GES Air Ship Design by William C. Patterson, Ph.D. Side View Solar-Electric Roof Exhaust G E S L Intake

Four Circular Mirrored Underslung Cargo-Passenger-Pilot Cabins



Circular Mirrored Underslung In-Line Cargo-Passenger-Pilot Cabins

Special Features for GES Airship

Clear or Mirrored Plastic Construction Planar Design Minimizes Fabrication Cost, Maximizes Solar Collection See Through to Flight-Check or Cam-Check Structure & Accessories Free Radiant Warming of Helium for Added Buoyancy Natural Lighting & Heating of Passenger Compartment Entire Air Ship Can Be LED Illuminated Greater Safety Multi-Section Construction Avoids Catastrophic Buoyancy Failure Wide Aspect Ratio Increases Lift & Eases Hangering Ouiet, Vectored Electric Engines F&R w/ Tandem Daisy Prop Propels Craft & Lowers Drag Valved Lateral Ports Orthogonally Channel Interior Jet Stream for Turns & Lateral Moves Tapered Core Airstream Steers & Stabilizes Ship, Obviates Need for Airfoils, Reduces Drag & Weight Fly Forward or Reverse Equipped with Air Current Display True Altitude Reported Circular Mirrored Plastic Passenger Compartments Optimize Aerodynamics & Afford Total Panorama Integral Parachutes Deploy as Cabins Separate from Buoyancy Package in an Emergency Planar Underbelly of Air Ship Is A Lift Body Large Solar-Electric Roof Provides Free Power for Propulsion & Accessories

Four-Point Auto-Reel Flyable Ground Tethering Affords Maximal Ground Anchoring Stability Emergency Landing: Rocket Harpoons Anchor Cables in Soft Ground (Farm Field, Golf Course, etc.)

GES Air Ship is dedicated to peacetime use only. Re-commissioning for military purposes, including spying, military reconnaissance, forward air control, bombing, or paratrooper drops, violates the GES AeroForce charter.

GES Air Ship Scale-Up

50' x 100' x 400' Air Ship (2M Gross $Ft^3 - 80,000 Ft^3$ JetWay = 1,920,000 Ft^3 He) 4,800 He Ft^3 /Length Ft 5,000 Ft^2 XS Weight: 32,000 Lb (80 Lb/Length Ft, $6.4 \text{ Lb/Ft}^2 \text{ X/S}$) No-Tear Tubular Aluminum Lattice with X-Box Reinforcement for Shape Retention Full Size Cost Estimate: \$32M



Box Kite Construction Parallel

Clear Plastic Air Ship Construction Small-Scale Precursors





Clear Gas Balloons with Multicolor LEDs Clear Balloon

60 Passengers & Crew (6.7 Pass/Ft; 32,000 He Ft³/Passenger) 40,000 Square Feet of Solar-Electric Collector (100 KW) F&R Vectored Tandem-Prop Electric Engines 37 KW (50 HP) Each for Total 75 KW (100 HP) 25 mph Cruise Speed (4 HP/MPH) (Ocean-Going Cargo Ship Bench Mark: 15 knots) Low-Energy LED Lighting Air-Filled Seating (Easy Chairs, Couches, Beds) and He-Filled Tubular Aluminum Frame Transparent Plastic "Walk-On-Air" Floor

GES Air Ship Consumes No Fuel: Unlimited Day Travel Free Solar Power Drives Electric Propulsion for Forward Progress Non-Consumable Helium Provides Free Lift Helium Compression & Rarefaction Manages Altitude & Attitude Control No Control Surface Weight Burden: Lateral JetWay Porting for Turns & Lateral Movement Low, Slow, Immense Air Ship Grants Every Human Being Thrill of Flying Over Earth's Beauty Available Designs for Super-Light Air-Filled Furniture Resting On Transparent Floor



Historical Reference

Goodyear Air Ship: Wingfoot Class (First Flight 2014)



Cost=\$21M L=246' W=65' 78 MPH Ceiling: 10,000' Wt: 19,780 Lb Payload: 5,181 Lb Frame: Al & C-Fiber Truss Air Ship Cross-Section: 3,317 Ft² Envelope: Polyurethane, Polyester, Tedlar Envelope Volume: 297,527 Ft³ Gondola: 2,626 Lb Seating: 14 Interior Noise: 64 dB Three Vectored 4-Cylinder Gasoline Engines @ 200 HP Each Three-Blade Props Fuel: 303 Gallons Endurance: 24 Hours

Goodyear Wingfoot Design Ratios

\$85,365/Length Ft \$70.58/He Ft³ \$1.5M/Passenger \$1,062/Lb 33 Lb/HP 12.6 GPH 7.7 HP/MPH Payload 26% of Total Weight 15 He Ft³/Total Lb 16 Length Ft/Passenger 19,835 He Ft³/Passenger 80 Lb/Length Ft 6 Lb/Ft² X/S 1,209 He Ft³/Length Ft

Core Converging-Nozzle Air-Jetway Longitudinal Cross-Section



Emergency Parachute & Raft Deployment of Separated Passenger Pod *Never "Crash & Burn" on Land or Sea Never "Sink & Drown" at Sea*



Bottom Air Bladder to Cushion Landing or Float at Sea

High-Efficiency Daisy-Windmill Air Ship Tandem Propellers F&R Tubular Jetway

Situating Propeller-Driven Intake Front & Center of Lead Rectangular Envelope Lowers Cross-Sectional Drag, Imparting Air Ship with Virtual Streamlined Frontal Profile Common to Conventional Dirigibles.

Jetway Constructively Channels Air Set in Motion by Propellers, Confining Imparted Energy Within the Tube for Higher Efficiency and Power.

Front View



Transverse Cross-Section



Propeller Super Blades Fill Nearly All Cross-Sectional Intake Area, Imparting Power to Nearly Every Molecule of Air Drawn into the Jet Stream.

Tandemizing Counter-Rotational Propellers Augments Power Boost of Entry Propeller AND Tames Vortices Passing Through the Jetway, Stripping Destabilizing Torsional Moments. Autonomous Air Ship Top-Entry Landing Port Design Affords Landing Crew Size Minimization Top View (A) Awaiting Air Ship and (B) Landed Air Ship



Pilot Carefully Manages GES Air Ship Descent & Hovers Directly Over Drop-In Hanger Four-Corner Lines Drop to Hanger Floor Within Expanded Catch-Ring Targets Catch-Rings Tighten Around Drop Lines & Reel to Top of Hanger Corner Taut Drop Lines Then Reel Downward, Pulling Air Ship onto Open Bay, Holding Level Attitude Pilot Further Pressurizes (Densifies) On-Board Envelope Helium During Landing to Aid Descent Air Ship Gently Grounds on its Deployed Air Bladders & is Secured Via Taut Drop Lines Passengers Exit Air Ship Cabins & Proceed on Foot to Hanger Exits Reverse Above Process for Loading & Launching GES Air Ship Landing & Take-Off Can Be Automated

60' High Hanger Walls Shield Air Ship from Winds While Parked, During Descent, and During Ascent Soft-Top Accordion Roof Deploys/Retracts Over Entry-Exit Portal to Seal Out Inclement Weather Wind & Weather-Excluding Walls of Drop-In Hanger Are Attractive Glass, Block, Brick, Metal Air Ship Port Situates on Open Field, Cushiony Grass Landscape Inside & Outside