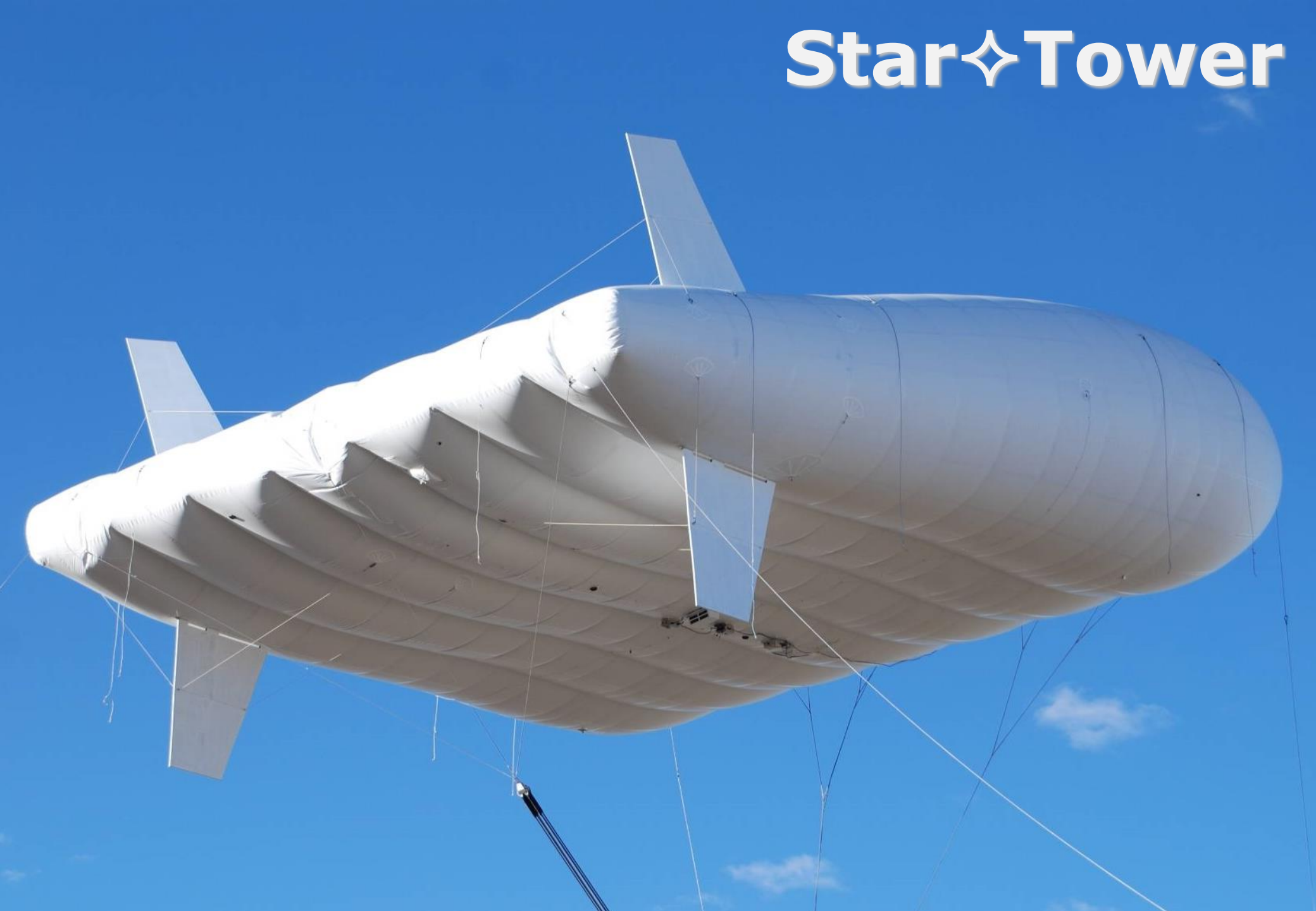

Star✧Tower Marketing
Near Space Systems, Inc.


Star✧Tower

Best Flight Performance

Highly Transportable

STAR TOWER

Small Footprint, Minimum Site Preparation

Improves Sensor Performance

NEAR SPACE SYSTEMS

Star✧Tower Delivers

STAR✧TOWER

- Affordable, persistent, overhead networking, communications, surveillance and sensing to enhance security and public safety
- Rapid alerting of security forces for smart incident response
- Situation Awareness for precise command & control
- Real-time dissemination of intelligence to responders
- Visible deterrent to reduce threats

Mission Suitability

Star✧Tower offers:

- Superior mission performance:
  - Unmatched wind performance
  - Enhanced sensor performance
- Outstanding tactical agility & responsiveness:
  - Tailored system optimized for the mission
  - Easy to transport; fast and simple to relocate
  - System flexibility for field operations
- Survivability from small arms fire
- Simple, effective operations, maintenance & logistics

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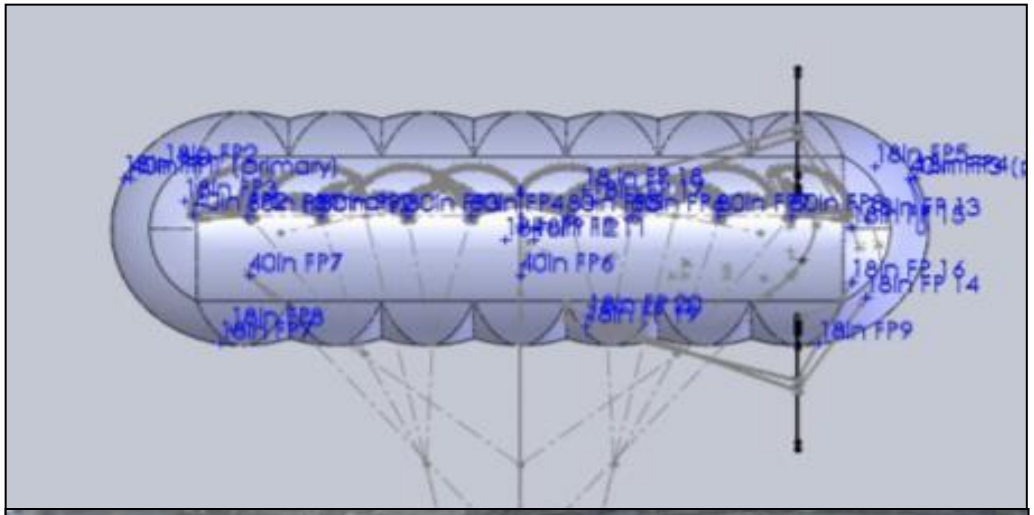
Star✧Tower Airfoil Shape

STAR✧TOWER

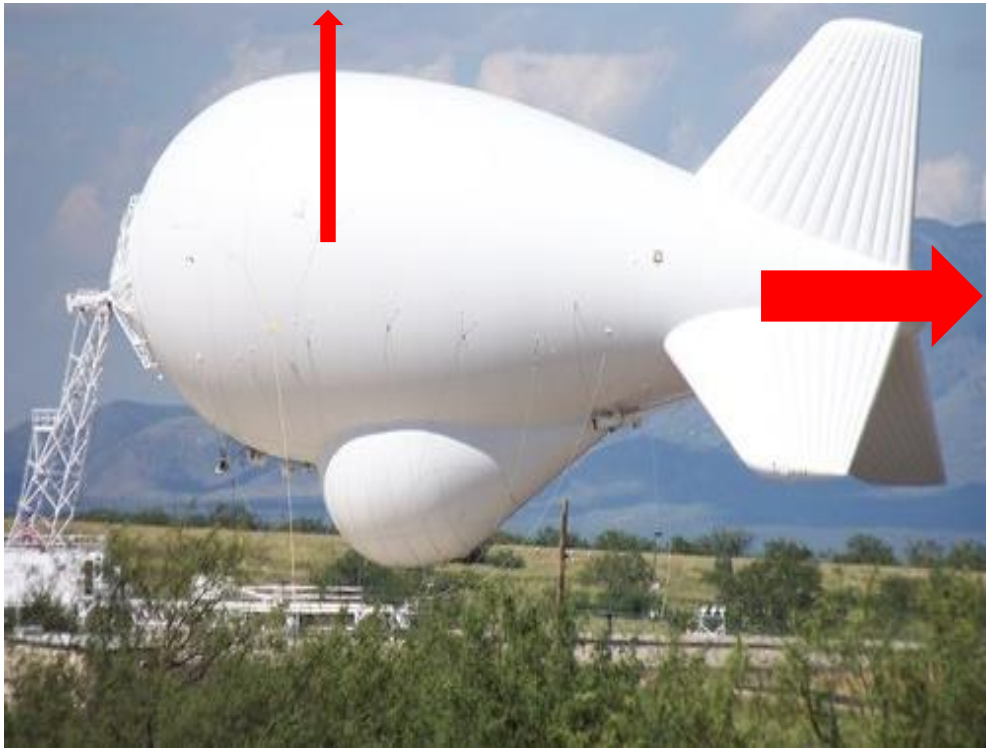
Envelope Configuration

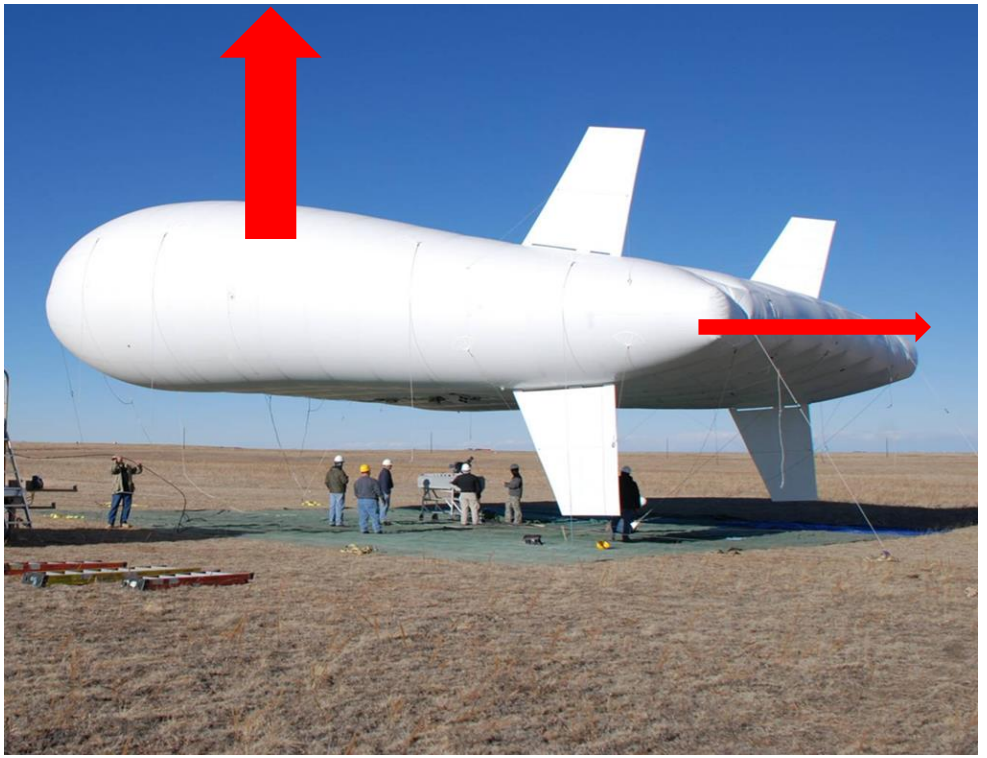


The Envelope:

- *Seven cell hull with porous fabric spars*
- *Five core cells of equal volume*
- *Two outer cells of larger volume*
- *Ballonet occupies the central three cells*
- *Internal fan patches for rigging lines*

The Star✧Tower Difference





- A traditional aerostat generates 2x more aerodynamic **drag** than lift
- Aerodynamic efficiency is not a primary design driver
- Result: aerostat is blown over, providing less sensor coverage in high winds

- A Star Tower aerostat generates 2x more aerodynamic **lift** than drag
- Aerodynamic efficiency is the primary design driver
- Result: aerostat lifts more in the wind and does not get blown over, providing greater sensor coverage in high winds

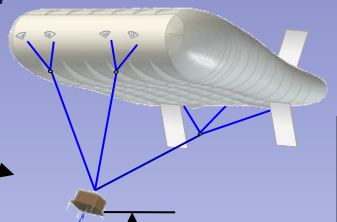
The Star✧Tower Difference

NEAR SPACE SYSTEMS

STAR✧TOWER

- *80-mph wind*
- *Both systems on a 2,000-ft tether*
- *Equal envelope lifting volume*
- *200 lbs excess buoyancy*

Star✧Tower
L/D = 1.9



2,000 ft

27.5º

2,000 ft

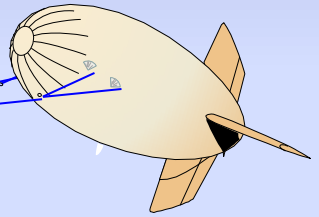
1,774 ft

Resulting Coverage
- *51.6 mi radius*
- ***8,366 sq. mi.***

63.4º

2,000 ft

895 ft

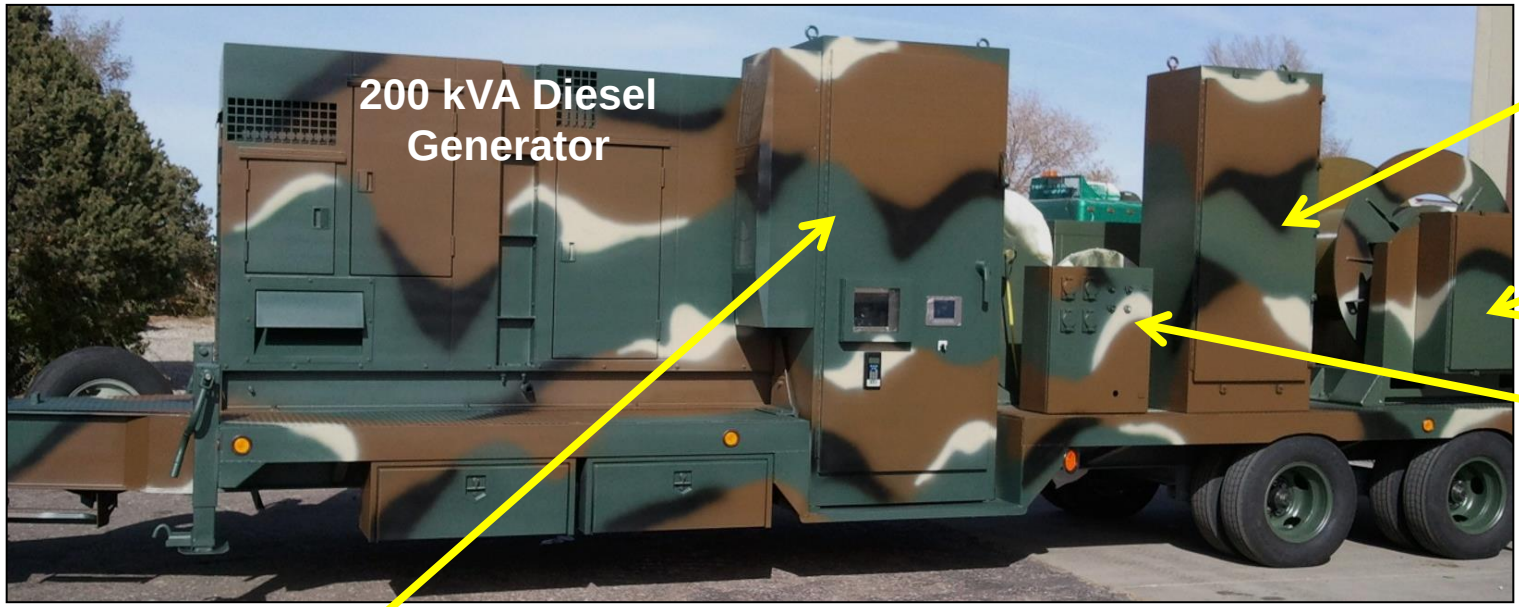


Conventional Aerostat
L/D = 0.5

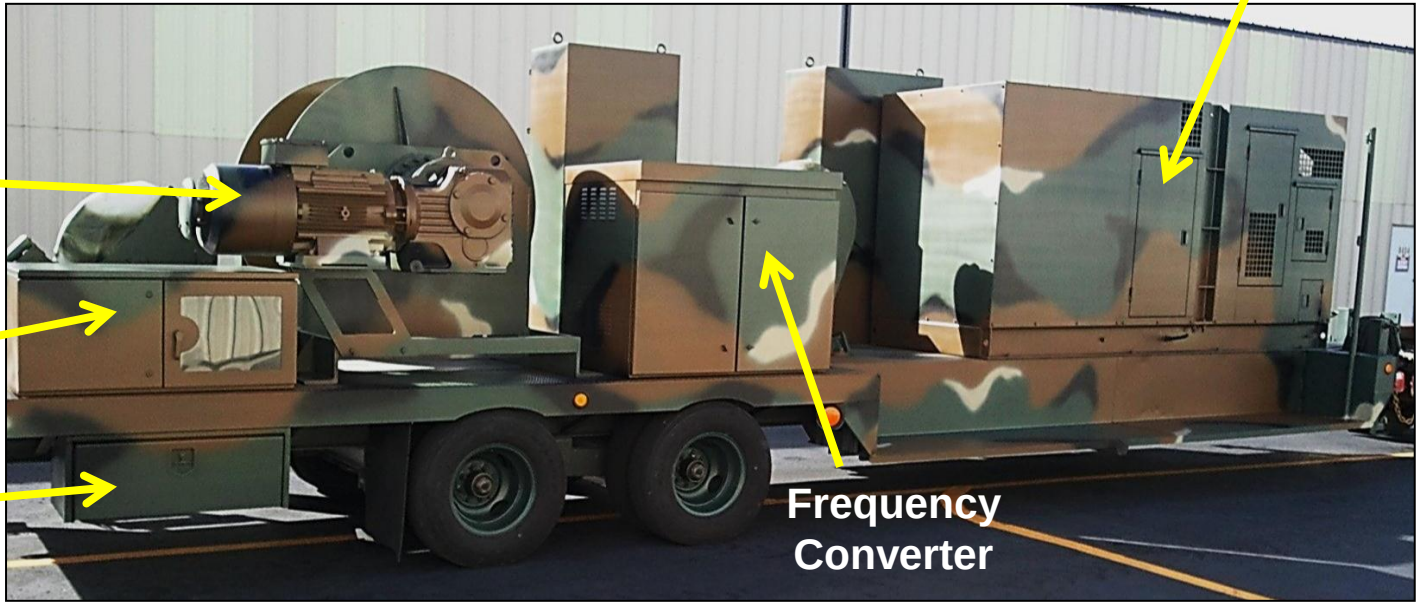
Resulting Coverage
- *36.7 mi radius*
- ***4,221 sq. mi.***

Star✧Tower provides greater mission availability and sensor coverage

ST 500 Base Station

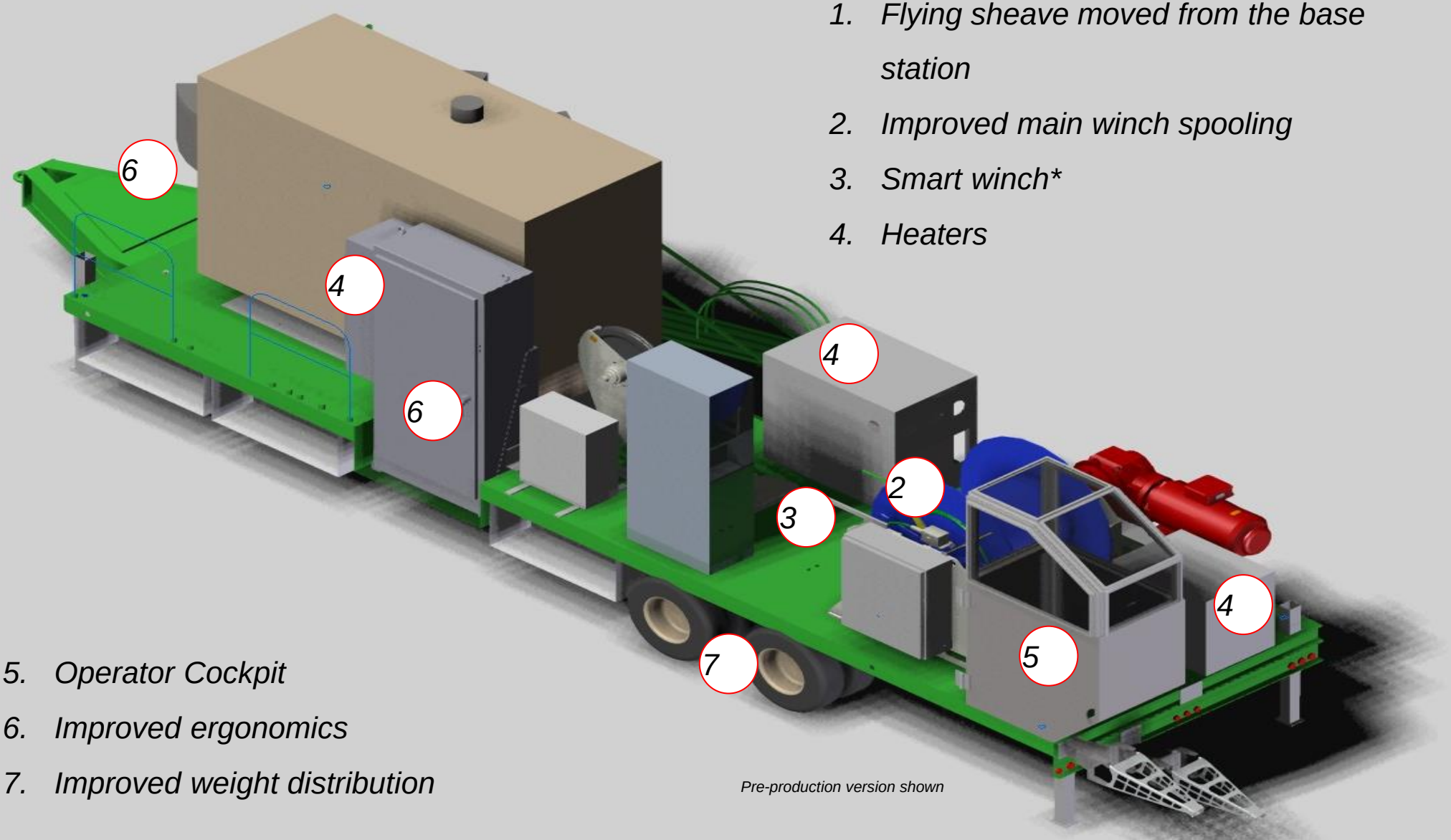


Winch Variable Frequency Drive



Base Station Upgrades

1. *Flying sheave moved from the base station*
2. *Improved main winch spooling*
3. *Smart winch**
4. *Heaters*



5. *Operator Cockpit*
6. *Improved ergonomics*
7. *Improved weight distribution*

Pre-production version shown

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Star✧Tower Base Station

(Configuration Options)

- Fully self-contained, self-supporting base station
- Trailer, truck-mount or fixed site options
- Highway and off-road capable
- Airlift up to ST-500 (80,000 cu. ft.)
- Helo-lift ST-100 (<30,000 cu. ft.)

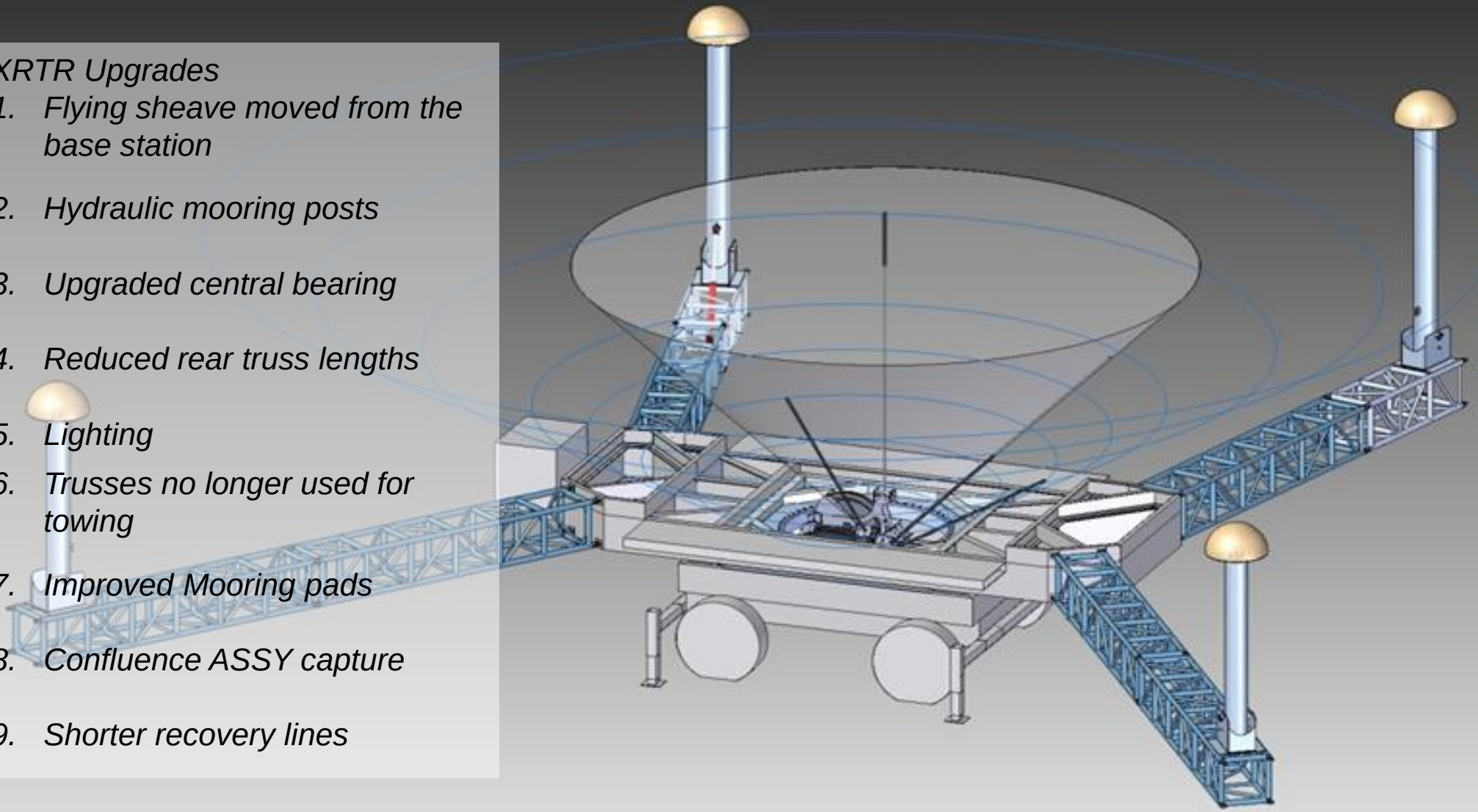
Star✧Tower 100 Base Station

Star✧Tower 100 is designed for rapid relocation

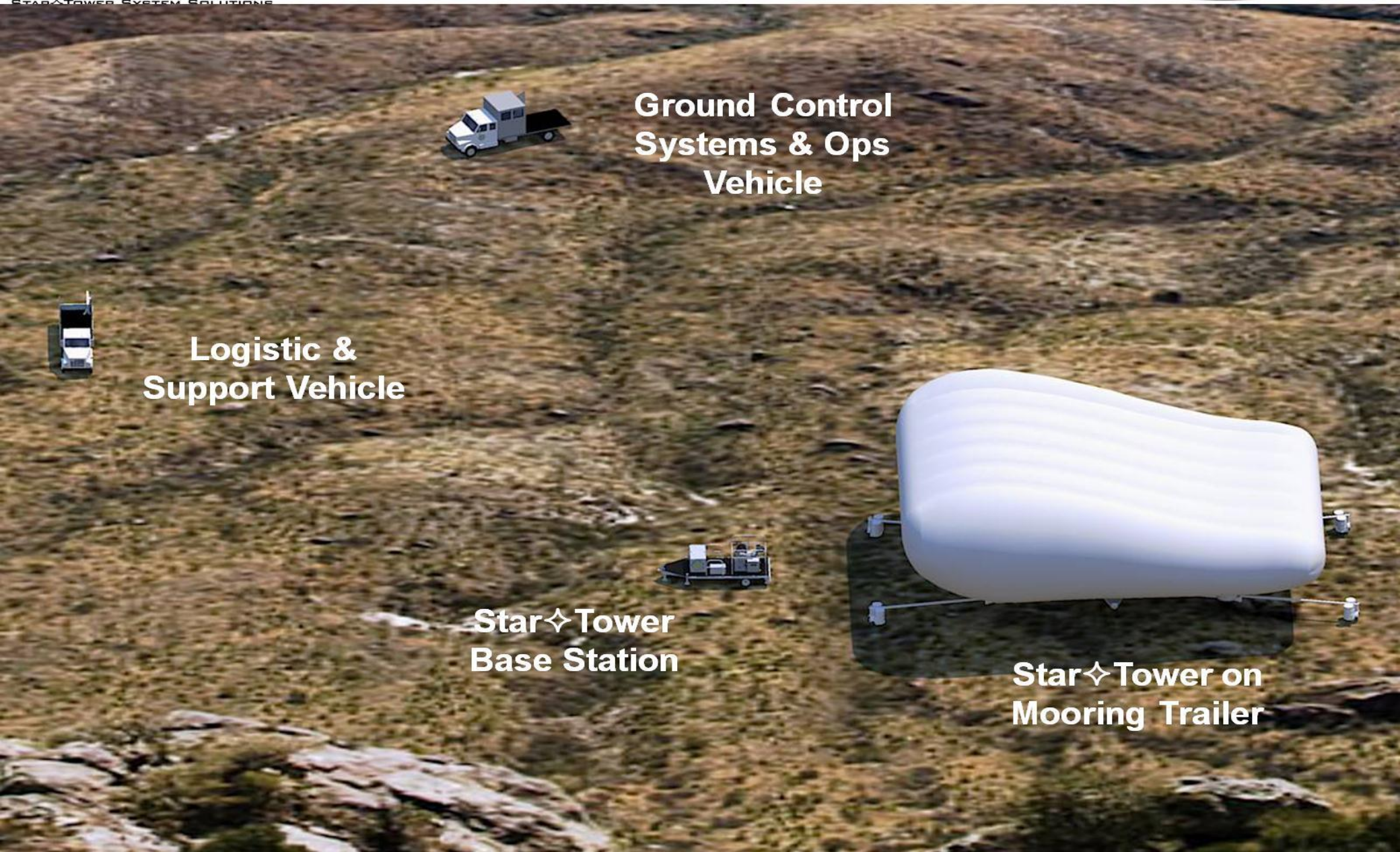
X-Rotator (XRTR)

XRTR Upgrades

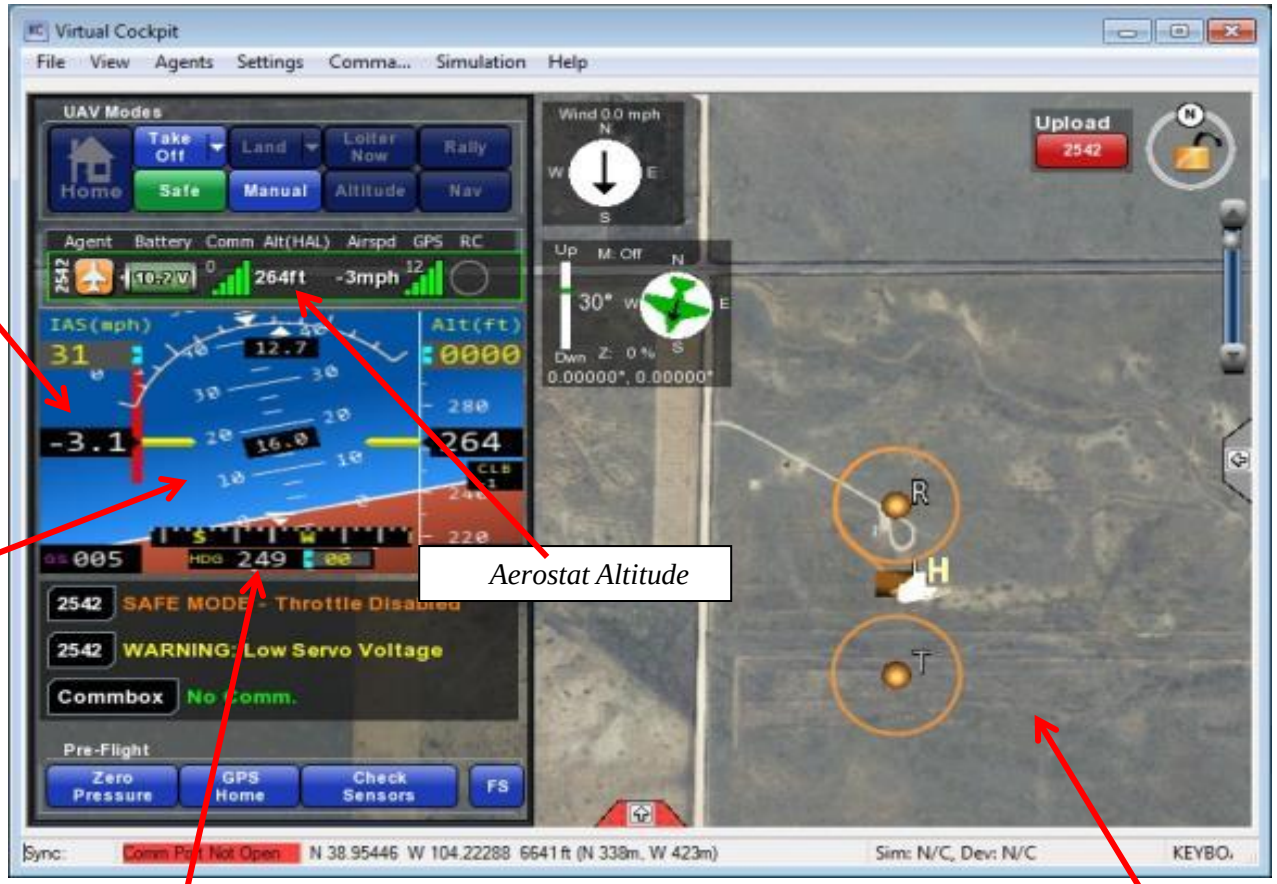
1. *Flying sheave moved from the base station*
2. *Hydraulic mooring posts*
3. *Upgraded central bearing*
4. *Reduced rear truss lengths*
5. *Lighting*
6. *Trusses no longer used for towing*
7. *Improved Mooring pads*
8. *Confluence ASSY capture*
9. *Shorter recovery lines*



Remote Operations



Flight Data Monitoring and Recording Display



Airborne Wind Speed

Aerostat Attitude
Pitch Angle
Roll

Aerostat Altitude

Aerostat Heading

Aerostat Location Map

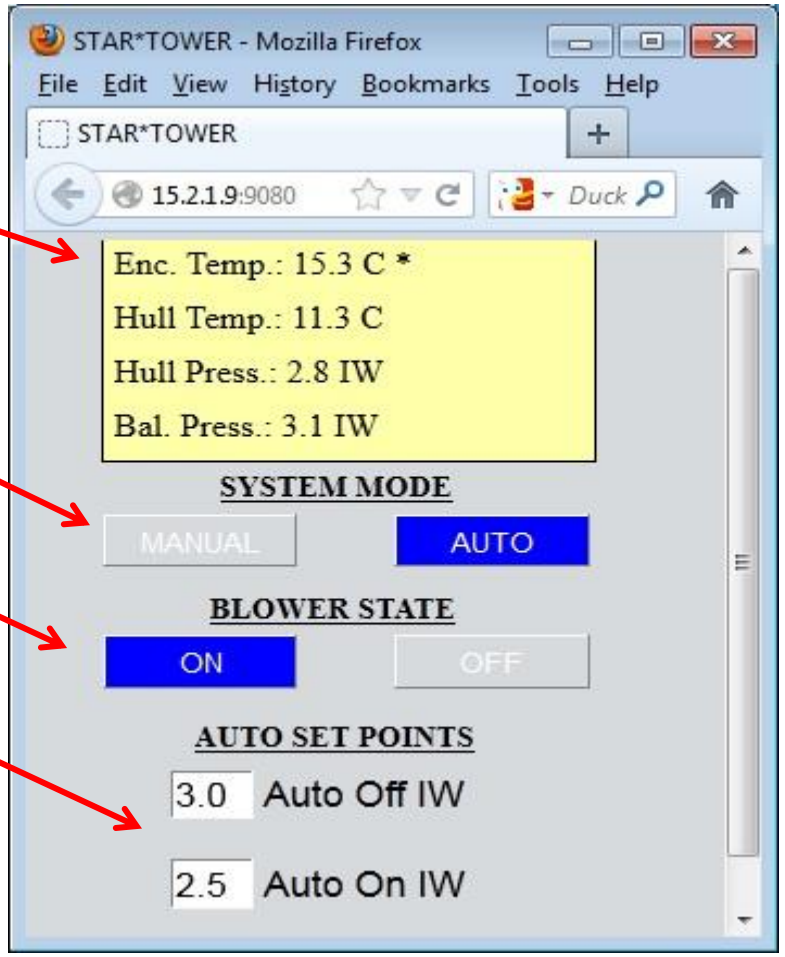
Gas Envelope Instrumentation Display

Pressure and Temperature Display

Blower Automatic or manual Setting

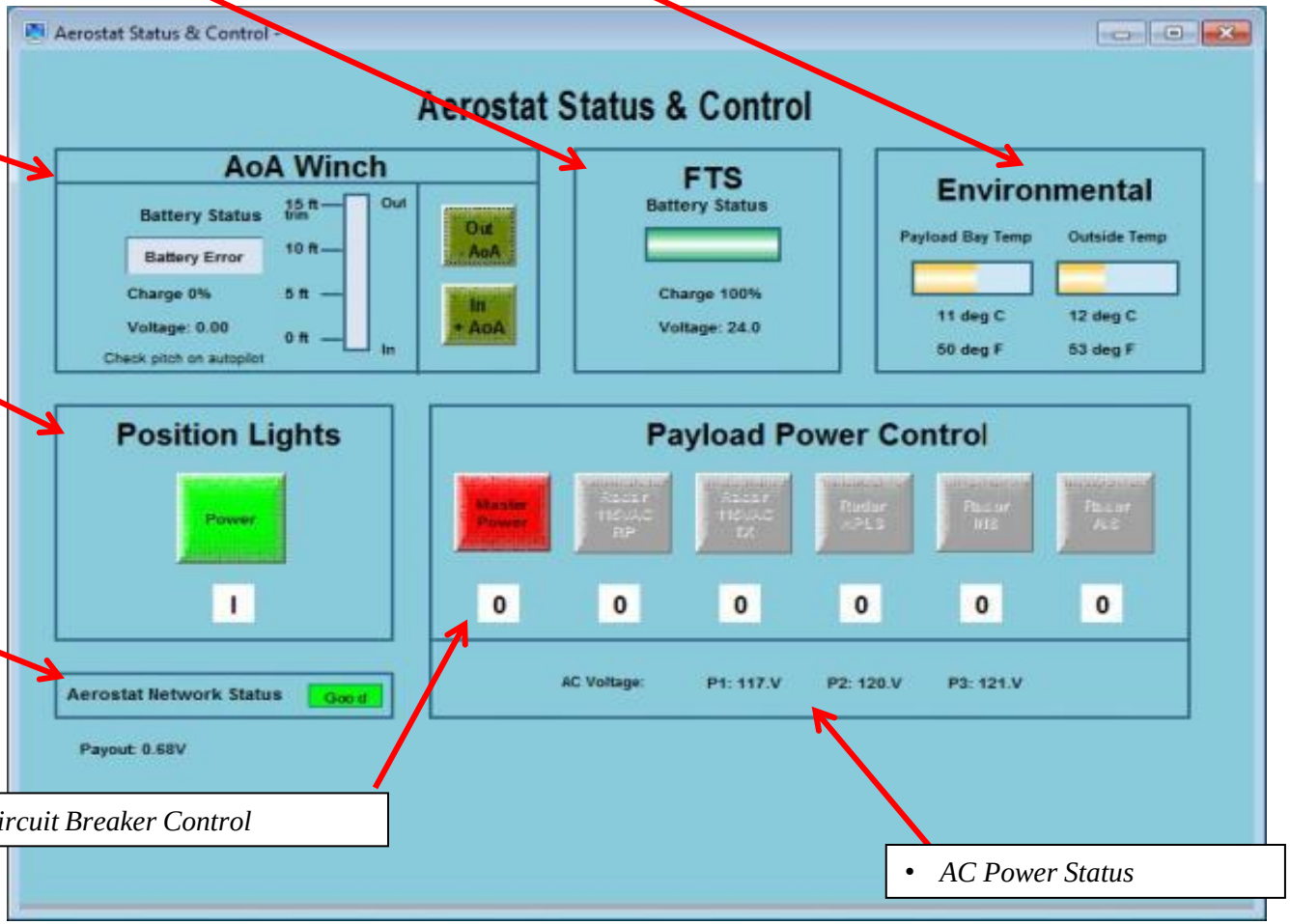
Blower Status Display

User inputs for Blower activation

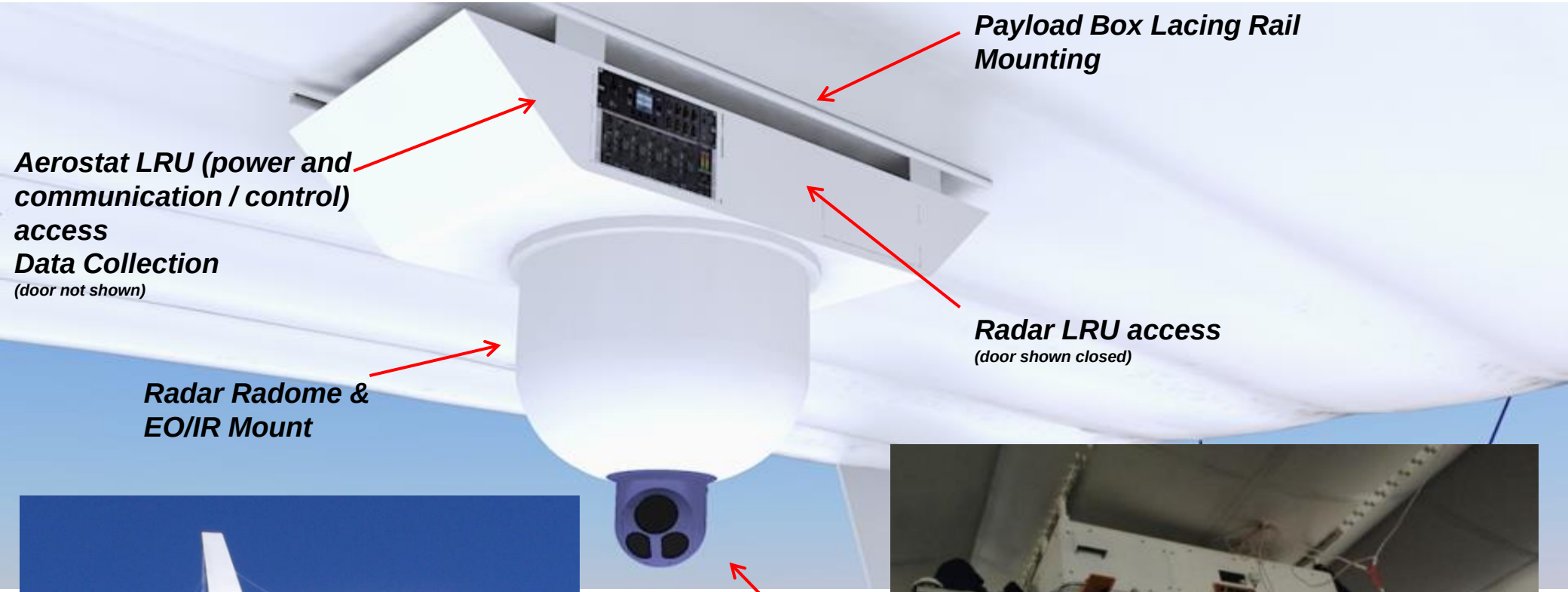


Aerostat Control Functions Display

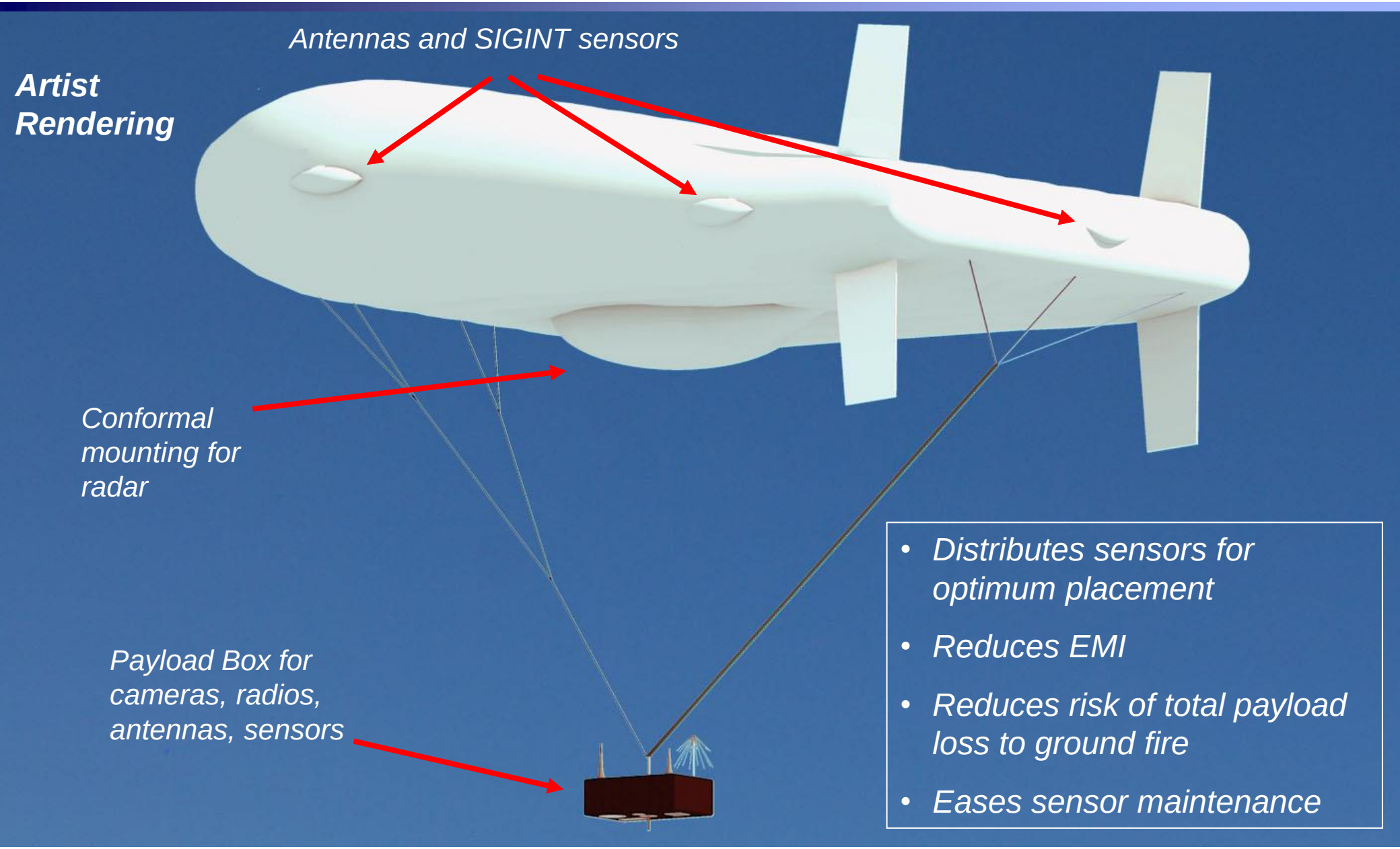
- *FTS Battery Status*
- *Internal and External Temperatures*
- *AoA Battery Status*
- *AoA Line Feed*
- *AoA Control*
- *Anti-Collision Lights Control*
- *Fiber Network Status*
- *Remote Control Circuit Breaker Control*
- *AC Power Status*



Payload Configuration



Distributed Payload System



- Distributes sensors for optimum placement
- Reduces EMI
- Reduces risk of total payload loss to ground fire
- Eases sensor maintenance

Sensor Types

 EO/IR Cameras	- High Definition (HD), full-motion video, day/night cameras w/ geo-ref and range finder - Up to 6 sensors, with multiple field of views - Image enhancing processor for poor visibility conditions (haze, smoke, moisture) - Full stabilization and ultra-accurate geo-referencing
 Multi-Mode Radar	- Modes include: Ground Moving Target Indicator, air, maritime, AIS and ground map - Day, night and weather detection capabilities; target identification in some modes - Abilities to detect dismounts (walkers), vehicles, aircraft, ships, oil spills - Features that include auto target classification, geo-locating, data recording
 Radio & Broadband	- Dedicated, secure radio and broadband networks for assured communication and data transfer beyond line-of-sight - Trunked radio network to support legacy radios - Geo-locating and tracking of all radios in the network
 User Devices for Two-Way Video and Data Relay	- Mobile laptops, 9-inch Android tablets, Android smart phones that provides secure, real-time 2-way comm., video/metadata transfer between users, command center Provides LAN, shared intelligence, network-centric collaboration - Provides geo-referenced moving map - Provides tracking of all personnel carrying the Android tablet
	- Ground Sensors are available in a wide range of form and function to detect motion, heat, chemicals, unique agents, etc. - Unattended ground sensors provide RF alerting when they detect their intended target - RF tracking of tagged objects of interest

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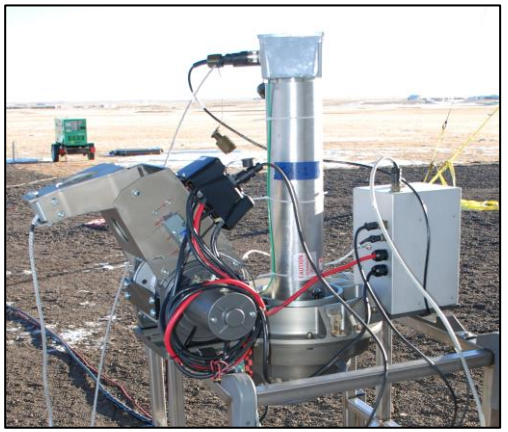
Star✧Tower Features

STAR✧TOWER

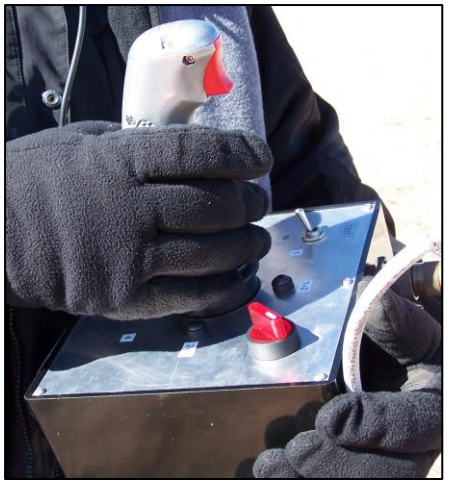
- High-performance airfoil shaped envelope
- Rigid, non-inflatable tails improves flight performance and reduces gas loss
- Smart winch, reflex camber and envelope shape negate downdrafts, greatly reducing chance of breakaways
- Active AoA control optimizes flight performance
- Automated features reduce crew size and lowers operating costs
- Remote operations from GCS reduces outside exposure
- Distributed payload system to optimize sensor performance
- Fully scalable design is tailored precisely to meet customer requirements and operating location

High Performance Airfoil Shape

Non-Inflatable Tails



AAoA Control



Consolidated Winch Controller

International Aerostat Competitors

Traditional Design, Many Weaknesses

International Aerostat Weaknesses

All international aerostat manufacturers ***except GNSS***, use the same traditional (old) aerostat envelope shape and all have the same weaknesses:

1. Low lift/high drag envelope coefficients limit mission performance:
   - Low wind limits reduce mission availability
   - Greater "blow-down" of blimp envelope reduces sensor coverage in all wind conditions
2. Old design is highly susceptible to downdrafts (slack tethers) and other mountain wind effects:
   - Significantly higher occurrences of breakaway and loss of aerostat
   - 35% of traditional aerostats flown in Afghanistan by US were lost to weather
3. Envelope shape requires continuous wind alignment when moored:
   - Complex mooring structure; significant weight and footprint penalties; limits mobility and responsiveness; more dangerous for ground crew
4. Old design requires more manpower to operate and maintain

Star✧Tower's next generation design overcomes these weaknesses

NEAR SPACE SYSTEMS

The Star✧Tower Difference

STAR✧TOWER

Star✧Tower overcomes all the weaknesses of our international competitors:

- Higher mission availability due to twice the operating wind limits (70 kts for Star✧Tower vs. 35 kts for other aerostats)
- Greater sensor coverage in all wind conditions because Star✧Tower has less tether lean in winds
- Much lower risk of breakaways and loss of system with new ST technologies (high L/D, reflex camber, smart winch)
- Distributed payload system and envelope stability improve sensors performance, especially at long ranges
- Automated features that reduce operating crew size and workload, and improves safety

Mission Applications

Security & Defense

- Maritime and Airspace Surveillance
- Border/Port/Critical Infrastructure Security
- Command & Control of Forces
- Security Force Movements
- Emergency Response

Maritime

Border

Real-time Connectivity

Ports, Points of Entry

Critical Infrastructure

Major Event & Public Safety

A relocatable Star✧Tower Aerostat can be placed at public events localized security and public safety

On-Site Security:

- Day/Night Surveillance
- Secure Communications Network
- Airborne CBRNE Sensors
- Integrated Ground Sensors
- Response Force Tracking
- Continuous Presence

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Oil & Gas Infrastructure

STAR TOWER

Pipeline security and leak detection technologies have matured significantly over the last few years to the point of now delivering:

High Probability of Detection

Very Low Probability of False Alarm

Pinpoint Location of the Incident

NEAR SPACE SYSTEMS

Star✧Tower for Defense

STAR✧TOWER

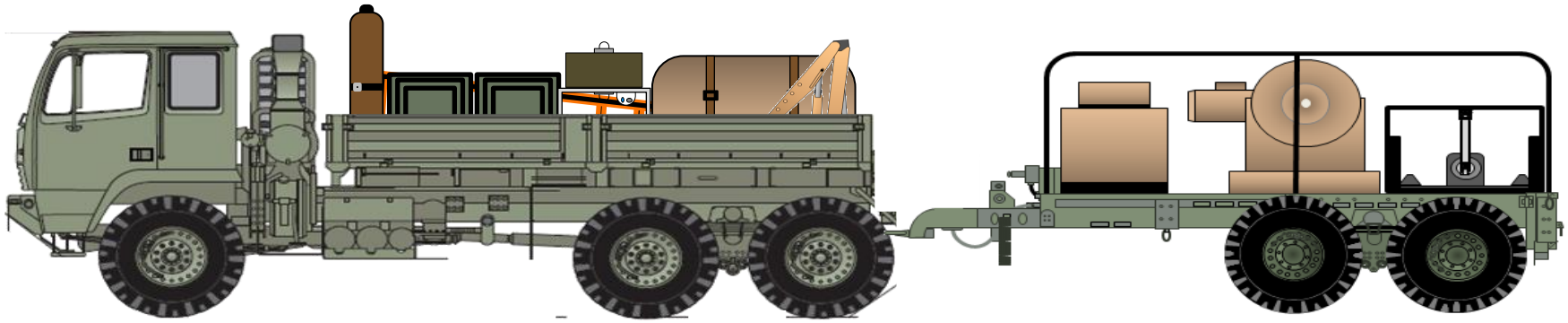
- All Star✧Towers offers:
  - Superior Mission Performance:
    - Unmatched wind performance
    - Enhanced sensor performance
  - Outstanding Tactical Agility & Responsiveness:
    - Tailored system optimized for the mission
    - Easy to transport; fast and simple to relocate
    - System flexibility for field operations
  - Survivability
  - Simple, Effective Operations, Maintenance & Logistics

NEAR SPACE SYSTEMS

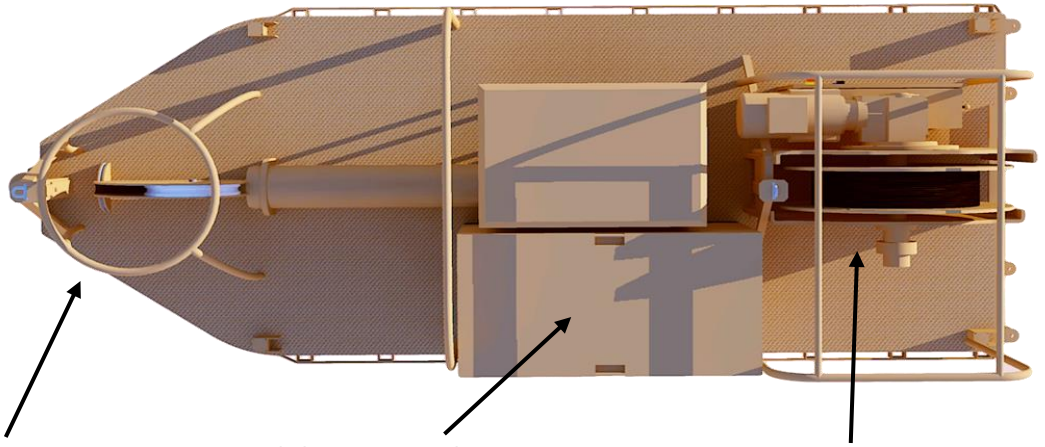
Optimized for Defense

STAR✦TOWER

- All mobile Star✧Tower aerostat systems are self-contained and highly transportable; all can be relocated and operating again in hours after arrival at a new site, not days
- Each Star✧Tower aerostat system is tailored to the customer and the mission. GNSS aerostats can be configured on a trailer, pallet, truck bed or fixed site to meet the widest range of employment requirements
- The Star✧Tower's transportable ground system can fly different size envelopes without modification, thereby allowing the same system to be employed at sea level or at higher elevations
- The Star✧Tower aerostat and payload can be rapidly reconfigured in the field to evolve with a changing tactical environment



Tactical Agility

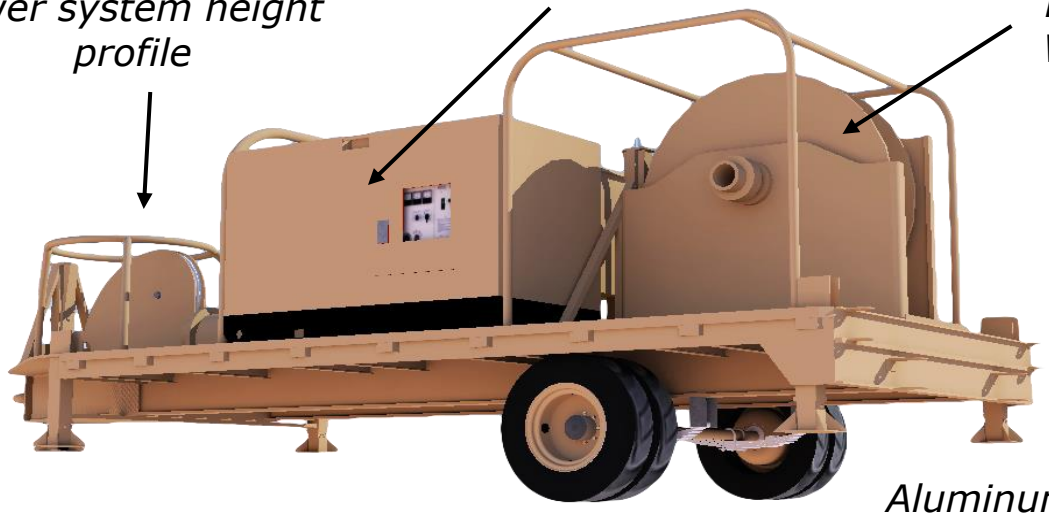


Flying winch sheave to lower system height profile

30 KVA TQ Generator

Primary Tether Winch

- *Star✧Tower aerostats with envelopes as large as 30,000 cubic feet can be slung by CH-47*
- *Provides maximum flexibility to locate and re-locate aerostat*



Aluminum Trailer with Helo Sling Points

Mobile Command & Control

Chandler/May Inc.:

- ISO 9001:2008, Huntsville AL
- Already delivered over 300 Army “One System Ground Control Stations” to DoD
- Meets or exceeds all PM-RUS RFI requirements for the GCS
- Currently supporting the Army’s Shadow and Gray Eagle UASs
- Chandler May manufactures all racks, cables, components, subassemblies, computers, monitors and recording systems

Enhancing All Missions

- Secure broadband/wireless service for all responders to ensure connectivity
- Wireless network for off-shore oil & gas operations

Environmental Monitoring

- Airborne and ground-based environmental sensors can collect and disseminate data to help environmental and agricultural engineers conduct research and analyses on a wide range of topics (soils, drainage patterns, contamination, etc.)

- Collected data can baseline the habitat, natural resource footprints to manage and prioritize government and commercial activities
- Collected data over time enables effective environmental management of land and sea resources to benefit the country and citizens

Environmental Engineering

- Airborne environmental sensors can feed collected data to help environmental and agricultural engineers conduct research and analyses on a wide range of topics (soils, drainage patterns, contamination, etc.)

- Collected data can baseline the habitat, natural resource footprints, then data collected over the years enables effective environmental management of land and sea

Security

- Maritime and Airspace Surveillance
- Border/Port/Critical Infrastructure Security
- Command & Control of Forces
- Security Force Movements
- Emergency Response

Maritime

Border

Real-time Connectivity

Ports, Points of Entry

Critical Infrastructure

Air Traffic Control at Remote Airfields

Star✧Tower can provide unmanned Air Traffic Control services to increase safety and security at remote airfields:

- *Elevated radar, surveillance cameras and communications to transmit airfield conditions to all incoming and outgoing aircraft*
- *Air traffic radar that identifies all aircraft in the area*
- *Camera surveillance of runway environment for safety and security*
- *Radar and Camera images relayed directly to cockpit*
- *Direct communications between aircraft*

NEAR SPACE SYSTEMS

Star✧Tower Delivers

STAR✧TOWER

- Affordable, persistent, overhead *networking*, *communications*, *surveillance* and *sensing*
- Real-time alerting, situation awareness and beyond-line-of-sight communications for emergency response
- Real-time dissemination of intelligence to responders
- Visible deterrent to reduce threats
- Overhead surveillance for public safety, traffic management, police/fire/rescue, etc.
- Geo-rectified sensing for environmental and exploration services
- Broadband and wireless for commercial services

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Summary

STAR✦TOWER

- Star✧Tower is the newest, most technically advanced and the best performing C3ISR aerostat system on the worldwide market
- Ideally configured for deployed operations in remote areas
- NSS can provide a “turn-key” system with in-country training and logistics support
- Our aerostat systems and payload suites are tailored precisely to fit mission requirements

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Night Operations

STAR TOWER

NEAR SPACE SYSTEMS

Security Technology Comparison

STAR TOWER

	Attribute	Aerostat	UAS	Fixed Wg Aircraft	Helicopter
MISSION PERFORMANCE	Loiter / Persistence	10	4	3	2
	Noise Signature	10	5	6	4
	Data Feed Reliability	10	5	5	5
	Fixed Point Security	10	4	6	6
	Border Security	10	5	3	7
	Oil & Gas Infrastructure Security	8	4	3	3
	Detecting and Defeating Poaching	9	3	4	5
	Comm Relay (Persistence)	10	6	4	3
	Payload Flexibility	10	3	2	4
	Launch/Recovery Winds	5	4	10	6
	Winds at Altitude	9	5	10	7
	Weather	8	6	10	8
	Total Score (High is Best):	**109**	**54**	**66**	**60**