aeroscraft
Innovation Never Stops

AIRSHIPS TO THE ARCTIC V

Approaching the Tipping Point

October 7 to 9, 2009.

aeroscraft
Innovation Never Stops

THE SYSTEMATIC APPROACH

Edward Pevzner

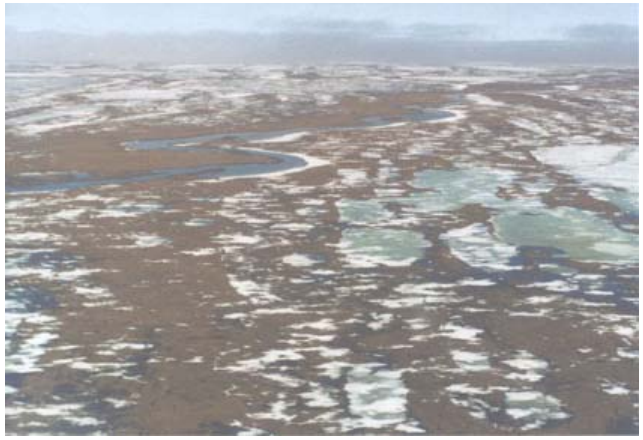
aeros

Montebello, California

edward.pevzner@aerosml.com

(323) 201-8306

NORTHERN OPERATIONAL ENVIRONMENT



OPERATIONAL ENVIRONMENT

- Significant distances between remote communities
- Last mile transportation is not the only challenge
- With climate change, winter roads are available for shorter periods
- No infrastructure; only smaller type of airlift is able to reach remote communities
- Severe weather conditions (temperature, wind)
- Unique environmental conditions

Without Addressing the Requirements the Air Vehicle will not Provide Utilities

aeroscraft
Innovation Never Stops

DESIGN ATTRIBUTES FOR NORTHERN REGIONS

NORTHERN UTILITY
- 60 Tons Payload
- Speed
- Range
- VTOL
- All Weather Ops
- Survivability
- Environment

Control of lift in all stages of air or ground operations including off-loading of payload without taking on external ballast
Ability to transport heavy, indivisible, or bulky goods
Operate without support infrastructure and from unimproved landing sites
Capable of hover and VTOL

• If we can't control buoyancy, we can't provide utilities in Northern Environment.

• If we can't achieve VTOL and control authority during hover, we can't provide utilities in Northern Environment.

• If we can't develop lightweight and cost efficient rigid structure, we can't provide utilities in Northern Environment

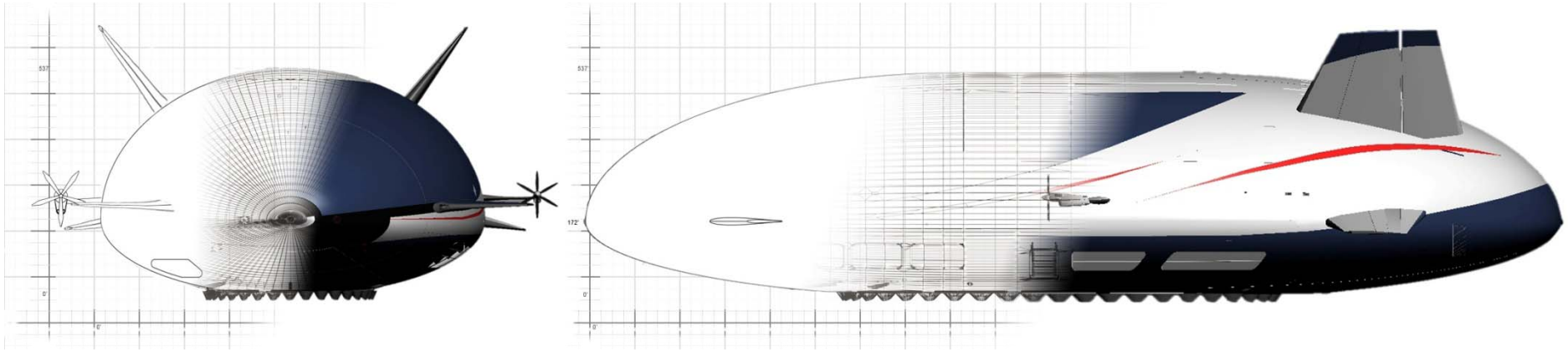
•If we can't sustain the operational weather conditions, we can't provide utilities in Northern Environment

Major Blocks: Technology Maturity, Civil Airworthiness Certification, Corporate Organizational Capability

aeroscraft
Innovation Never Stops

AEROSCRAFT DEVELOPMENT CHALLENGE

Aeroscraft – Buoyancy Assisted Air Vehicle

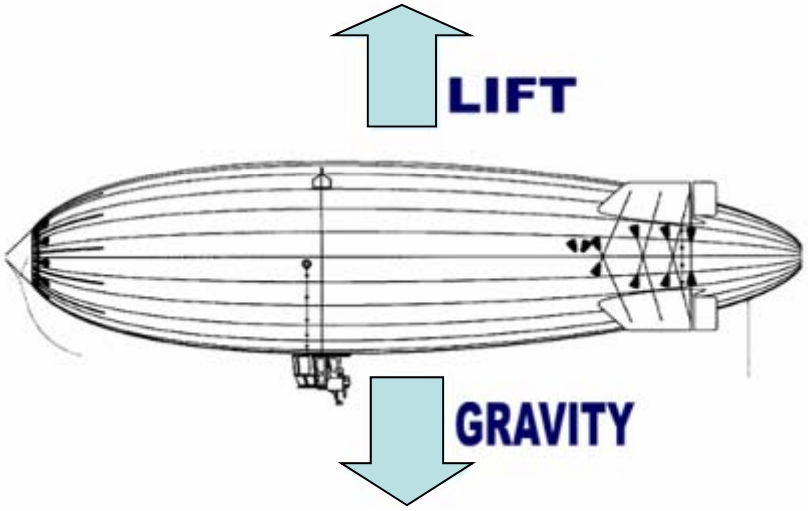


The Aeroscraft is a new type of rigid variable buoyancy air vehicle designed to control lift in all stages of air or ground operations including the ability to offload payload without re-ballasting. The key features of the Aeroscraft include the rigid structure, buoyancy management system, vertical takeoff and landing capabilities, and the ability to operate at low speed, in hover and from unprepared surfaces.

It is not Just Another Engineering Challenge – Requires Paradigm Shift from Traditional Aircraft Design Approach

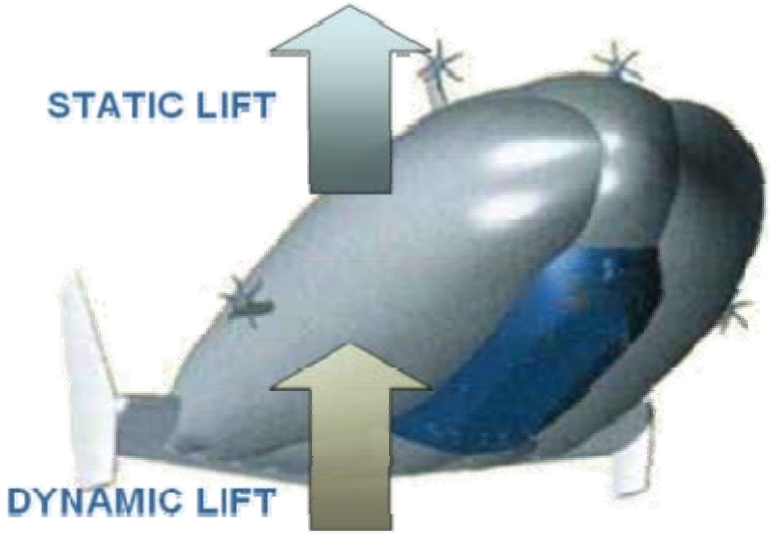
LIGHTER-THAN-AIR FLIGHT

CONVENTIONAL AIRSHIP



The static lift generated as a result of Archimedes principle, and the force of gravity are precisely balanced

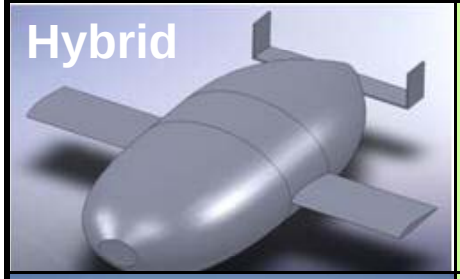
HYBRID AIRSHIP



Dynamic lift is generated by its lifting body envelope. The principle is the same as an aircraft wing with airspeed being required.

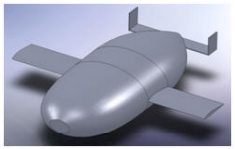
aeroscraft
Innovation Never Stops

MODE OF OPERATIONS

Type of Platform	Ground Operation	Take-Off and Ascent	Cruise	Descent and Landing	Payload off loading
 Airship	LTA Requires ground crew support	LTA Requires ground crew support	LTA	LTA Requires ground crew support	LTA Requires ballast exchange
 Hybrid	HTA	HTA Requires runway	HTA	HTA Requires runway	HTA Requires ballast exchange
 Aeroscraft	HTA	LTA	LTA/HTA Established by mission requirements	LTA	HTA

aeroscraft
Innovation Never Stops

COMBINED LIFT AIR VEHICLES CONCEPTS

Air Vehicle	Description	Operational Principles
Aeroscraft 	A new aircraft approach using derivative airship concepts and a suite of technologies integrated to control lift at all times, independently of off-board ballast Achieves Greater Utility – Fewer Operational Limitations	• **Control of lift in all stages of air or ground operations including off-loading of payload without taking onboard ballast.** • **Operate without significant support infrastructure and from unimproved landing sites** • **Comprehensive capability of VTOL and hover**
Airship 	Rigid, Semi-Rigid or Non-Rigid air vehicle that generates lift through the buoyancy of entrapped lighter-than-air gas Dependency on off-board ballast and ballonet control	• **Severe limitations in ability to control lift** • **Requires significant support infrastructure** • **Ground operations have severe limitations**
Hybrid Airship 	Non-Rigid air vehicle that generates static lift through the buoyancy of entrapped lighter-than-air gas and aerodynamic lift Dependency on off-board ballast and ballonet control	• **Significant limitations in ability to control lift requires ballast** • **Limited hover capability**

aeroscraft
Innovation Never Stops

ENABLING TECHNOLOGY

•Positive control of lift in all stages of air or ground operations including on/off loading of payload
• Operate without support infrastructure and from unimproved landing sites
• VTOL at maximum payload and terminal area hover

• Allows for a full yaw / drift authority to the pilot in side winds at all flight phases at any flight speed.
• Landing in extremely short and narrow landing sites.

• Operational flexibility at max payload
• Envelope shape and stability not dependant on internal pressure
• Punctures do not jeopardize structural integrity
• Envelope shape and internal payload minimize cross-wind input

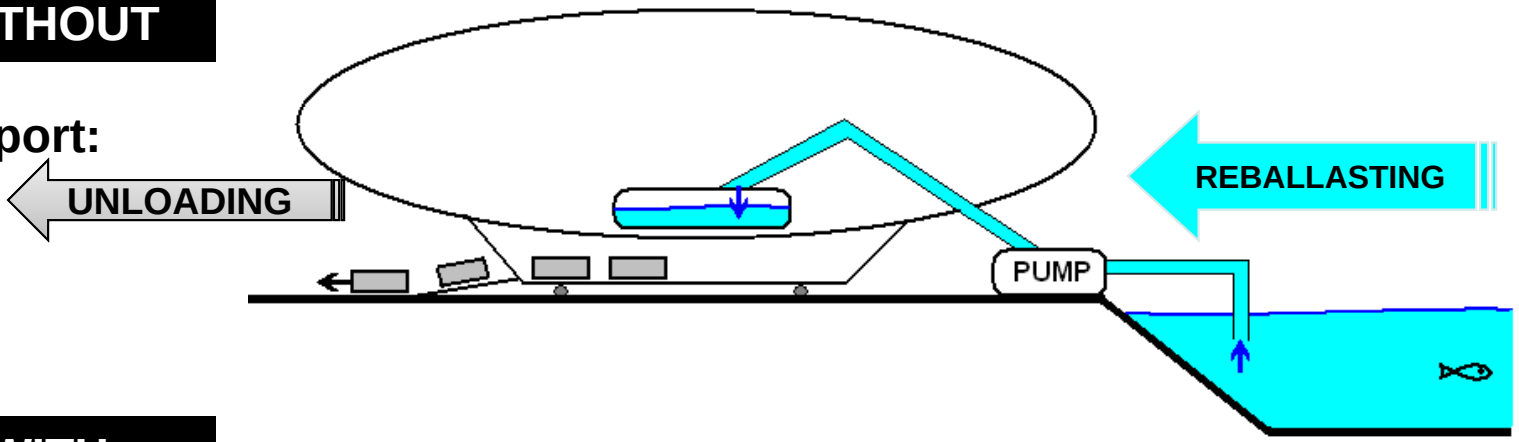
Without Proven Technology the Vehicle will not Answer Requirements

aeroscraft
Innovation Never Stops

BALLAST CONTROL

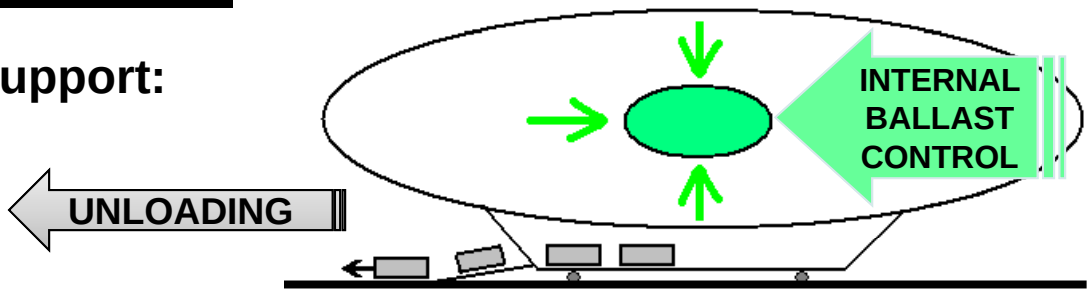
WITHOUT

Additional support:
- Infrastructure
- External ballast



WITH

Additional support:
- None



Aeros Buoyancy Control

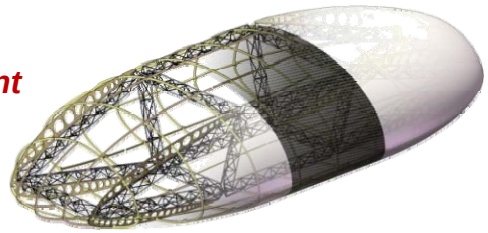
BALLAST CONTROL REQUIRED IN ORDER TO PROVIDE:

- ***Positive control of lift in all stages of air or ground operations including off/on-loading of payload***
- ***Operate without support infrastructure and from unimproved landing sites***
- ***Capable of Hover and VTOL***

aeroscraft
Innovation Never Stops

RIGID STRUCTURE

Rigid Airship: Envelope, Shape, & Stability Not Dependant On Internal Pressure



	RIGID	NON-RIGID
LOCATION OF PAYLOAD	Internal to envelope	External to envelope
PAYLOAD SIZE (weight & volume)	Same as Non-rigid	Same as Rigid
DURABILITY	Punctures (holes) do not jeopardize structure integrity	Punctures in envelope cause immediate pressure and integrity loss. Must be patched quickly.
GROUND HANDLING	Envelope shape and internal payload minimize cross-wind input	Gusty winds necessitate more ballast, tethering
TIME TO PRODUCE	Components are fabricated in parallel, and quickly integrated at once	Component fabrication & integration must be done in series
COST	Production cost is low due to fast production time	Production cost is high to sequential production

Rigid Airship is Superior for Operations in Northern Regions

FAA CERTIFICATION BASIS

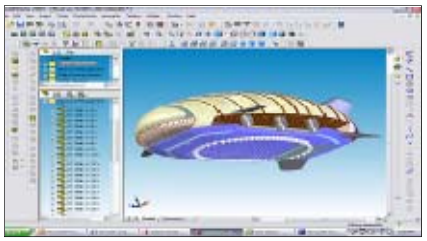
CERTIFICATION BASIS:

Compliance with 14 CFR Part 21, §21.17(b) will be shown utilizing Aeroscraft Airworthiness Criteria (AAC) Doc.# ML001 based on Parts 23, 25, 27, 29, 31, 33, 35 and FAA Airship Design Criteria. The AAC will be jointly developed by FAA and Aeros as part of Aeroscraft TC project.

Type Certificate Application for the Aeroscraft is Accepted by the FAA

aeroscraft
Innovation Never Stops

AEROS EXPERTISE



From Vision to Production

aeroscraft
Innovation Never Stops

ORGANIZATION CAPABILITIES

CUSTOMER SUPPORT

Payload Integration & Training	Pilot and Ground Crew Training	Maintenance Personnel Training	Operational Support
			

DESIGN AND PRODUCTION

R&D and Engineering	Mechanical Assembly and Quality Control	Envelope Production	Systems Integration
 	 	 	 

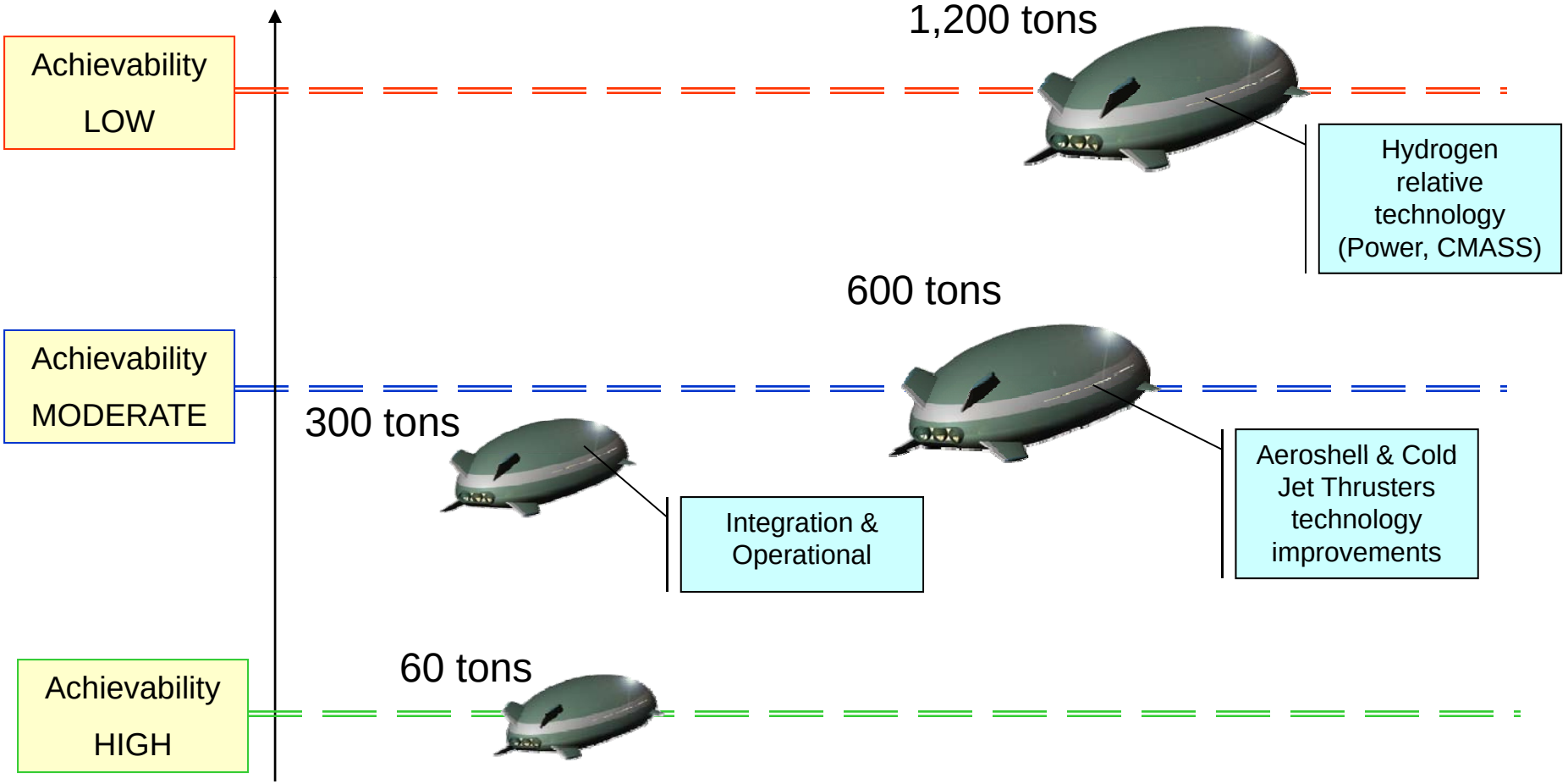
Aeros Maintains In-House Capabilities for All Phases of Design and Production
Our Commitment and Support Never Ends

aeroscraft
Innovation Never Stops

ADVANCED TECHNOLOGY DEMONSTRATOR PROGRAM

	BLOCK 1	BLOCK 2	BLOCK 3
Advance Technology Demonstrator (ATD)	**Primary Systems Production & Integrations:** • Structure Group • Buoyancy Control System • Low Speed Control System • Powerplant • Flight Control System • Flight Management System • Landing System • Crew System	**Production and Integration Completions** **FAA Certifications** **Test Program** **Roll Out**	**Flight Test**
Aeroscraft 60Ton Model	**Parallel Development 60 Ton Model** Acquire design solutions from ATD Design reviews leading to PDR		

RISK FACTORS



All Major Blocks Successfully Addressed - 60 Tons Aeroscraft – High Achievability

aeroscraft
Innovation Never Stops

THANK YOU!