

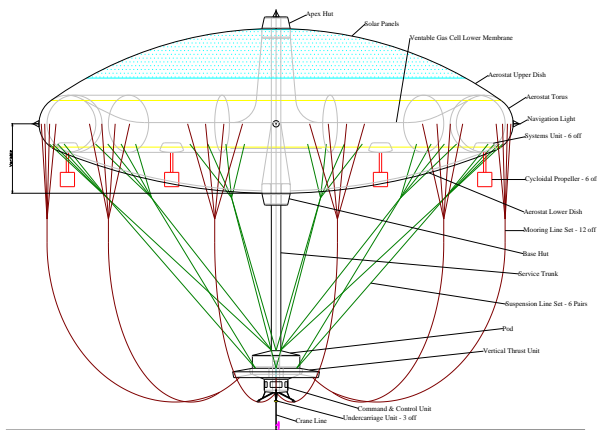
LS-L100

A Roving Transport Category Heavy-Lift Aerial-Crane

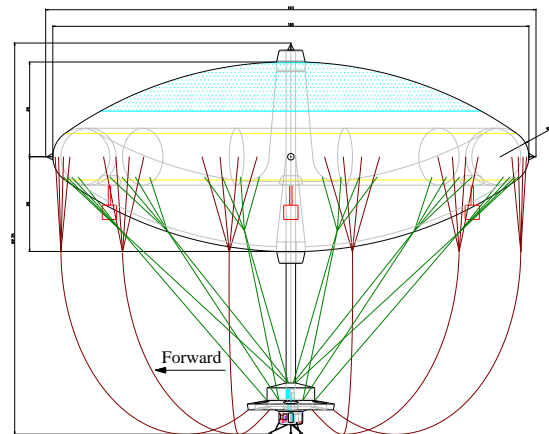


The LS-L100 is an omni-directional lighter-than-air (LTA) technology Transport Category airship to fulfil serious aerial-crane and other duties, which may be in marine environments or remote regions without infrastructure. It will have long flight endurance and payloads may be switched for customer systems with unbroken time on duty (perhaps months). It provides a stable platform for sensitive and outsized payloads up to 50 tonne (50,000 kg). Operators may expect a practical, easily-maintained aircraft with relatively low acquisition and operating costs that alternative aircraft can't yet match, allowing them to expand their services and create new markets.

Swappable under-slung units will enable quick configuration changes; for example, from freighter to a sky station. The design allows quick setup and deployment (less than 5 days out of the box), easy to manage on the ground (10 person setup, launch and moor), maintenance and operation by a single pilot plus 3 crew (relief pilot/crane operator and 2 systems engineers for in-flight support).



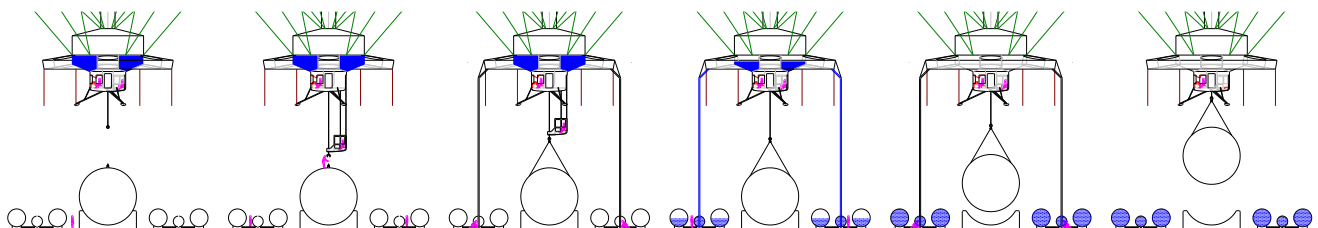
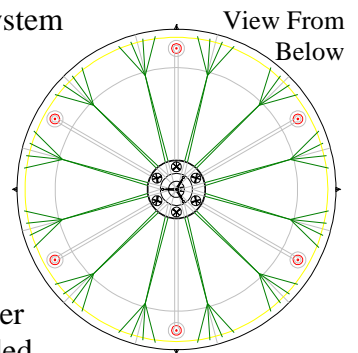
View Looking Aft - Prelaunch, Post Capture, Sea Level



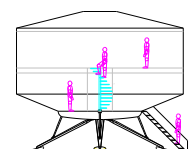
Side Elevation - Free Flight at Pressure Height

Key Aspects:

- 6 degree of freedom control with cycloidal propellers and a vertical thrust system
- Omni-directional dirigible motorised gas balloon for heavy-lift duties
- Low drag variable geometry lenticular aerostat for aero-static/dynamic lift
- Quiet operation, routinely flown as a silent steady un-powered free balloon
- Stable long endurance that is environmentally friendly (low emissions)
- VTOL style manned operation – balloon/airship and helicopter methods
- Doesn't need stabilisers, elevators or rudders – controlled with thrust
- Fixed when moored and able to be cloaked at low level for storm protection
- Compact (smaller than traditional airships) able to access small sites wherever
- May be assembled and maintained outdoors, but skirt protection recommended
- A resilient aircraft, able to operate in normal weather that most aircraft also would fly in
- Designed for setup and operation at small level sites anywhere without a mast or runways



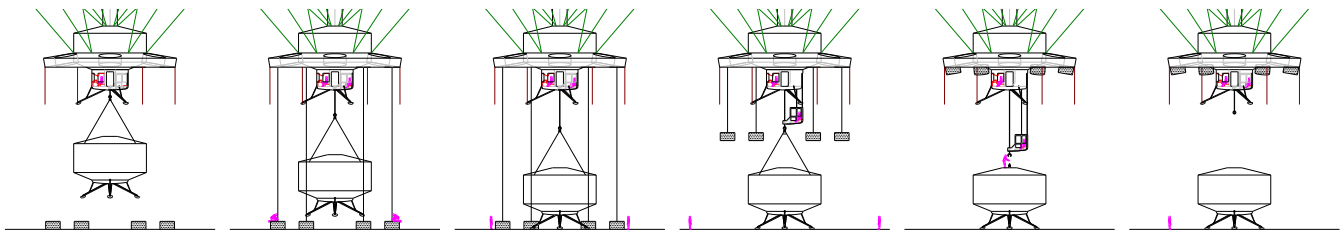
Duties: designed for ad-hoc aerial crane duties and cargo transport almost anywhere with under-slung payloads up to 50 tonne (50,000 kg), as illustrated above & below. Light transport payload units also were designed, as illustrated right, for general freight haulage – able to be picked up and delivered without grounding.



Note similarity to the LS-L100's pod.

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Payload placement or pickup may involve ballast exchange to maintain force equilibrium between buoyancy and LS-L100 gross weight aided by vertical thrust. Ballast may be a variety of things but, if not available, a fixed quantity of gas may be quickly vented to reduce buoyancy when setting payloads down.

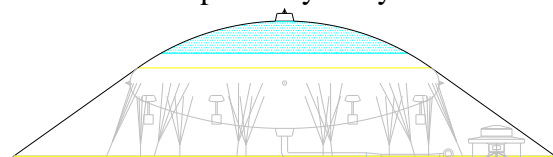
General specification:

Gas fill / Overall aerostat volume	160,000 m ³ (5,650,300 ft ³) / 242,930 m ³ (8,579,000 ft ³)
Aerostat maximum diameter	100 m (328 ft)
Aerostat height at sea level / pressure altitude	30 m (98.4 ft) / 40 m (131.2 ft)
Overall SkyPorter height	82.35 m (270.2 ft)
Disposable load / Payload	75,000 kg (165,350 lb) / 50,000 kg (110,230 lb)
Max and cruise airspeeds	55 Kn (101.9 km/h) and 45 Kn (83.3 km/h)
Max wind speed - launch/capture	25 Kn (46.3 km/h) gusting to 30 Kn (55.6 km/h)
Max wind speed - low moored	80 Kn (148.2 km/h)
Max wind speed - low moored & cloaked	100 Kn (185.2 km/h)
Cruise altitude	600 m (2000 ft) AMSL
Pressure altitude (ceiling)	2500 m (8200 ft) AMSL
Endurance - continuous cruise power	48 h at cruise airspeed
Endurance – un-powered	Unlimited
Range - continuous cruise power	4000 km (2485 miles)
Range - floating with wind	Unlimited
Power – max airspeed	TBD kW (TBD hp) Solar & Diesel producing electricity
Power – cruise airspeed	TBD kW (TBD hp)
Propulsion	Electrically driven cycloidal propellers

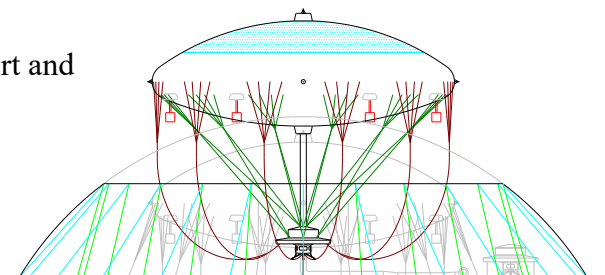
Notes: Following prototype production and shake down, confirmation of these estimates will be possible with likely improvements. The LS-L100 will be developed to meet Transport Category requirements.

Storm Protection

It's recommended that operators also acquire an annular skirt and a Dome for respectively away field and base maintenance



severe weather protection, as shown left and right.



These are both compatible light temporary structures needing ballast or anchors instead of concrete foundations to hold them. Launch/capture is vertical, directly from either base, obviating cross-field ground movement. No runways, mast or swinging awkwardly in the breeze – just simple common sense!

Current status

The concept portrayed uses methods known to work, so can be developed to produce a viable prototype. Development plans also have been scoped to a first level sufficient for investor due diligence. However, Luffships is using its small designs to investigate alternative dynamic ways for pick&put actions to reduce need for ballast exchange. The final solution thus isn't yet fixed, needing low investment to continue and deliver.

Contact as below.

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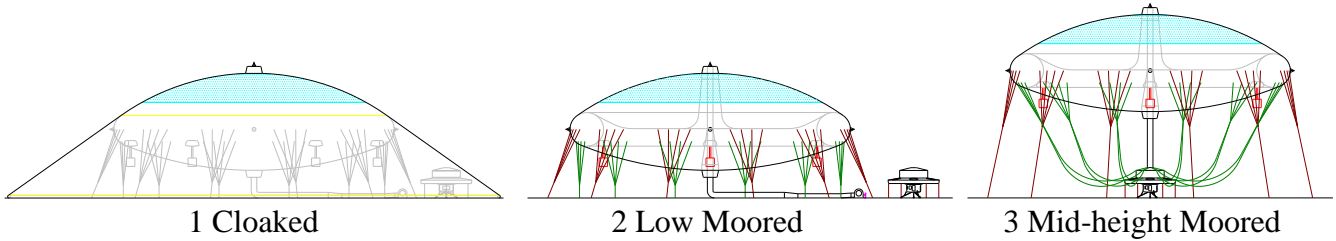
ADDENDUM



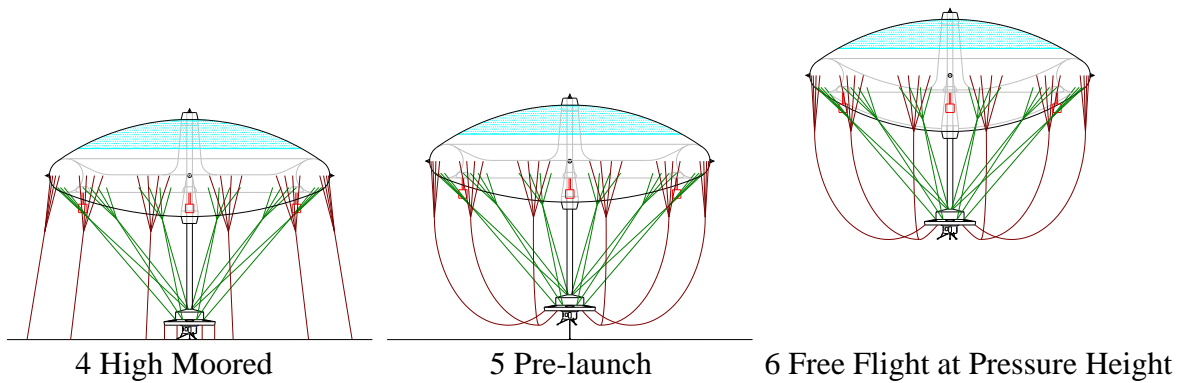
Cycle of Operations

The following illustrations show generally how the LS-L100 would be operated:

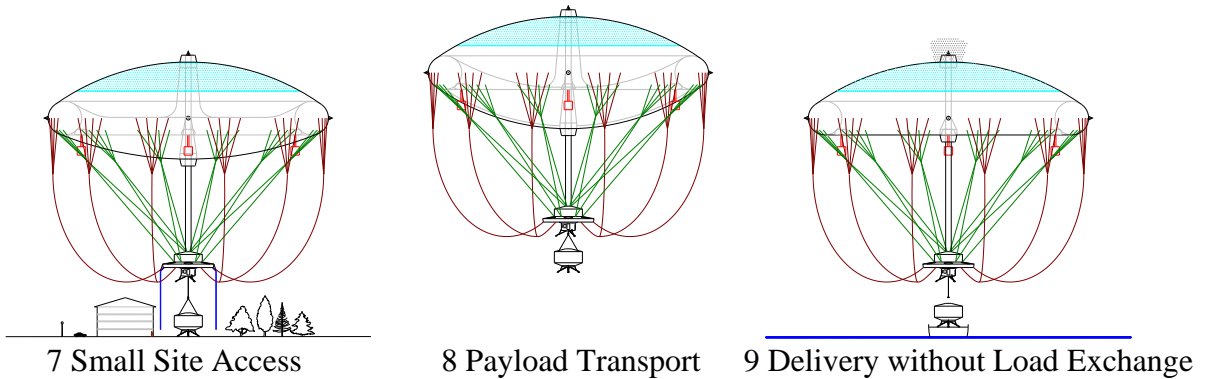
A) Secure mooring against severe weather at the operator's base



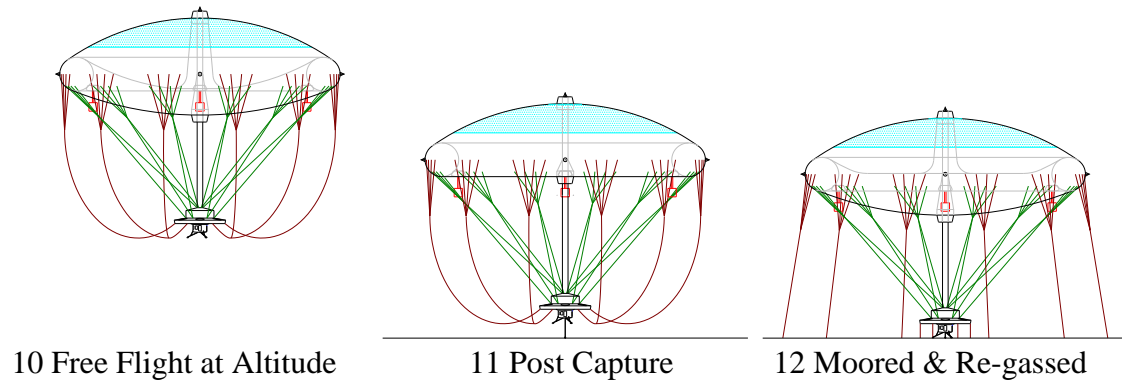
B) Preparation and flight – launched directly from the base vertically



C) Extraction, transport and delivery operations to suit customer needs and circumstances



D) Base return for replenishment (gas, fuel and ballast), captured directly without fuss



Naturally, if the delivery site is arranged with ballast for load exchange when the payload is set down, then gas venting may be obviated. We also are working to develop new dynamic airflow methods to enable payload pic&put operations without ballast exchange, being tested/developed on small variants.

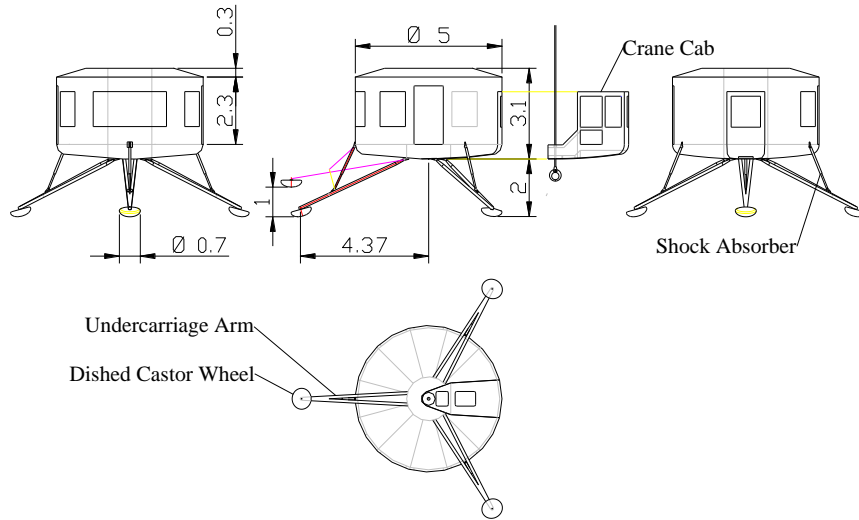
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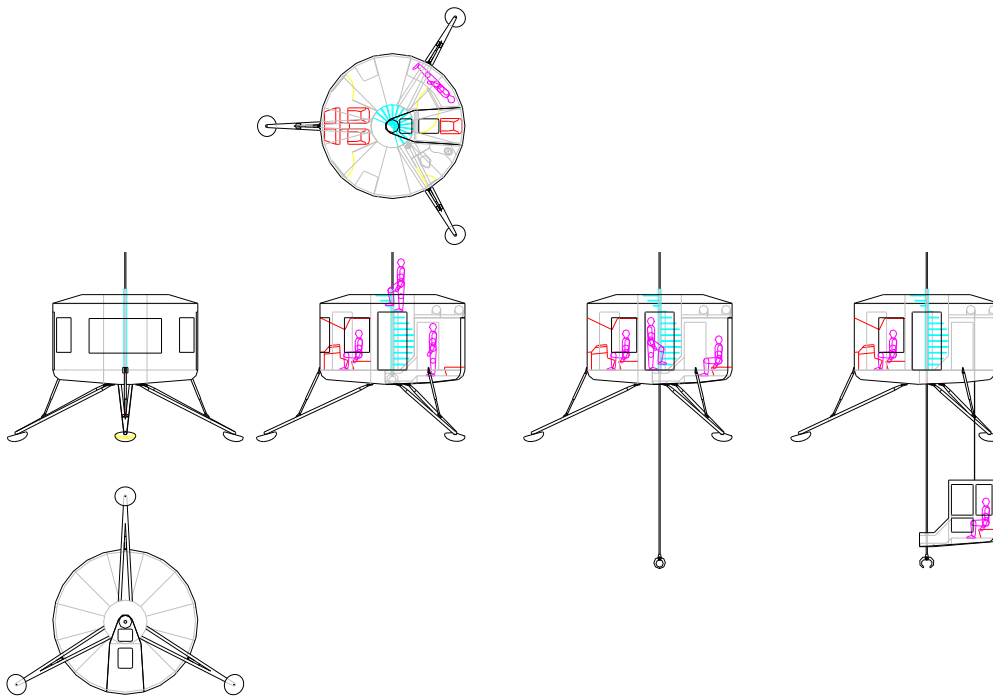


Further Information

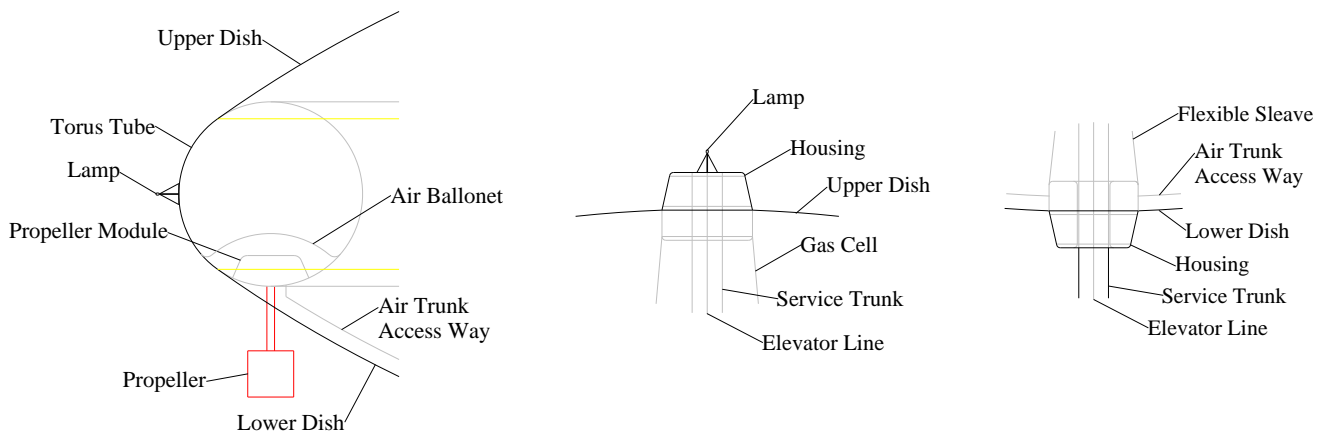
Command & Control Unit - Cushioned ground contact



Command & Control Unit – General working arrangements



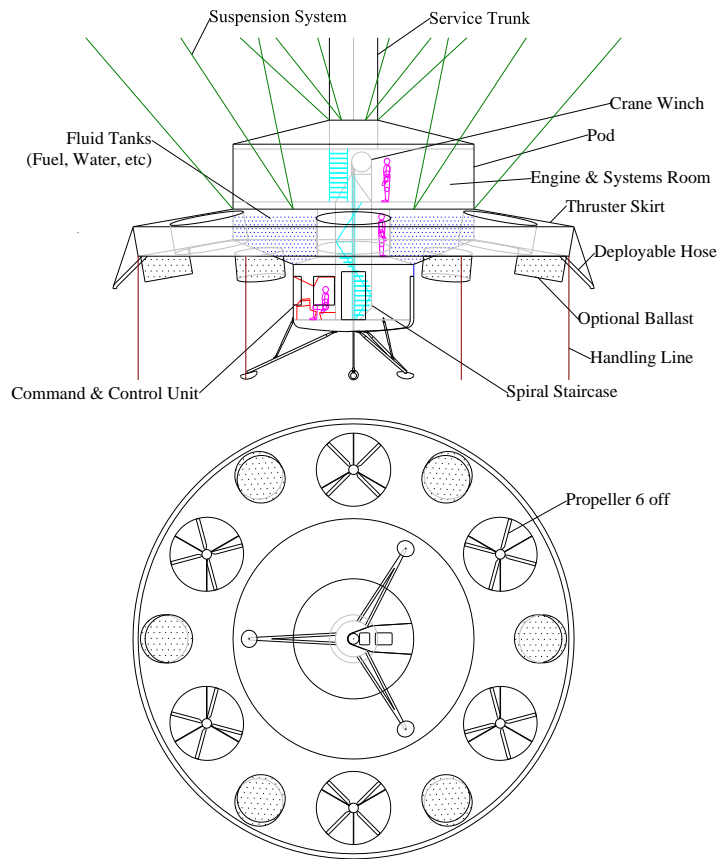
Aerostat Installations - Cycloidal Propellers for rapid thrust vectoring through 360°, plus Apex and Base Housings for crew and systems' needs



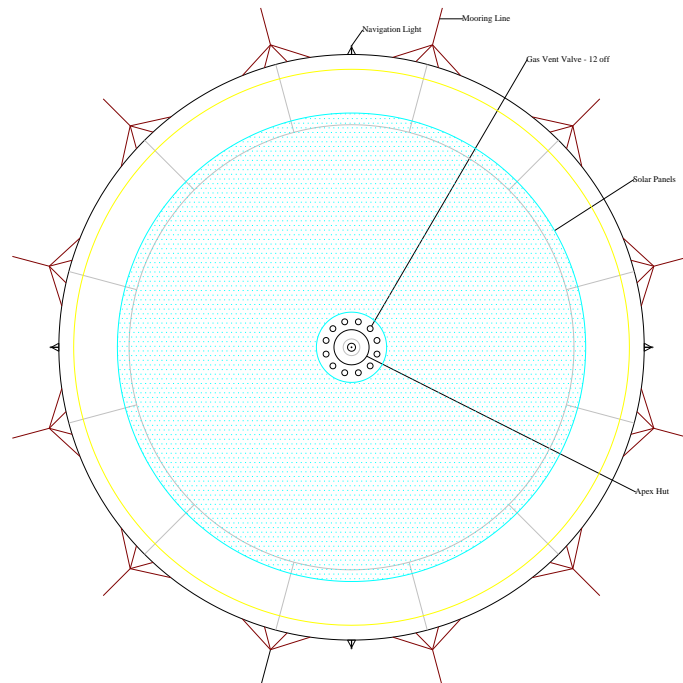
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Pod – General Arrangement – The LS-L100’s working centre



A bird’s eye view looking down on the aerostat



There are many ways to pick ballast up and it may be many things, but water is convenient.

