volume airships (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Anumá Aerospace Corp. Partial vacuum airship	USA	Rigid, variable buoyancy, fixed volume, variable vacuum	Variable vacuum		Conceptual design phase, patented 2020. Aerostat, drone & cargo airship planned.
llia Toli Partial vacuum airship	USA	Rigid, variable buoyancy, fixed volume, variable vacuum	Variable vacuum		Conceptual design phase, patent application filed.

Variable buoyancy, fixed volume, variable vacuum airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Dynapod Inc. Dynapod	USA	Variable buoyancy, variable volume ("origami" folding hull)	Alter volume of ammonia lift gas & envelope + vector thrust + aero lift		Patented design concept by A. C. Davenport, circa mid-1970s. Not developed.
Ural OKBD (Bimbat) Ural-2	Soviet Union	Variable buoyancy, variable volume ("ballastless" Airship)	Expandable longitudinal gores in envelope provide volume control		USSR author's certificate No. 198925 awarded for ballastless design. Appeared in 1965 film "The Hyperboloid of Engineer Garin."
Ural OKBD (Bimbat) Ural-3	Soviet Union	Variable buoyancy, variable volume, (vertical wing "ballastless" Airship)	Expandable gores in the envelope provide volume control		First flight in 1982. First use of an airship operating as a "flying crane."

Variable buoyancy, variable volume airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Ural OKBD (Bimbat) Vertical wing airship	Soviet Union	Variable buoyancy, variable volume, (vertical wing "ballastless" airship)	Volume control system + vector thrust		Concept, circa 1980s, based on Ural-3. One or more vertical wing airships could be connected to lift very heavy sling loads. Not developed.
Ural OKBD (Bimbat) Horizontal wing airship	Soviet Union	Variable buoyancy, variable volume ("ballastless" Airship)	Volume control system + vector thrust		Concepts, circa 1980s, with several tailplane configurations. Internal cargo or sling loads. Not developed.
Ural OKBD (Bimbat) Double hull airship	Soviet Union	Variable buoyancy, variable volume ("ballastless" Airship)	Volume control system + vector thrust		Concept, circa 1980s, for a flying crane with a supplementary upper hull that can be attached to provide additional lift. Subscale model flew in early 1990s but not developed.

Variable buoyancy, variable volume airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Ural OKBD (Bimbat) Triangular (delta) wing airship	Soviet Union	Variable buoyancy, variable volume ("ballastless" Airship)	Volume control system + vector thrust	A state of the sta	Concept, circa 1980s, for a heavy cargo airship to carry a large external load. Not developed.
Ural OKBD (Bimbat) Lenticular airship	Soviet Union	Variable buoyancy, variable volume ("ballastless" Airship)	Volume control system + vector thrust		Concept, circa 1980s, for a flying crane. Subscale lenticular model flown, but not developed.
PK Vozdukh All-metal variable volume airship	Soviet Union	Variable buoyancy, variable volume ("ballastless" Airship)	Volume control system + vector thrust		Concept for cargo airship for handling external sling loads. Not developed.

Variable buoyancy, variable volume airships (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
Voliris V901	France	Variable volume, semi-buoyant, non-rigid	Variable helium volume + aero lift		Sub-scale Demonstrator; 1 st flight in 2012.
Voliris V930	France	Variable volume, semi-buoyant, semi-rigid	Variable helium volume + aero lift	VOLIRIS DEV21	Unveiled in 2012. Development later cancelled, redirected to NATAC V932.
EADS Tropospheric airship	France	Variable buoyancy, variable volume (twin-hull)	Variable helium volume + vector thrust + aero lift		Conceptual design, model displayed at Paris Air Show 2013.
Aero-Nautic Services & Engineering (A-NSE) A-N1800 Hydroblimp	France	Variable buoyancy, variable volume, semi-rigid (tri-lobe hull)	Variable helium volume + vector thrust + aero lift		Concept, circa late 2010s, equipped with floats for water landing, optionally piloted.

Variable buoyancy, variable volume airships (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Aero-Nautic Services & Engineering (A-NSE) A-N20 000	France	Variable buoyancy, variable volume, semi-rigid (tri-lobe hull)	Variable helium volume + vector thrust + aero lift	ANTE AND	Concept, circa late 2010s for multi- mission, medium- lift airship, 8 – 12 MT payload.
Voliris V902 mini-NATAC	France	Variable buoyancy, variable volume, non-rigid (inflated wing)	Variable helium volume + aero lift		Sub-scale, mini-NATAC demonstrator 1 st flight in 2017.
Voliris NATAC V932	France	Variable buoyancy, variable volume, non-rigid (inflated wing)	Variable helium volume + aero lift		Active development program, 2023.
Voliris SeaBird	France	Variable buoyancy, variable volume, non-rigid (inflated wing)	Variable helium volume + aero lift		Active development program, 2023.

Variable buoyancy, variable volume airships (P2.5)

Airship	Country	Airship type	Lift control	Graphic	Status
Aeroplatform Initiative Design Bureau Aerosmena (AIDBA) A-20, A60, A200 & A600	Russia	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust + aero lift	Addition of the second se	Designed by Orpheus Kozlov, AIDBA formed in 2015, R&D for A20 complete in 2017, 1 st flight possible by mid-2020s.
LokomoSky LokomoSkyner	Russia	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust + aero lift		Design concept, 2005 – 2012. 1/7 th - scale demonstrator flew in 2009. Not developed.
Design Bureau Thermoplan ALA-40 Thermoplane prototype	Russia	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust + aero lift		Moscow Aviation Institute started project in late 1970s. 1/5 th scale ALA-40 damaged after 1992 rollout. Never flew.
Design Bureau Thermoplan ALA-200 Thermoplane	Russia	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust + aero lift	Thermopian ALA-200 (200 mètres de diamètre) Fuseiage d'Antonive 124	

Variable buoyancy, hybrid thermal (Rozière) airships (P2.1)

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Airship	Country	Airship type	Lift control	Graphic	Status
Thermo-Skyships Ltd. (TSL) Thermo-Skyship sub-scale demonstrator	UK	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust	SHY SHIP	John West design concept circa 1972. 30-ft demonstrator flew indoors in April 1975.
Thermo-Skyships Ltd. (TSL) Thermo-Skyship	UK	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust + aero lift	E CONTRACTOR	Several design iterations, development ended circa 1982.
Lockheed Corp. Starship SRA	USA	Hybrid thermal airship	Two lifting gases: helium & variable temperature air + vector thrust + aero lift	Riccheed sums	Small rigid airship (SRA) designed by Roy P. Gibbens, circa 1983. Not developed.
Gibbens & Associates AirLighter	USA	Hybrid thermal airship	Two lifting gases: helium & variable temperature air + vector thrust + aero lift	And a state	Derived from Lockheed Starship, Roy P. Gibbens, 1990. Not developed.

Variable buoyancy, hybrid thermal (Rozière) airships (P2.2)

Modern Airships - Part 2 - Rev. 6

Airship	Country	Airship type	Lift control	Graphic	Status
Boeing Hybrid thermal airship	USA	Hybrid thermal airship (lenticular)	Two lifting gases: helium & variable temperature air + vector thrust + aero lift		Patented design concept circa 2008 – 2010 for military airship with 8 MW solar power for directed energy weapons.

Variable buoyancy, hybrid thermal (Rozière) airships (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
Solomon Andrews Aereon I & II	USA	Conventional, triple hull, non-rigid	Aerostatic & aerodynamic lift + center of gravity control + hydrogen vent + disposable ballast		First patent and demonstration of variable buoyancy propulsion in 1863.
Utah Aereon Corp. SA-1	USA	Variable volume, non-rigid	Aerostatic & aerodynamic lift + variable helium volume + helium vent + disposable ballast	NIMAR CONTRACTOR	Twin hull airship designed by Leslie Warner. Flight tested in 1980.
Walden Aerospace/LTAS HY-SOAR B.A.T.	USA	Rigid, fixed-wing, ultra-light class aircraft	Helium Density Controlled Buoyancy (DCB) system enables buoyant & semi- buoyant flight		Single person aircraft design concept by Michael Walden, circa 1990s.
Walden Aerospace/LTAS VAMPIRE	USA	Rigid, fixed wing aircraft	Helium Density Controlled Buoyancy (DCB) system enables buoyant & semi- buoyant flight		3 or 4 person aircraft design concept by Michael Walden, intended for around-the- world flight, circa 1990s.

Variable buoyancy propulsion airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
New Mexico State University Advanced High- Altitude Aerobody (AHAB)	USA	Non-rigid, semi-buoyant aerobody	Helium control + center of gravity control		Sub-scale, solar powered model indoor test flight demonstrated variable buoyancy propulsion in the early 2000s.
Hunt Aviation Gravity plane	USA	Rigid, variable geometry, semi-buoyant aircraft	Originally: helium lift gas control system. By 2010, used phase-change working fluid cycle, possibly ammonia.	PLAY VIDEO	Concept unveiled in October 2003.
Phoenix	UK	Semi-rigid, semi-buoyant, fixed wing, airship	Helium control + center of gravity control		Sub-scale, solar powered model demonstrated variable buoyancy propulsion in 2019.

Variable buoyancy propulsion airships (P2.2)
Airship	Country	Airship type	Lift control	Graphic	Status
Millennium Airship SkyFreighter SF20T, SF50T & SF500T	USA & Canada	Semi-buoyant hybrid, semi-rigid	Proprietary Integrated Thrust and Maneuvering Management System (ITAMMS)		Development plan & industrial team defined, 1st production craft 6- 7 years after financing in place.
Dirisolar DS 12, DS 900, DS 1500 & DS 30	France	Semi-buoyant hybrid, rigid	Vector thrust + aero lift + ballast + helium vent	DIRISOLAR	Concceptual design, solar powered.
Airship-GP AeroTruck, AeroBoat & AeroYacht	Russia	Semi-buoyant hybrid, semi-rigid	Vector thrust + aero lift + ballast + helium vent	CR-100	Conceptual hybrid designs, also available as "super hybrid" with variable buoyancy control.
Turtle Airships	Spain	Semi-buoyant hybrid, semi-rigid	Vector thrust + aero lift + ballast + helium vent		Design concept by Darrell Campbell circa early 1980s. Solar powered.

Semi-buoyant, hybrid airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Nautilus SpA Elettra Twin Flyers (ETF)	Italy	Semi-buoyant hybrid, semi-rigid	Vector thrust + aero lift + ballast + helium vent		Conceptual design circa 2013 evolved from twin to mono-hull.
Flying-Yacht	Canada	Semi-buoyant hybrid, non-rigid (pressurized passenger deck structure)	Flies in ground effect, lift is controlled by airspeed	the flying yacht.com	Hokan Colting preliminary design circa 2012, based on EGT Bullet. Not developed.
Magnus Aerospace Corp. LTA 20-1	Canada	Semi-buoyant hybrid, semi-rigid	Magnus effect + vector thrust		Rotating gas envelope generates Magnus lift. Patented & developed early-to- mid 1980s. 19-ft diameter Carleton demonstrator flew. Not developed.

Semi-buoyant, hybrid airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Dolphin Luftshiff Cargo / passenger transport	Former East Germany	Semi-buoyant hybrid, rigid	"Corrugated" propellers + aero lift		Design & patents by Wilhelm Schmidt & Ulrich Queck, 1960s – 1980s. Not developed.
MBDA Armatus airship	Germany	Semi-buoyant hybrid, semi-rigid	Vector thrust + aero lift + ballast + helium vent		Armed twin-hull unmanned airship with drone launchers, flies at medium altitude. Not developed
Kamov Company Aerolet	Russia	Semi-buoyant hybrid, semi-rigid, ("ballastless" airship)	Vector thrust + aero lift + helium vent	РОССИЯ	Powerful rotor system compensates for weight change during load exchange. Not developed.
Krylo Design Bureau SHa-10b	Russia	Semi-buoyant hybrid, non-rigid	Vector thrust + aero lift + ballast + helium vent	SHa~10b RURA	Concept pre-2013 for 10 metric ton regional transport. Not developed.

Semi-buoyant, hybrid airships (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
Chinese Academy of Sciences Hybrid airship for airborne electromagnetic (AEM) surveys	China	Semi-buoyant hybrid, non-rigid	Vector thrust + aero lift + ballast + helium vent		Flew in 2015 with ground penetrating radar.
Vantage Airship Manufacturing Co., Ltd. CT-60T & CT-200T	China	Semi-buoyant hybrid airship, non-rigid	Aero lift + vector thrust + ballast + helium vent	A LA	Conceptual design circa 2015; seeking development partners.

Semi-buoyant, hybrid airships (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Ural OKBD (Bimbat) Hybrid winged airship	Soviet Union	Semi-buoyant hybrid, semi-rigid, fixed wing aircraft	Aero lift		Concept, circa 1980s. Not developed.
Solar Ship Caracal	<mark>Canad</mark> a	Semi-buoyant hybrid, semi-rigid, inflated wing aircraft	Aero lift	Solorshy Contractions	20 meter solar powered prototype flew in 2014. Discontinued after crash during Test & Eval program.
Solar Ship Wolverine	Canada	Semi-buoyant hybrid, semi-rigid, inflated aerobody aircraft	Aero lift	PEACE + REEEDOM	Designed to carry five metric tons. Solar powered. Design updated after 2017 prototype tests.
Solar Ship Nanuq	Canada	Semi-buoyant hybrid, semi-rigid, inflated aerobody aircraft	Aero lift	PEACE+FREEDOM	Heavy-lift cargo airship. Solar powered. Design updated based on 2017 Wolverine prototype testing.

Semi-buoyant, airplane / airship hybrids (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Tumenecotrans BARS & Bella-1	Soviet Union / Russia	Semi-buoyant hybrid aircraft, rigid	Aero lift + lift fan		Prototype developed with SibNIIA; Bella-1 1 st flight in 1995; now in storage.
Tumenecotrans Rescue sloop	Russia	Semi-buoyant hybrid, rigid, fixed wing aircraft	Aero lift + lift fan		Manned concept circa 2013 for Third Dimension Project, based on Bella-1 flown in 1995.
Tumenecotrans "Micro" RVK	Russia	Semi-buoyant hybrid, rigid, fixed wing aircraft	Aero lift + lift fan		Unmanned concept circa 2013 for Third Dimension Project, based on manned Bella-1.
Nimbus s.r.l. Eos Xi	Italy	Semi-buoyant hybrid, semi-rigid, inflated wing aircraft	Aero lift	nimbus	Small, unmanned, solar powered aircraft 1 st displayed at 2007 Paris Air Show. Wingspan of 6.5 m (21.3 ft).

Semi-buoyant, airplane / airship hybrids (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Nimbus s.r.l. Metaplano T8, T10, T15, T30 and T60	italy	Semi-buoyant hybrid, semi-rigid, inflated wing aircraft	Aero lift		Concepts circa 2000 for a family of large, solar powered, semi- buoyant, inflated wing, optionally manned aircraft.
Prospective Concepts AG Stingray	Czech Republic	Semi-buoyant hybrid, semi-rigid, inflated wing aircraft	Aero lift		Single seat, 13 m (42.6 ft) wingspan. Flew 1995 – 2000. Can fly with helium lift gas or just air.
Egan Airships PLIMP Model D drone	USA	Semi-buoyant plane / blimp hybrid (PLIMP)	Aero lift + vector thrust	Dimo	Prototype flew in 2018. FAA certification in progress.
Egan Airships PLIMP Model J	USA	Semi-buoyant plane / blimp hybrid (PLIMP)	Aero lift + vector thrust		Announced in Nov 2018.

Semi-buoyant, airplane / airship hybrids (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
PK Vozdukh Multi-purpose, helicopter / airship hybrid	Soviet Union	Helistat (helicopter / airship hybrid)	Buoyant envelope + two helicopter rotor systems	Pieco nooco	Concept. 10 MT payload. Not developed.
Kiev OKBV Albatros	Russia	Helistat (helicopter / airship hybrid)	Buoyant envelope + two helicopter rotor systems	MARINA ALISATIPOL PERFIN	Concept, circa 1991, in collaboration with aircraft manufacturer Antonov. Not developed.
Myasishchev Experimental Design Bureau (OKB-23) VS-80 Vertostat	Russia	Helistat (helicopter / airship hybrid)	Two buoyant envelopes + two rotors along the centerline	CCCCREWTO CCCCCREWTO CCCCRE CCCCREWTO CCCCREWTO CCCCRE CCCCREWTO CCCCRE CCCCRE CCCCRE	Concept, circa 1990. 80 MT payload. Not developed.
Myasishchev Experimental Design Bureau (OKB-23) VS-90 Vertostat	Russia	Helistat (helicopter / airship hybrid)	Two buoyant envelopes + 2 or 3 rotor along the centerline + outboard propellers	c) bace Trans/Barro Trans	Concept, circa 1990. Not developed.

Semi-buoyant, helicopter / airship hybrids (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Thales Alenia Space Stratobus	France	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent	ThalesAlenia	Multi-mission pseudo satellite at 20 km. Official project launch in 2016, first flight planned 2024.
TAO Group SkyDragon	Germany	Non-rigid, stratospheric (segmented gas envelope)	Initial helium charge + fuel gas + ballast + helium vent		STS-111 sub-scale prototype flew in 2009. SkyDragon development continuing.
Atlas LTA Advanced Technology PAHAP	Israel	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent		Pseudo satellite at 16 – 22 km. Propulsion Assisted High Altitude Platform (PAHAP) Discontinued.
Sceye Inc. Stratospheric airship	USA	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent		Pseudo satellite at 20 km. Sub-Scale Vehicle (SSV) flew in 2017. Active flight test program underway since 2017.

Stratospheric airships / High-Altitude Platform Stations (HAPS) (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
ESA / Lindstrand High-Altitude Long-Endurance (HALE) aerostatic craft	EU	Semi-rigid, stratospheric	Initial helium charge + ballast + helium vent		20 km pseudo satellite for communications, astronomy. Design concept.
Galileo Systems Graf Galileo	USA	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent	USA	HAPS design concept. Circa 2008.
Sanswire Stratellite One	USA	Rigid, stratospheric	Initial helium charge + ballast + helium vent		Full size airship built & float tested in 2005. Abandoned in 2007. Never flew.
Sanswire / WSGI Argus One	USA	Non-rigid, stratospheric (segmented gas envelope)	Initial helium charge + ballast + helium vent		Development of TAO STS-111, flew 2009 – 2011. Work on full-size 70 meter version discontinued.

Stratospheric airships / High-Altitude Platform Stations (HAPS) (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
StratXX X-Station	Switzerland	Non-rigid, maneuverable stratospheric balloon with "fly-down" recovery vehicle	Initial helium charge + ballast + helium vent	KSTATION 100	Founded 2005. Successful with aerostats, but not with X-Station. Filed for bankruptcy in 2019.
Beijing Aerospace Technology Co. & BeiHang Yuanmeng (Dream)	China	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent		75 m prototype, multi-mission airship. 1 st flight in October 2015. Similar layout to Graf Galileo.
NASA 20-20-20 airship challenge	USA	Non-rigid or semi-rigid, stratospheric	Initial helium charge + ballast + helium vent		Planned design competition for stratospheric astronomical & earth observatory, 20 km, 20 hours, 20 kg payload.

Stratospheric airships / High-Altitude Platform Stations (HAPS) (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
EU CAPANINA	EU	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent	Cipanya	2003 – 2007 program focus on communications system design from a notional airship.
Augur RosAeroSystems HAA Berkut	Russia	Semi-rigid, stratospheric	Initial helium charge + ballast + helium vent		Design concept, multi-mission airship, circa 2015. Not developed.
Aerostatica Stratospheric airship	Russia	Semi-rigid, stratospheric	Initial helium charge + ballast + helium vent		Design concept circa 2015, for a laser power transmission system.
Stratosys Skyrider	Czech Republic	Semi-rigid, stratospheric	Initial helium charge + ballast + helium vent	STRATOSYST	Under development since 2017 for telcom applications, also for interplanetary mission applications.

Stratospheric airships / High-Altitude Platform Stations (HAPS) (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Capgemini Engineering (formerly Altran Aerospace) EcoSat AS30 (prototype)	France	Semi-rigid, stratospheric	Initial helium charge + ballast + helium vent		1/3-scale prototype displayed at 2019 5G European Forum, intended to validate platform systems.
Capgemini Engineering (formerly Altran Aerospace) EcoSat AS80	France	Semi-rigid, stratospheric	Initial helium charge + ballast + helium vent		Multi-mission airship, intended for continuous, autonomous operation in the stratosphere.
Strasa.Tech HAPS multi- mission platform	Israel	Non-rigid, stratospheric	Initial helium charge + variable buoyancy control system		Sub-scale demonstrator introduced May 2022. Partnered with Atlas LTA Adv Tech. Replaces Atlas PAHAP.
Avealto Ltd. Wireless Infrastructure Platform (WIPS)	UK	Non-rigid, stratospheric	Initial helium charge + ballast + helium vent	AVEALTO	Test vehicle unveiled 2023. WIPS may be powered by microwaves beamed from ground station.

Stratospheric airships / High-Altitude Platform Stations (HAPS) (P2.5)

Airship	Country	Airship type	Lift control	Graphic	Status
Italian Aerospace Research Center (CIRA) Hybrid High Altitude Airship (HHAA)	Italy	Hybrid, stratospheric	Initial helium charge + aero lift + ballast + helium vent		Development started about 2017. Selected for EuroHAPS funding Mar 2023 for flight demonstrator.

Stratospheric airships / High-Altitude Platform Stations (HAPS) (P2.6)

Airship	Country	Airship type	Lift control	Graphic	Status
Project Sol'R Nephelios	France	Ultra-light (ULM Class 5) non-rigid blimp (all-electric)	Vector thrust + ballast + helium vent	MISSING MISSIN	Single seat, solar-powered, all- electric. 1 st flight in 2009.
Airstar Electroplume 250	France	Ultra-light (ULM Class 5) non-rigid blimp	Vector thrust + ballast + helium vent	O PA	Single seat, 1 st flight in 2005.
Airstar Electroplume 320	France	Ultra-light (ULM Class 5) non-rigid blimp	Vector thrust + ballast + helium vent		Single seat, all- electric. 1 st flight at the September 2009 Coupe Icare.
Airstar Elliptoplume 150	France	Ultra-light (ULM Class 5) non-rigid blimp	Vector thrust + ballast + helium vent		Single seat, elliptical envelope, all-electric. Introduced at September 2009 Coupe Icare.

Personal gas airships (P2.1)

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Personal gas airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Airstar Manned AéroLifter	France	Ultra-light (ULM Class 5) non-rigid blimp	Vector thrust + ballast + helium vent	Carlos Ca	Single seat, all electric. 1 st flight in 2015, adaptation of AeroLifter drone for logging.
Aero-Nautic Services & Engineering (A-NSE) A-N400	France	Ultra-light non-rigid blimp	Vector thrust + ballast + helium vent		Single seat, twin engine blimp can be used as a patrol blimp with sea-landing system.
Shi Songbo Personal blimp	China	Ultra-light non-rigid blimp (H ₂ lifting gas)	Vector thrust + ballast + hydrogen vent		Self-built, 23 m (75 ft) long, two seat. 1 st flight in 2015.

Airship	Country	Airship type	Lift control	Graphic	Status
Ural OKBD (Bimbat) Thermostat ("spindle")	USSR	Non-rigid thermal airship	Hot air control + ballast		Concept, circa 1980s, fueled by natural gas in blisters on the gas envelope. Not developed.
Ural OKBD (Bimbat) Thermostat (lenticular)	USSR	Non-rigid thermal airship	Hot air control + ballast		Concept, circa 1980s. Also a "Heliostat" version with solar arrays on the hull for supplementary power. Not developed.
Augur RosAeroSystems (RAS) Au-29 Finch	Russia	Non-rigid thermal airship	Hot air control		Built in 2005. Set three records for FAI class BX-02.

Thermal (hot air) airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Augur RosAeroSystems (RAS) Au-31 Woodpecker	Russia	Non-rigid thermal airship	Hot air control		Single person "micro" thermal airship, built in 2003.
Augur RosAeroSystems (RAS) Au-35 Polar Goose	Russia	Non-rigid thermal airship	Hot air control	метрополь	17 August 2006, establishing FAI Class-B (airship) absolute altitude record.
Augur RosAeroSystems (RAS) Au-37 Merciless	Russia	Non-rigid thermal airship	Hot air control		Established two FAI subclass VK-03 world records in 2009.

Thermal (hot air) airships (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Airstar Colibri	France	Non-rigid thermal airship	Hot air control + ballast		Introduced at the 2009 Coupe Icare (Icarus Cup) in Grenoble.

Thermal (hot air) airships (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
LTAS XEM-1	USA	Rigid, solar powered, hybrid EK drive	Aerostatic + ballast	6	Sub-scale, proof- of-concept demonstrator, design by Michael Walden, indoor EK flight tests 1974 - 1977.
LTAS EK-1	USA	Conventional, non-rigid, skin integrated EK drive	Aerostatic + ballast		Sub-scale, proof- of-concept demonstrator, design by Michael Walden, indoor EK flight tests in 2003.
Walden Aerospace Big Black Delta (BBD)	USA	Rigid, EK drive	Variable buoyancy control		Concept design by Michael Walden circa 2002.
Festo b-IONIC Airfish	Germany	Non-rigid, EK drive	Aerostatic + ballast		Indoor EK flight tests in 2005.

Electro-kinetically (EK) propelled airships (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Airspeed Airships AS-series blimps (200, 260, 300, 400, 500, 800)	UK	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Firm in business from mid-1980s to early-2000s. Various models ranging from 4 to 13.5 m (13 to 36 ft).
Information Technology Institute, Campinas AURORA	Brazil	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Airspeed Airships AS-800 adapted in 2001 for semi- autonomous flight research. Blimp updated in 2006.
LAAS / CNRS Karma (V1)	France	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Airspeed Airships AS-500 adapted in 2002 for semi- autonomous flight research. Replaced in 2003.
LAAS / CNRS Karma V2.0	France	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Replacement for Karma (V1), 1 st flew in 2003, continued semi-autonomous flight research & development.

LTA drones (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
TAO Group Lotte drone	Germany	Conventional, non-rigid drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent	Inches Parties	16 m (52.5 ft) Lotte- 1 1 st flight in 1992. Lotte-2 & -3 continued flying until 2014.
Hemeria (formerly CNIM Air Space and Airstar Aerospace) Diridrone	France	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent		Under development since 2017, 14 m (48 ft) multi-mission drone carries 10 kg (22 lb) payload.
Jülich Institute FieldShip UAV blimp	Germany	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		10 meter (32.8 ft) long, battery powered UAV blimp supports agricultural research.

LTA drones (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
"BAK and Technologies" Research & Development Center BAK EM50 drone	Belarus	Conventional, non-rigid drone blimp	Aero lift + vector thrust + ballast + helium vent	ОТИ НАНБеларуси	8.8 m (28.5 ft) multi-mission LTA drone. 1 st flight in 2014. Manufacturing capability in place awaiting orders.
DKBA Lenticular airship demonstrator drone	Russia	Conventional, semi-rigid, drone airship (lenticular)	Aero lift + vector thrust + ballast + helium vent		2.4 m (7.9 ft) diam. technology demonstrator, flew indoors in 2009.
DKBA DP-27 Anuta drone	Russia	Conventional, semi-rigid, drone airship (lenticular)	Aero lift + vector thrust + ballast + helium vent	AHIOTA	16 m (62.5 ft) diam. multi-mission drone. 1 st flight in Sep 2011. Development discontinued.
DKBA DP-29 drone	Russia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Multi-mission LTA drone. 1 st flight in September 2014. Larger cargo drone version expected in early 2000s.

LTA drones (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
DKBA Aerocrat REP (Robotic electrically powered platform)	Russia	Conventional, semi-rigid, drone airship (lenticular)	Aero lift + vector thrust + ballast + helium vent	A CONTRACT OF CONTRACT	Concept, circa 2009 – 2014, 45 m (148 ft) diam. multi-mission drone. Development discontinued.
Ural OKBD (Bimbat) Ural-4 (MIASS-1)	Russia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	WIND THEIR WHACC'S	"Ecology service" airship built in 1990 for the Central Design Bureau of Rocket & Space Systems (MIASS).
Airstar Canada Cargo drone	Canada	Conventional, semi-rigid, drone airship (all-electric)	Aero lift + vector thrust + ballast + helium vent		Circa late 2010s, cargo carried on external sling, three electric- powered propellers.

LTA drones (P2.4)

Airship	Country	Airship type	Lift control	Graphic	Status
Aerotain AG Skye drone	Switzerland	Conventional, non-rigid, drone blimp (spherical, all-electric)	Helium charge + vector thrust + ballast ("tuning weights") + helium vent		Entertainment drone, 2.7 m (8.6 ft) diameter, capable of collision-free choreographed group flights.
StratXX PhoeniXX	Switzerland	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	PHOENIXX	Concept circa 2010. Multi- mission, medium altitude, works with X-Bugs. Filed for bankruptcy in 2019.
StratXX X-Bugs	Switzerland	Conventional, semi-rigid	Vector thrust + aero lift + ballast + helium vent		Twin hull concept, circa 2010s, about 150 m ³ (5,300 ft ³) total. Works with PhoeniXX LTA drone.
Transoceans Léilo subscale demonstrator	France	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent		Approx. 6 m (20 ft) sub-scale model of Léilo airship speed record challenger. Flown in 2015.

LTA drones (P2.5)

Airship	Country	Airship type	Lift control	Graphic	Status
Hipersfera d.o.o. 1SM scale model drone	Croatia	Conventional, rigid, drone blimp (ellipsoidal, all-electric)	Aero lift + vector thrust + ballast + helium vent		Technology demonstrator model, diameter about 3.6 m (11.9 ft), indoor & outdoor flight tests in 2010.
Hipersfera d.o.o. HS-5K multi-mission drone	Croatia	Conventional, rigid, drone blimp (ellipsoidal, all-electric)	Aero lift + vector thrust + ballast + helium vent		Hypersphere airships & tethered aerostat integrates via ground system for data processing & distribution.
Cloudline Pre-production UAV cargo blimp	South Africa	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent	Cloudline	1 st flight in 2018, 10 kg (22 lb) payload, range 50 km (31 miles).
Cloudline Production UAV cargo blimp	South Africa	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent		Production prototype UAV blimp flying in 2022. Aviation regulatory reviews in progress in several countries.

LTA drones (P2.6)

Airship	Country	Airship type	Lift control	Graphic	Status
Shanghai Jiao Tong University Zhiyuan-1 (ZY-1)	China	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent		Flew 2007 – 2009, as a flight control system tech demonstrator. Built by SAS.
Shanghai Jiao Tong University Tianzhou-1	China	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent		2013 flights tested performance & stability with a single vectoring stern propeller.
Hangzhou Gauss Inflatable Tech Co. Alibaba Cloud drone blimp	China	Hybrid, non-rigid drone blimp	Aero lift + vector thrust + ballast + helium vent	C_3 AlbabaCloug 天空猫联网 LoRa g	20 m hybrid airship shape resembling 2006 Lockheed Martin P791. Flew tethered in 2018, but claimed to be capable of free flight.
Hangzhou Gauss Inflatable Tech Co. Family of small drone blimps	China	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		8 to 30 m (26 to 98 ft) drone blimps. Current products.

LTA drones (P2.7)

Airship	Country	Airship type	Lift control	Graphic	Status
Suzhou Ark Aviation Technology Co. Ltd. (SAS) FZ-series blimp drones	China	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Current product line, scalable, available in a range of sizes & configurations, circa 2022.
Suzhou Ark Aviation Technology Co. Ltd. (SAS) 93-meter (305-ft) long-range blimp drone	China	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Custom drone for Chinese People's Liberation Army, circa 2014.
Suzhou Ark Aviation Technology Co. Ltd. (SAS) 30-meter (98.4-ft) lenticular blimp drone	China	Conventional, non-rigid, drone blimp (ellipsoidal)	Helium charge + vectored thrust + ballast		Custom drone for School of Aeronautics and Astronautics at Shanghai Jiaotong University.
Suzhou Ark Aviation Technology Co. Ltd. (SAS) 25-meter (82-ft) blimp drone	China	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	**	Custom drone for Beijing Sky High Technology Co. Ltd.

LTA drones (P2.8)

Airship	Country	Airship type	Lift control	Graphic	Status
Suzhou Ark Aviation Technology Co. Ltd. (SAS) 16-meter (52.5 ft) blimp drone	China	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Custom drone for Harbin Institute of Technology.
Vantage Airship Manufacturing Co., Ltd. CA-24R, -25R, -30R, -32R & -36R drones	China	Conventional, non-rigid, drone blimp	Aero lift + ballast + helium vent	ま 中国南方电网 CHINA SOUTHERN POWER GHID	Family of 24 – 36 m (79 – 118 ft) LTA non-rigid drones. Current products.
DRDO Aerial Delivery Research & Development Establishment (ADRDE) Unmanned small airship system	India	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	CUSATS ADRDE DRDD	USAS is a sub-scale prototype for a future larger free-flying airship.
Aero Drum Ltd. 5 m outdoor Blimp drone	Serbia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	Contraction of the second seco	Current product, gondola-mounted thrust vectoring propellers + lateral prop in lower tail fin. Similar to 6 m outdoor blimp.

LTA drones (P2.9)

Airship	Country	Airship type	Lift control	Graphic	Status
Aero Drum Ltd. 10 m outdoor blimp drone	Serbia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Current product, gondola-mounted thrust vectoring propellers + lateral prop in lower tail fin. Similar to 7 m outdoor blimp.
Aero Drum Ltd. 12 m outdoor blimp drone	Serbia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	Contraction of the second seco	Current product, flank-mounted thrust vectoring propellers attached to the envelope + tail propeller.
Aero Drum Ltd. UniBlimp	Serbia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	UNIBLIMP	7-m & 10-m similar models, solar and/or battery power available. Current product.
Aero Drum Ltd. TransAtlantic Solar UniBlimp	Serbia	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Designed for 2023 World Solar Airship Race; fly 6,000 km, S. Africa to Brazil on battery + solar power.

LTA drones (P2.10)

Airship	Country	Airship type	Lift control	Graphic	Status
Mustafa Demir Blimp drone	Turkey (Türkiye)	Conventional, non-rigid, drone blimp (all-electric)	Aero lift + vector thrust + ballast + helium vent		Prototype circa 2022.
Otonom Teknoloji Tepegöz drone airship	Turkey (Türkiye)	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent		Sub-scale electric- powered drone airship with solar array being developed.
Korea Telcom KT 5G Skyship demonstrator	South Korea	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	kt 5G skyship	Airborne 5G communications tests conducted in South Korea & India in 2018.
Korea Telcom KT 5G Skyship drone	South Korea	Hybrid, non-rigid, drone	Aero lift + vector thrust + ballast + helium vent	kt EG skyship kt S skyship	Concept for operational 5G platform.

LTA drones (P2.11)

Airship	Country	Airship type	Lift control	Graphic	Status
Kelluu LTA drone	Finland	Conventional, non-rigid, drone blimp	Aero lift + ballast + helium vent		Sophisticated drone airship integrated with aerial monitoring & data services.
HyLight blimp drone	France	Conventional, non-rigid, drone blimp	Aero lift + vector thrust + ballast + helium vent	HyLight	Founded 2020. Hydrogen lifting gas & fuel cell power. Aerial monitoring services.

LTA drones (P2.11)

Airship	Country	Airship type	Lift control	Graphic	Status
Aero-Nautic Services & Engineering (A-NSE) T-C350 & T-C1400 aerostats	France	Variable buoyancy, variable volume, non-rigid, tethered aerostat	Alter volume of helium lift gas envelope + vector thrust + aero lift + recharge	ANSE	Current product. A-NSE tethered aerostats used operationally.
Hemeria (formerly CNIM Air Space & Airstar) White Hawk tactical-class aerostat	France	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Small aerostat, rapid deployment. Flies at 200 m (656 ft) with 5 kg (11 lb) payload.
Hemeria (formerly CNIM Air Space & Airstar) Eagle Owl operational-class aerostat	France	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		19 m (62 ft) aerostat. Flies at 600 m (1,968 ft) with 90 kg (198 lb) payload.
Hemeria (formerly CNIM Air Space & Airstar) Condor strategic-class aerostat	France	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		30 m (98 ft) aerostat, flies at 1,000 m (3,280 ft) with 250 kg(551 lb) payload. Transportable in 20 ft container.

Unpowered aerostats - Tethered aerostats (Kite balloons) (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Airborne Industries Tactical-class aerostat	UK	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		15 m (49 ft) aerostat, rapid deployment, typically for event and border security.
Airborne Industries Operational-class aerostat	UK	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		19 – 22 m (62 – 72 ft) aerostat with suspended payload typ. day / night optical, SIGINT, ELINT
Airborne Industries Strategic-class aerostat	UK	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		23 m (75.5 ft) aerostat, multiple payload mounted under gas envelope.
StratXX X-Tower	Switzerland	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge	ETRATXX BITRATXX	Multi-mission aerostat. 1 st tethered flight in 2011. StratXX filed for bankruptcy in 2019.

Unpowered aerostats – Tethered aerostats (Kite balloons) (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
StratXX X-Tower (redesign)	Switzerland	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Redesigned multi- mission aerostat circa 2018, designed to operate at 2 km (1.25 mile) altitude.
Augur RosAeroSystems Irbis & Lynx tactical-class tethered aerostats	Russia	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		12.7 to 19 m (40 – 62 ft), mobile systems, video surveillance, SIGINT, COMINT. Lynx shown.
Augur RosAeroSystems Gepard & Tiger operational-class tethered aerostats	Russia	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		28 – 38.5 m (91.5 – 126 ft), mobile systems, can carry radar &other sensors. Tiger shown.
Augur RosAeroSystems Puma strategic-class tethered aerostat	Russia	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		61 m (200 ft), fixed site, large radar for air defense, ground & marine target detection. Sold to China.

Unpowered aerostats – Tethered aerostats (Kite balloons) (P2.3)

Airship	Country	Airship type	Lift control	Graphic	Status
Israel Aerospace Industries (IAI) HAAS tethered aerostats	Israel	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Gas envelope is TCOM 117M. 1 st unit deployed by Israeli Air Force in March 2022.
RT LTA Systems Ltd. Skystar tethered aerostats	Israel	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Family of mobile, ellipsoidal aerostats, first introduced in 2004. Popular models, deployed worldwide.
Aero-T SkyGuard tethered aerostats	Israel	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Est. in 2016 as a subsidiary of RT LTA Systems. 1 st production Skyguard 1 flew in January 2021.
DRDO Aerial Delivery Research & Development Establishment (ADRDE) Akashdeep & Nakshatra aerostats	India	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		35 m Akashdeep 1 st flight in Dec 2010. 38 m Nakshatra operational tests in 2016. Both used polyurethane coated fabric. Project cancelled in 2017.

Unpowered aerostats – Tethered aerostats (Kite balloons) (P2.4)
Airship	Country	Airship type	Lift control	Graphic	Status
Otonom Teknoloji Doruk Tactical-class aerostat	Turkey (Türkiye)	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		1 st flight circa 2015. Has flown from a Turkish naval vessel. Current product.
Otonom Teknoloji Doruk operational-class aerostat	Turkey (Türkiye)	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		1 st flight in 2020. Current product.
Otonom Teknoloji Dolunay small tactical aerostats	Turkey (Türkiye)	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Family of small mobile spherical aerostats. Current product.
Mustafa Demir Aerostats	Turkey (Türkiye)	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		Prototype circa 2022.

Unpowered aerostats – Tethered aerostats (Kite balloons) (P2.5)

Modern Airships - Part 2 - Rev. 6

Airship	Country	Airship type	Lift control	Graphic	Status
China Mobile 5G Cloud One	China	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge	-60 22 7 - 9-7	Airborne 5G cellular base station for emergencies. 1 st operational test flight Sep 2021.
Aerospace Research Institute of the Chinese Academy of Sciences Jimu No. 1	<mark>China</mark>	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		After launch from Tibet plateau in May 2022, reached a new world record altitude of 9,032 meters (29,633 ft).
Suzhou Ark Aviation Technology Co. Ltd. (SAS) Tethered blimps	China	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		FZ30T & FZ40T are large aerostats. Current product.
Suzhou Ark Aviation Technology Co. Ltd. (SAS) Tethered balloon	China	Conventional, non-rigid, tethered aerostat (spherical)	Initial helium charge + recharge		Similar capabilities to tethered blimps. Current product.

Unpowered aerostats – Tethered aerostats (Kite balloons) (P2.6)

Modern Airships - Part 2 - Rev. 6

Airship	Country	Airship type	Lift control	Graphic	Status
Hangzhou Gauss Inflatable Tech Co Family of small drone blimps	China	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge		12 to 22 m tactical conventional aerostats + small Skystar aerostat (resembles RT LTA Skystar). Current products.
Abu Dhabi Autonomous Systems Investment (ADASI) ADASI 200	United Arab Emirates	Conventional, non-rigid, tethered aerostat	Initial helium charge + recharge	ADASI	Displayed at the Dubai Airshow 2013.

Unpowered aerostats – Tethered aerostats (Kite balloons) (P2.7)

Airship	Country	Airship type	Lift control	Graphic	Status
Aerophile SAS Sightseeing balloons	France	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		Firm formed in 1993. More than 60 balloons sold worldwide. Large Aero30NG operating at six sites.
Airborne Industries Parachute training balloon	UK	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		28 – 30 m "barrage balloon" can carry 6 for parachute jumps at 304 m (1,000 ft).
Atlas LTA Advanced Technology Skylift sightseeing balloon	Israel	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		Sightseeing tethered aerostat, based on Auger AL-30 type certificate.
Augur RosAeroSystems AL-30 Aerolift sightseeing balloon	Russia	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		Manned sightseeing aerostat, 18.3 m (62.3 ft) diameter, 18 pax to 150 m (500 ft).

Unpowered aerostats – Tethered manned aerostats (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Lindstrand Technologies Ltd. HiFlyer sightseeing balloon	UK	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		30 pax aerostat manufactured since 1996. Installed in more than 60 locations around the world.
Lindstrand Technologies Ltd. SkyFlyer sightseeing balloon	UK	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		30 pax aerostat, operable in higher winds (40 kt), 365 days a year. 1st operational use in 2018.
Lindstrand Technologies Ltd. Gen 2 parachute training balloon	UK	Conventional, non-rigid, tethered balloon	Initial helium charge + recharge		8 parachutists. Current product for military market.

Unpowered aerostats – Tethered manned aerostats (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Aeerstatica Energy Airships Tethered aerostat wind generator	Germany	Tethered, rigid, LTA airborne wind turbine	Initial helium (or hydrogen) charge + aero lift from hull	PIERSI MILES	Current project. 1 st flight of proof-of-concept prototype may occur in 2023.
Airbine [™] Renewable Energy Systems Airborne Wind Turbine (AWT)	USA	Tethered, semi-rigid, LTA airborne wind turbine	Initial helium charge + recharge + aerodynamic kite		Concept patented 2010. Currently seeking investors.
Altaeros Energies Buoyant Airborne Turbine (BAT)	USA	Tethered non-rigid, LTA airborne wind turbine	Initial helium charge + recharge + aerodynamic kite		Altaeros founded in 2010. BAT project was active thru about 2019. Firm re-focused on conventional aerostats.

Unpowered aerostats – Tethered LTA Wind Turbines (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
LTA Windpower Inc. PowerShip	Canada	Tethered, semi-rigid, neutrally- buoyant airborne wind turbine	Initial hydrogen charge + aero lift from wings	CR: WWW.LTAWIND.com	Patent filed in 2009. Project was active in 2014 but appears to have been discontinued by 2020. Hydrogen lifting gas.
Magenn Power Inc. Magenn Air Rotor System (MARS)	Canada	Tethered, non-rigid, rotating, LTA airborne wind turbine	Initial helium charge + recharge + Magnus lift from rotating open turbine		Patents filed in 2005. Small-scale prototype flown in 2006 followed by larger units. Work appears to have been discontinued by the late 2010s.

Unpowered aerostats – Tethered LTA Wind Turbines (P2.2)

Airship	Country	Airship type	Lift control	Graphic	Status
Novosibirsk OKB Heavy-lift airship towed barge	Soviet Union	Conventional, non-rigid, towed aerostat	Initial helium charge + ballast + helium vent	The second secon	Concept, circa mid- 1960s. Barge not built. OKB also designed a natural gas carrier and other airships.
Airstar Aerospace AéroLifter	France	Conventional, non-rigid, towed aerostat	Initial helium charge + ballast + helium vent		Logging drone towed on zip line, demonstrated in 2014.

Unpowered aerostats - Heavy-lift balloons (P2.1)

Airship	Country	Airship type	Lift control	Graphic	Status
Airstar Aerospace Open (zero- pressure) stratospheric balloons	France	Gas-filled zero-pressure, open balloon (at equilibrium pressure)	Initial helium charge + ballast		Flights up to 1 week, to 45,000 meters (28.0 miles) with payload up to 2,700 kg (5,952 lb)
Airstar Aerospace Pressurized stratospheric balloons	France	Gas-filled low-leakage balloon at slight positive pressure	Initial helium charge + ballast	Contraction of the second seco	Flights up to 6 month, to 20,000 meters (12.4 miles) with payload up to 50 kg (110 lb)

Unpowered aerostats - Free-flying high-altitude balloons (P2.1)

3. Assessment of near-term LTA market prospects

Among the airships described in Part 2, the following advanced airship seems to be the best candidate for achieving type certification in the next five years:

- Flying Whales (France): The LCA60T rigid cargo airship was significantly redesigned in 2021, which resulted in a considerable schedule delay. In March 2023, Flying Whales reported that they expected to complete construction and flight testing of the first production prototype in the 2024 2025 timeframe, followed by EASA certification and start of industrial production in 2026. The project appears to be well funded from diverse international sources in France, Canada, China and Morocco. Full-scale production facilities are planned in France, China and Canada and commercial airship operating infrastructure is being planned.
- Hybrid Air Vehicles (UK): The Airlander 10 commercial passenger / cargo hybrid airship is being developed by HAV based on their experience with the Airlander 10 prototype, which flew from 2016 to 2017. In 2022, Valencia, Spain-based Air Nostrum, which operates regional flights, ordered 10 Airlander 10 aircraft, with delivery scheduled for 2026. Also in 2022, Highlands and Islands Airport (HIAL) sponsored a study for introducing the Airlander 10 in Scotland. In April 2023, the regional UK government of South Yorkshire concluded a financial agreement that is expected to lead to the Airlander 10 being manufactured in Doncaster, in the north of England. Things are moving in the right direction. However, FutureFlight reported that "the plan cannot proceed unless HAV secures a strategic investor. It needs at least £100 million to begin construction."

The following airship manufacturers in Part 2 have advanced designs and they seem to be ready to manufacture a first prototype if they can arrange funding:

• Aerovehicles (USA / Argentina): They claim their AV-10 nonrigid, multi-mission blimp can carry a 10 metric ton payload and be type certified within existing regulations for blimps. This should provide a lower-risk route to market for an airship with an operational capability that does not exist today.

- Atlas LTA Advanced Technology (Israel): After acquiring the Russian firm Augur RosAeroSystems in 2018, Atlas is continuing to develop the ATLANT variable buoyancy, fixed volume heavy lift airship. They also are developing a new family of non-rigid Atlas-6 and -11 blimps and unmanned variants. However, the development plans and schedules have not yet been made public.
- **BASI (Canada):** The firm has a well-developed design in the MB-30T and a fixed-base operating infrastructure design that seems to be well suited for their primary market in the Arctic.
- Euro Airship (France): The firm reports having productionready plans for their rigid airship designs. In June 2023, Euro Airship announced plans to build and fly a large rigid airship known as Solar Airship One around the world in 2026.
- Millennium Airship (USA & Canada): The firm has well developed designs for their SF20T and SF50T SkyFreighters, has identified its industrial team for manufacturing, and has a business arrangement with SkyFreighter Canada, Ltd., which would become a future operator of SkyFreighter airships in Canada. In addition, their development plan defines the work needed to build and certify a prototype and a larger production airship.

The promising airships in Part 2, listed above, will be competing in the worldwide airship market with candidates identified in *Modern Airships - Part 1*, which potentially could enter the market in the same time frame. Among the new airships described in Part 1, the following advanced airship seems to be the best candidates for achieving type certification in the next five years:

• LTA Research and Exploration (USA): Pathfinder 1 rigid airship, which is expected to make its first flight in 2024. The program appears to be well funded.

The following airship manufacturers in Part 1 have advanced designs and they seem to be ready to manufacture a first commercial prototype if they can arrange adequate funding:

- AT² Aerospace (USA): Their Z1 hybrid airship formerly was known as the Lockheed Martin LMH-1. In May 2023, Lockheed Martin exited the hybrid airship business without completing type certification and transitioned that business, including intellectual property and related assets, to the newly formed, commercial company AT² Aerospace. In June, Straightline Aviation (a former LMH-1 customer) signed a Letter of Intent with AT² Aerospace, signaling commercial support for the Z1 hybrid airship.
- Aeros (USA): It seems that Aeros has been ready for more than a decade to begin type certification and manufacture a prototype of their Aeroscraft ML866 / Aeroscraft Gen 2 variable buoyancy / fixed volume airship. The firm has reported successful subsystem tests.

For decades, there have been many ambitious projects that intended to operate an airship as a pseudo-satellite, carrying a heavy payload while maintaining a geo-stationary position in the stratosphere on a long-duration mission (days, weeks, to a year or more). None were successful. This led NASA in 2014 to plan the 20-20-20 airship challenge: 20 km altitude, 20 hour flight, 20 kg payload. The challenge never occurred, but it highlighted the difficulty of developing an airship as a persistent pseudo-satellite. The most promising new stratospheric airship manufacturers identified in Part 2 are:

- Sceye Inc. (USA): This small firm has built a headquarters and manufacturing facility in New Mexico. Since 2017, it has been developing a mid-size, multi-mission stratospheric airship aimed at demonstrating the ability to deliver communications services to users living in remote regions. A sub-scale vehicle first flew in 2017. Short-duration flights of a prototype stratospheric airship have been conducted since 2021..
- **Thales Alenia Space (France):** The firm is developing the multi-mission Stratobus. Their latest round of funding from France's defense procurement agency called for a full-

scale, autonomous Stratobus demonstrator airship to fly by the end of 2023, five years later than another demonstrator that was ordered in the original 2016 Stratobus contract, but not built. Thales Alenia Space missed the end of 2023 target and an updated schedule has not yet been announced.

China remains an outlier after the 2015 flight of the Yuanmeng stratospheric airship developed by Beijing Aerospace Technology Co. & BeiHang. The current status of the Chinese stratospheric airship development program is not described in public documents.

Among the many smaller airships identified in Part 2, the following manufacturers could have their airships flying by the mid 2020s if adequate funding becomes available.

- **Dirisolar (France):** The firm has a well-developed design for their five passenger DS 1500, which is intended initially for local air tourism, but can be configured for other missions. When funding becomes available, it seems that they're ready to go.
- **A-NSE (France):** The firm offers a range of aerostat and small airships, several with a novel tri-lobe, variable volume hull design. Such aerostats are operational now, and a manned tri-lobe airship could be flying later in the 2020s.

There has been a proliferation of small LTA drone blimps and other small LTA drone vehicles. Some were developed initially for military surveillance applications, but all are configurable and could be deployed in a range of applications. Some enterprising LTA drone developers also are developing value-adding applications and are offering information services, rather than simply selling a drone to be operated by a customer.

The 2020s will be an exciting time for the airship industry. We'll finally get to see if the availability of several different heavy-lift airships with commercial type certificates will be enough to open a new era in airship transportation. Aviation regulatory agencies need to help reduce investment risk by reducing regulatory uncertainty and putting in place an adequate regulatory framework for the wide variety of advanced airships being developed. Customers with business cases for airship applications need to step up, place firm

orders, and then begin the pioneering task of employing their airships and building a worldwide airship transportation network with associated ground infrastructure. This will require consistent investment over the next decade or more before a basic worldwide airship transportation network is in place to support the significant use of commercial airships in cargo and passenger transportation and other applications. Perhaps then we'll start seeing the benefits of airships as a lower environmental impact mode of transportation and a realistic alternative to fixed-wing aircraft, seaborne cargo vessels and heavy, long-haul trucks.

4. Links to the individual articles

The following links will take you to the individual articles that address all of the airships identified in the preceding graphic table.

Note that a few of these articles address more than one airship design from the same manufacturer / designer and they may be in different categories (i.e., Augur RosAeroSystems, Atlas LTA Advanced Technology). These designs are listed separately in the above graphic tables and the following index. The links listed below will take you to the same article.

CONVENTIONAL AIRSHIPS

Conventional, rigid airships

- Aerostatica / RosAeroSystems A-06: <u>http://lynceans.org/wp-content/uploads/2022/02/Aerostatica-converted.pdf</u>
- Augur RosAeroSystems (RAS) DZ-N1 & MD-900: <u>https://lynceans.org/wp-content/uploads/2021/09/Augur-RosAeroSystems R2-converted-compressed.pdf</u>
- Buoyant Aircraft Systems International (BASI) MB-30T & -100T: <u>https://lynceans.org/wpcontent/uploads/2021/04/BASI.pdf</u>
- Flying Whales LCA60T: <u>http://lynceans.org/wp-</u> <u>content/uploads/2021/09/Flying-Whales_R2-converted-</u> <u>compressed-1.pdf</u>
- FlyWin demonstrator airship: <u>http://lynceans.org/wp-</u> content/uploads/2022/02/FlyWin-airships-converted.pdf
- Gibbens & Associates AirLighter 2 and cycloidal propellers: <u>https://lynceans.org/wp-content/uploads/2023/10/Gibbens-</u> <u>Assoc_AirLighter-Cy-Prop.pdf</u>
- Leningrad OKB heavy-lift rigid airships: <u>http://lynceans.org/wp-content/uploads/2022/02/Leningrad-OKB-airships-converted.pdf</u>
- Lightspeed USA Inc. Lightships LS-12 & -60: <u>http://lynceans.org/wp-content/uploads/2021/10/Lightspeed-USA-converted.pdf</u>

- Solar Flight Sunship: <u>http://lynceans.org/wp-</u> <u>content/uploads/2021/04/Solar-Flight_Sunship_R1-converted-</u> <u>1.pdf</u>
- The Hamilton Airship Company (THAC) HA-44, -80 & -140: <u>https://lynceans.org/wp-content/uploads/2021/04/Hamilton-</u> <u>Airships-converted.pdf</u>
- TP Aerospace Atlas 80: <u>https://lynceans.org/wpcontent/uploads/2021/04/TP-Aerospace_Atlas-80_R1converted.pdf</u>
- Transoceans Léilo, Trans-Mediterranean & Trans-Atlantic airships: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Aerial-Concept-Group-Transoceans-</u> <u>converted.pdf</u>

Conventional, semi-rigid airships

- Aere Airships: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/07/Aere-Airships.pdf</u>
- Airstar Alpha: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/Alpha-Alize-converted.pdf</u>
- Capgemini Engineering (formerly Altran Aerospace) Sun Cloud: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/Capgemini-Engg_Altran-Aerospace-</u> <u>solar-airships-converted.pdf</u>
- LTA Corp. Alizé: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/Alpha-Alize-converted.pdf
- SkyLifter Ltd. Flying Crane, SL150, SL50, SL25 & SL20: <u>http://lynceans.org/wp-content/uploads/2021/04/Skylifter_R1-converted-compressed.pdf</u>
- SolarAirShip High-Speed Solar Airship (HSSA): <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/09/Helios_SolarAirShip_High-Speed-</u> <u>Solar-Airship_HSSA.pdf</u>

Conventional, non-rigid airships (blimps)

 21st Century Airships - Voyager: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/21st-Century-_Voyager-converted.pdf

- 21st Century Airships & Techsphere spherical blimps: <u>https://lynceans.org/wp-content/uploads/2021/04/21st-Century-Techsphere-converted.pdf</u>
- Aérial Concept Group & Transoceans IRIS Challenger I & II: <u>http://lynceans.org/wp-content/uploads/2022/02/Aerial-Concept-Group-Transoceans-converted.pdf</u>
- Aerostatica 01, 02 & 300: <u>http://lynceans.org/wpcontent/uploads/2022/02/Aerostatica-converted.pdf</u>
- Aerovehicles, Inc. (AVI) AV-10 blimp: <u>https://lynceans.org/wp-content/uploads/2021/04/AeroVehicles_Aerocat_R1-converted.pdf</u>
- Atlas LTA Advanced Technology Atlas-6 and -11 blimps: <u>https://lynceans.org/wp-content/uploads/2021/04/Atlas-LTA-Advanced-Technology-airships-converted.pdf</u>
- Augur RosAeroSystems (RAS) MA-55, PD-300, Au-11, -12M.
 -30 & SOKOL: <u>https://lynceans.org/wp-</u> content/uploads/2021/09/Augur-RosAeroSystems_R2converted-compressed.pdf
- Aviation Industry Corporation of China (AVIC) AS700: <u>https://lynceans.org/wp-</u> <u>content/uploads/2023/12/AVIC_AS700.pdf</u>
- DKBA conventional airships 2DP & DP-6000 blimps: <u>http://lynceans.org/wp-content/uploads/2022/02/DKBA-conventional-airships-converted.pdf</u>
- E-Green Technologies (EGT) Bullet 125 & 580: <u>https://lynceans.org/wp-content/uploads/2021/04/EGT_Bullet-converted.pdf</u>
- Myasishchev Experimental Design Bureau (OKB-23) 2AB & Cruise-1 blimps: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/Myasishchev-Design-Bureau-airships-</u> <u>converted.pdf</u>
- Ural OKBD (Bimbat) cargo blimp: <u>http://lynceans.org/wp-content/uploads/2022/02/Bimbat-Ural-OKBD-airships-converted.pdf</u>
- Vantage Airship Manufacturing Co. blimps: <u>https://lynceans.org/wp-content/uploads/2021/08/Vantage-Airship_R2-converted.pdf</u>
- Voliris V900: <u>https://lynceans.org/wp-</u> content/uploads/2021/08/Voliris_R1-converted-compressed.pdf

VARIABLE BUOYANCY AIRSHIPS

Variable buoyancy, fixed volume airships

- AeroVehicles, Inc. (AVI) Minicat, Aerocat R-12 & R-40: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/AeroVehicles_Aerocat_R1-</u> <u>converted.pdf</u>
- Airship-GP "Super Hybrid" AeroTruck, AeroBoat & AeroYacht: <u>https://lynceans.org/wp-content/uploads/2021/04/Airship-GP_R1-converted.pdf</u>
- Atlas LTA Advanced Technology ATLANT 30, 100 & 300: <u>http://lynceans.org/wp-content/uploads/2021/04/Atlas-LTA-Advanced-Technology-airships-converted-compressed.pdf</u>
- Augur RosAeroSystems (RAS) ATLANT: <u>https://lynceans.org/wp-content/uploads/2021/09/Augur-</u> <u>RosAeroSystems_R2-converted-compressed.pdf</u>
- Euro Airship 10T, 50T, 400T & Solar Airship One: <u>https://lynceans.org/wp-content/uploads/2021/04/Euro-Airship.pdf</u>
- Global Airships Atlas: <u>https://lynceans.org/wpcontent/uploads/2021/04/Global-Airships Atlas R1converted.pdf</u>
- H2 Clipper Inc. H2 Clipper hydrogen transport: <u>https://lynceans.org/wp-content/uploads/2022/02/H2-Clipper-converted-1.pdf</u>
- Imaginactive Alert, Invitation & Kugaaruk: <u>http://lynceans.org/wp-content/uploads/2021/04/Imaginactive_-</u> <u>Alert-Invitation-Kugaruuk-converted-compressed.pdf</u>
- Kiev OKBV D-1: <u>http://lynceans.org/wp-</u> content/uploads/2022/02/Kiev-OKBV-airships-converted.pdf
- Krylo Design Bureau SHa-2000: <u>http://lynceans.org/wpcontent/uploads/2022/02/Shalaev-Krylo-Design-Bureauairships-converted.pdf</u>
- LTA Aerostructures 10T & 70T: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/LTA-Aerostructures_R1-converted.pdf
- Skylite Aeronautics GeoShip: <u>https://lynceans.org/wpcontent/uploads/2021/04/Skylite-Aeronautics GeoShip R1converted.pdf</u>

- Third Dimension Project SHa-3500: <u>http://lynceans.org/wpcontent/uploads/2022/02/Third-Dimension-Projectconverted.pdf</u>
- Varialift Plc. ARH-PT, ARH 50 & 250: <u>https://lynceans.org/wp-content/uploads/2021/04/Varialift-Airships.pdf</u>

Variable buoyancy, variable vacuum airships

- Anumá Aerospace Corp. partial-vacuum airship: <u>https://lynceans.org/wp-content/uploads/2022/02/Anuma-Aerospace-converted.pdf</u>
- Ilia Toli partial-vacuum airship: Coming in 2024

Variable buoyancy, variable volume airships

- A-NSE tri-lobe airships & aerostats: <u>https://lynceans.org/wp-content/uploads/2021/04/A-NSE.pdf</u>
- Arthur Clyde (A.C.) Davenport Dynapod: <u>https://lynceans.org/wp-content/uploads/2021/09/Dynapod_R1-</u> <u>converted.pdf</u>
- EADS Tropospheric Airship: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/EADS_Tropospheric-Airship_R1-</u> <u>converted.pdf</u>
- PK Vozdukh all-metal, variable volume airship: <u>http://lynceans.org/wp-content/uploads/2022/02/PK-Vozdukh-airships-converted.pdf</u>
- Ural OKBD (Bimbat) Ural-2, Ural-3, Double hull airship, Horizontal wing airship, Lenticular airship, Triangular (delta) wing airship, Vertical wing airship: <u>http://lynceans.org/wpcontent/uploads/2022/02/Bimbat-Ural-OKBD-airshipsconverted.pdf</u>
- Voliris V901, V902, V930, V932 NATAC & SeaBird: <u>https://lynceans.org/wp-content/uploads/2021/08/Voliris_R1-</u> <u>converted-compressed.pdf</u>

Variable buoyancy, hybrid thermal-gas (Rozière) airships

 Aerosmena (AIDBA) - A20, A-60, A200 & A600: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/Aerosmena_hybrid-thermal-airshipsconverted.pdf

- Boeing hybrid thermal airship: <u>http://lynceans.org/wp-content/uploads/2021/04/Boeing_hybrid-thermal-airship-converted-1.pdf</u>
- Design Bureau Thermoplan Thermoplane ALA-40 & -200: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/Thermoplan_hybrid-thermal-airships-</u> converted.pdf
- Gibbens & Associates AirLighter and cycloidal propellers: <u>https://lynceans.org/wp-content/uploads/2023/10/Gibbens-Assoc_AirLighter-Cy-Prop.pdf</u>
- Lockheed Corp. Starship hybrid thermal small rigid airship (SRA): <u>https://lynceans.org/wp-</u> content/uploads/2023/10/Lockheed_Starship-SRA.pdf
- LocomoSky LokomoSkyner: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/LocomoSky_hybrid-thermal-airships-</u> <u>converted.pdf</u>
- Thermo-Skyships Ltd. (TSL) Thermo-Skyship: <u>https://lynceans.org/wp-content/uploads/2021/09/Thermo-Skyships_hybrid-thermal-airships_R1a-converted-compressed.pdf</u>

Variable buoyancy propulsion airships

- Hunt Aviation Gravity Plane: <u>https://lynceans.org/wpcontent/uploads/2021/04/Hunt-Aviation-Gravity-Planeconverted.pdf</u>
- New Mexico State University Advanced High-Altitude Aerobody (AHAB): <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/New-Mexico-State-</u> <u>University_AHAB_R1-converted.pdf</u>
- Phoenix: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/Phoenix.pdf
- Solomon Andrews Aereon & Aereon 2 (1863): <u>http://lynceans.org/wp-content/uploads/2021/04/Solomon-Andrews Aereon-Aereon-II-converted.pdf</u>
- Utah Aereon Corp. Aereon SA-1: <u>https://lynceans.org/wp-</u> content/uploads/2023/10/Utah-Aereon-Corp_Aereon-SA-1.pdf

 Walden Aerospace / LTAS - HY-SOAR B.A.T & VAMPIRE: <u>https://lynceans.org/wp-content/uploads/2021/04/Walden-LTAS_VB-propelled-airships_R1-converted.pdf</u>

SEMI-BUOYANT AIR VEHICLES

Semi-buoyant, hybrid airships

- Airship-GP AeroTruck, AeroBoat & AeroYacht: <u>https://lynceans.org/wp-content/uploads/2021/04/Airship-GP_R1-converted.pdf</u>
- Chinese Academy of Sciences Hybrid airship for Airborne Electromagnetic (AEM) surveys: <u>https://lynceans.org/wpcontent/uploads/2022/07/China-hybrid-airship-for-AEMsurveys.pdf</u>
- Dirisolar DS 0.6, DS 12, DS 900, DS 1500 & DS 30: <u>https://lynceans.org/wp-content/uploads/2021/04/Dirisolar.pdf</u>
- Dolphin Luftschiff: <u>http://lynceans.org/wp-</u> content/uploads/2022/02/Dolphin-Luftschiff-converted.pdf
- Flying-Yacht: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/Flying-Yacht_R1-converted.pdf</u>
- Kamov Company Aerolet: <u>http://lynceans.org/wp-</u> content/uploads/2022/02/Kamov_Aerolet-converted.pdf
- Krylo Design Bureau SHa-10b: <u>http://lynceans.org/wpcontent/uploads/2022/02/Shalaev-Krylo-Design-Bureauairships-converted.pdf</u>
- Magnus Aerospace Corp. LTA 20-1 spherical Magnus effect airship: <u>http://lynceans.org/wp-</u> <u>content/uploads/2021/04/Magnus-Aerospace_spherical-airship-</u> <u>converted-compressed.pdf</u>
- MBDA Armatus airship: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/MBDA_CVS301-Vigilus_Amantus-</u> <u>airship-converted.pdf</u>
- Millennium Airship SkyFreighter SF20T, SF50T & SF500T: <u>https://lynceans.org/wp-content/uploads/2021/04/Millennium-Airship_SkyFreighter-R1-converted.pdf</u>
- Nautilus SpA Elettra Twin Flyers (ETF): <u>https://lynceans.org/wp-</u>

content/uploads/2021/04/Nautilus_Elettra-Twin-Flyers_R1converted.pdf

- Turtle Airships: <u>http://lynceans.org/wp-</u> <u>content/uploads/2021/04/Turtle-Airships-converted-1.pdf</u>
- Vantage Airship Manufacturing Co., Ltd. CA-60T & CA-200T: <u>https://lynceans.org/wp-content/uploads/2021/08/Vantage-</u> <u>Airship R2-converted.pdf</u>

Semi-buoyant, airplane / airship hybrids

- Egan Airships PLIMP Model D drone & Model J: <u>https://lynceans.org/wp-content/uploads/2021/04/Egan-Airships PLIMP R1-converted.pdf</u>
- Nimbus Eos Xi & Metaplano inflated wing aircraft: <u>http://lynceans.org/wp-content/uploads/2022/02/Nimbus-srl_EosXi-Metaplano-converted.pdf</u>
- Prospective Concepts AG Stingray: <u>http://lynceans.org/wp-content/uploads/2022/02/Prospective-Concepts-AG_Stingray-converted.pdf</u>
- Solar Ship Semi-buoyant aircraft: <u>https://lynceans.org/wp-content/uploads/2021/04/Solar-Ship_R1-converted.pdf</u>
- Tumencotrans BARS & Bella-1: <u>https://lynceans.org/wpcontent/uploads/2021/08/Tumenecotrans_BARS-Bella-1-</u> <u>converted-compressed.pdf</u>
- Tumenecotrans Rescue sloop & "Micro" RVK: <u>http://lynceans.org/wp-content/uploads/2022/02/Third-</u> <u>Dimension-Project-converted.pdf</u>
- Ural OKBD (Bimbat) Hybrid winged airship: <u>http://lynceans.org/wp-content/uploads/2022/02/Bimbat-Ural-OKBD-airships-converted.pdf</u>

Semi-buoyant, helicopter / airship hybrids

- Kiev OKBV Albatros: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/Kiev-OKBV-airships-converted.pdf</u>
- Myasishchev Experimental Design Bureau (OKB-23) VS-80 & VS-90 Vertostats: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/Myasishchev-Design-Bureau-airships-</u> <u>converted.pdf</u>

 PK Vozdukh - multi-purpose, helicopter / airship hybrid: <u>http://lynceans.org/wp-content/uploads/2022/02/PK-Vozdukh-airships-converted.pdf</u>

STRATOSPHERIC AIRSHIPS / HIGH-ALTITUDE PLATFORM STATIONS (HAPS)

- Aerostatica Stratospheric airship: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/Aerostatica-converted.pdf</u>
- Atlas LTA Advanced Technology Propulsion Assisted High-Altitude Platform (PAHAP): <u>http://lynceans.org/wpcontent/uploads/2021/04/Atlas-LTA-Advanced-Technologyairships-converted-compressed.pdf</u>
- Augur RosAeroSystems (RAS) HAA Berkut: <u>https://lynceans.org/wp-content/uploads/2021/09/Augur-</u> <u>RosAeroSystems_R2-converted-compressed.pdf</u>
- Avealto Ltd HAPS: <u>https://lynceans.org/wp-</u> content/uploads/2023/10/Avealto-Ltd_HAPS.pdf
- Beijing Aerospace Technology Co. & BeiHang Yuanmeng stratospheric airship: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/China Yuanmeng-stratospheric-</u> <u>airship.pdf</u>
- Capgemini Engineering (formerly Altrans Aerospace) EcoSat AS30 & AS80: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/02/Capgemini-Engg_Altran-Aerospace-</u> <u>solar-airships-converted.pdf</u>
- CIRA (Italian Aerospace Research Center) Hybrid High-Altitude Platform Systems (HAPS): <u>https://lynceans.org/wpcontent/uploads/2024/02/CIRA-HAPS.pdf</u>
- ESA / Lindstrand High-Altitude Long-Endurance (HALE) aerostatic craft: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/09/ESA_Lindstrand-HALE_R1-</u> <u>converted.pdf</u>
- EU CAPANINA: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/EU-CAPANINA-converted.pdf
- Galileo Systems Graf Galileo High-Altitude Airship: <u>https://lynceans.org/wp-content/uploads/2024/01/Graf-Galileo-High-Altitude-Airship.pdf</u>

- NASA 20-20-20 airship challenge: <u>http://lynceans.org/wpcontent/uploads/2021/04/NASA-20-20-20-airship-challengeconverted-1.pdf</u>
- Sanswire / WSGI Stratellite One & Argus One: <u>http://lynceans.org/wp-content/uploads/2021/04/Sanswire-WSGI-airships-converted-compressed.pdf</u>
- Sceye Inc. stratospheric airship: <u>https://lynceans.org/wp-content/uploads/2021/04/Sceye_stratospheric-airship-converted.pdf</u>
- Strasa.Tech HAPS platform: <u>https://lynceans.org/wp-content/uploads/2022/09/Strasa-Tech-converted.pdf</u>
- Stratosyst Skyrider: <u>https://lynceans.org/wp-</u> content/uploads/2022/02/Stratosyst-Skyrider.pdf
- StratXX X-Station: <u>http://lynceans.org/wp-</u> <u>content/uploads/2021/04/StratXX-airships-converted-1.pdf</u>
- TAO Group SkyDragon: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/TAO-Group-airships-converted.pdf
- Thales Alenia Space Stratobus: <u>https://lynceans.org/wp-content/uploads/2021/04/Thales-Alenia-Space_Stratobus-converted.pdf</u>

PERSONAL GAS AIRSHIPS

- Airstar Electroplume 250 & 320, Elliptoplume 150 & Manned AéroLifter: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Airstar_airships_tethered-</u> <u>aerostat_stratospheric-balloons.pdf</u>
- A-NSE A-N400: <u>https://lynceans.org/wp-content/uploads/2021/04/A-NSE.pdf</u>
- Project Sol'R Nephelios: <u>http://lynceans.org/wpcontent/uploads/2021/04/Project-SolR_Nephelios_R1converted-1.pdf</u>
- Shi Songbo personal blimp: Coming in 2024

THERMAL (HOT AIR) AIRSHIPS

 Airstar - Colibri 1800: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Airstar_airships_tethered-</u> <u>aerostat_stratospheric-balloons.pdf</u>

- Augur RosAeroSystems (RAS) Au-29, -31, -35 & -37: <u>https://lynceans.org/wp-content/uploads/2021/09/Augur-RosAeroSystems_R2-converted-compressed.pdf</u>
- Ural OKBD Thermostat (spindle & lenticular): <u>http://lynceans.org/wp-content/uploads/2022/02/Bimbat-Ural-OKBD-airships-converted.pdf</u>

ELECTRO-KINETICALLY (EK) PROPELLED AIRSHIPS

- Festo b-IONIC Airfish: <u>https://lynceans.org/wpcontent/uploads/2021/04/Festo_b-IONIC-Airfish_R1converted.pdf</u>
- Walden Aerospace / Lighter Than Air Solar (LTAS) XEM-1, EK-1 & BBD: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/Walden-LTAS_EK-propelled-</u> <u>airships.pdf</u>

LTA DRONES

- Aero Drum Uniblimp drone: Coming in 2024
- Aerotain AG Skye spherical blimp: <u>https://lynceans.org/wpcontent/uploads/2021/04/Aerotain_Skye-spherical-droneconverted.pdf</u>
- Airspeed Airships AS-series drone blimps: <u>https://lynceans.org/wp-</u> <u>content/uploads/2023/11/Airspeed-Airships.pdf</u>
- Airstar Aerospace Airstar Canada cargo airship drone: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Airstar_airships_tethered-</u> <u>aerostat_stratospheric-balloons.pdf</u>
- BAK EM50 blimp: <u>https://lynceans.org/wp-</u> <u>content/uploads/2021/04/BAK_EM50-drone-blimp-</u> <u>converted.pdf</u>
- Cloudline autonomous cargo airship drone: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/10/Cloudline_UAV-cargo-blimp.pdf</u>
- DKBA conventional airships drones: <u>http://lynceans.org/wpcontent/uploads/2022/02/DKBA-conventional-airshipsconverted.pdf</u>

- DKBA lenticular airships drones: <u>http://lynceans.org/wpcontent/uploads/2022/02/DKBA-lenticular-airships-</u> <u>converted.pdf</u>
- Hemeria (formerly CNIM Air Space) Diridrone: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Hemeria_CNIM-Air-Space-</u> <u>compressed.pdf</u>
- Hipersfera d.o.o. Hypersphere HS-5K multipurpose drone: <u>http://lynceans.org/wp-content/uploads/2022/02/Hypersphere-</u> <u>converted.pdf</u>
- HyLight blimp drone: Coming in 2024
- India Defense Research and Development Organization (DRDO) ADRDE - drone blimp: <u>https://lynceans.org/wpcontent/uploads/2023/06/DRDO-ADRDE-aerostats-smallunmanned-airship.pdf</u>
- Information Technology Institute, Campinas AURORA semiautonomous drone blimp: <u>https://lynceans.org/wp-</u> content/uploads/2023/11/AURORA-semi-autonomous-blimp.pdf
- Jülich Institute FieldShip UAV blimp: <u>https://lynceans.org/wp-content/uploads/2023/06/Julich-Institute-FieldShip-UAV-blimp.pdf</u>
- Kelluu Airships drone blimps: Coming in 2024
- Korea Telcom KT 5G Skyship drone airship: Coming in 2024
- LAAS / CRNS Karma semi-autonomous blimp: <u>https://lynceans.org/wp-content/uploads/2023/11/Karma-semi-autonomous-blimp.pdf</u>
- Lindstrand Technologies GA-22 drone blimp: <u>http://lynceans.org/wp-content/uploads/2022/02/Lindstrand-GA-42-GA-22-converted.pdf</u>
- Mustafa Demir drone blimp: <u>http://lynceans.org/wp-</u> <u>content/uploads/2022/03/Mustafa-Demir_aerostat-drone-</u> <u>airship-converted.pdf</u>
- Otonom Teknoloji drone airship: <u>https://lynceans.org/wpcontent/uploads/2023/06/Otonom-Teknoloji-aerostats-droneairship.pdf</u>
- Shanghai Jiao Tong University ZY-1 & Tianzhou-1: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/10/China_Shanghai-Jiao-Tong-</u> <u>University_Research-airships-1.pdf</u>

- StratXX PhoexiXX drone: <u>http://lynceans.org/wp-</u> <u>content/uploads/2021/04/StratXX-airships-converted-1.pdf</u>
- Suzhou Ark Aviation Technology Co. Ltd. drone blimps: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/10/China_Suzhou-Ark-Aviation-Co.pdf</u>
- TAO Group Lotte airship: <u>https://lynceans.org/wp-</u> content/uploads/2021/04/TAO-Group-airships-converted.pdf
- Transoceans Léilo sub-scale demonstrator: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Aerial-Concept-Group-Transoceans-</u> <u>converted.pdf</u>
- Ural OKBD Ural-4 (MIASS-1) drone: <u>http://lynceans.org/wp-content/uploads/2022/02/Bimbat-Ural-OKBD-airships-converted.pdf</u>
- Vantage Airship Manufacturing Co., Ltd. drone blimps: <u>https://lynceans.org/wp-content/uploads/2021/08/Vantage-Airship_R2-converted.pdf</u>

UNPOWERED AEROSTATS

Tethered aerostats (Kite balloons)

- Abu Dhabi Autonomous Systems Investment (ADASI) aerostats: <u>https://lynceans.org/wp-</u> <u>content/uploads/2023/06/ADASI-aerostats.pdf</u>
- A-NSE T-C350 & T-C1400 tethered aerostats: <u>https://lynceans.org/wp-content/uploads/2021/04/A-NSE.pdf</u>
- Aero-T SkyGuard tethered: <u>https://lynceans.org/wp-</u> <u>content/uploads/2023/06/Aero-T-SkyGuard.pdf</u>
- Airborne Industries tethered aerostats aerostats & parachute training balloons: <u>https://lynceans.org/wp-</u> <u>content/uploads/2023/06/Airborne-Industries-aerostats.pdf</u>
- Airstar Aerospace White Hawk, Eagle Owl & Condor tethered aerostats: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Airstar airships tethered-</u> <u>aerostat_stratospheric-balloons.pdf</u>
- Atlas LTA Advanced Technology tethered aerostat & THAP: <u>https://lynceans.org/wp-content/uploads/2021/04/Atlas-LTA-</u> <u>Advanced-Technology-airships-converted.pdf</u>

- Augur RosAeroSystems tethered aerostats: <u>https://lynceans.org/wp-content/uploads/2023/06/Augur-RosAeroSystems-tethered-aerostats.pdf</u>
- China Mobile Cloud One 5G base station aerostat: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/10/China_Cloud-One-5G-base-station-</u> <u>aerostat.pdf</u>
- Chinese Academy of Sciences Jimu No 1 high-altitude aerostat: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/10/China_Jimu-No-1-high-altitude-</u> <u>aerostat.pdf</u>
- Hangzhou Gauss Inflatable Tech Co. inflatable blimps & aerostats: <u>https://lynceans.org/wp-</u> content/uploads/2023/06/China-Gauss-Inflatable-blimpsaerostats.pdf
- Hemeria (formerly CNIM Air Space & Airstar Aerospace) -White Hawk, Eagle Owl & Condor tethered aerostats: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Hemeria_CNIM-Air-Space-</u> <u>compressed.pdf</u>
- India Defense Research and Development Organization (DRDO) ADRDE - aerostats & small unmanned airship: <u>https://lynceans.org/wp-content/uploads/2023/06/DRDO-ADRDE-aerostats-small-unmanned-airship.pdf</u>
- Israel Aerospace Industries (IAI) HAAS aerostat: <u>https://lynceans.org/wp-content/uploads/2023/06/Israel-Aerospace-Industries-HAAS-aerostat.pdf</u>
- Mustafa Demir tethered aerostat: <u>https://lynceans.org/wpcontent/uploads/2022/03/Mustafa-Demir_aerostat-droneairship-converted.pdf</u>
- Otonom Teknoloji tethered aerostats: <u>https://lynceans.org/wpcontent/uploads/2023/06/Otonom-Teknoloji-aerostats-droneairship.pdf</u>
- RT LTA Systems Ltd. Skystar™ tethered aerostats: <u>https://lynceans.org/wp-content/uploads/2023/06/RT-LTA-Systems-Ltd-aerostats.pdf</u>
- StratXX X-Tower tethered aerostat: <u>https://lynceans.org/wp-content/uploads/2021/04/StratXX-airships-converted-1.pdf</u>

 Suzhou Ark Aviation Technology Co. Ltd. – aerostats: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/10/China_Suzhou-Ark-Aviation-Co.pdf</u>

Tethered manned aerostats

- Aerophile SAS sightseeing balloons: Coming in 2024
- Airborne Industries tethered aerostats aerostats & parachute training balloons: <u>https://lynceans.org/wp-</u> content/uploads/2023/06/Airborne-Industries-aerostats.pdf
- Atlas LTA Advanced Technology Skylift sightseeing aerostat: <u>https://lynceans.org/wp-content/uploads/2021/04/Atlas-LTA-</u> <u>Advanced-Technology-airships-converted.pdf</u>
- Augur RosAeroSystems AL-30 sightseeing aerostats: <u>https://lynceans.org/wp-content/uploads/2023/06/Augur-RosAeroSystems-tethered-aerostats.pdf</u>
- Lindstrand Technologies HyFlyer, SkyFlyer sightseeing balloons & Gen2 parachute training balloons: Coming in 2024

Tethered LTA wind turbines

- Aeerstatica Energy Airships: <u>https://lynceans.org/wp-</u> content/uploads/2023/06/Aeerstatica.pdf
- Airbine[™] Renewable Energy Systems (ARES) Airborne Wind Turbine (AWT): <u>https://lynceans.org/wp-</u> <u>content/uploads/2023/01/Airbine-AWT.pdf</u>
- Altaeros Energies Buoyant Airborne Turbine (BAT): Coming in 2024
- LTA Windpower Inc. PowerShip: <u>https://lynceans.org/wp-</u> content/uploads/2023/10/LTA-Windpower-Inc.pdf
- Magenn Air Rotor System MARS: Coming in 2024

Tethered heavy lift balloons

• Airstar Aerospace – AéroLifter: <u>https://lynceans.org/wp-content/uploads/2022/02/Airstar_airships_tethered-aerostat_stratospheric-balloons.pdf</u>

 Novosibirsk OKB - Heavy-lift airship towed barge: <u>http://lynceans.org/wp-content/uploads/2022/02/Novosibirsk-OKB-airships-converted.pdf</u>

Free-flying high-altitude balloons

 Airstar Aerospace – stratospheric balloons: <u>https://lynceans.org/wp-</u> <u>content/uploads/2022/02/Airstar_airships_tethered-</u> <u>aerostat_stratospheric-balloons.pdf</u>