

03/03/14

**Presentation:
Merged Energy
Solutions -
Multi-
Industrial
Greenhouse
Facility, and
Transforming
Alaska**

<TARGET><BILL></BILL><SUBJECT>03-03-14 Presentation Merged Energy Solutions - Multi- Industrial Greenhouse Facility, and Transforming Alaska</SUBJECT><COMM>HENE28</COMM></TARGET>

Alaska Legislature

House Special Committee on Energy



Rep. Charisse Millett

State Capitol Building, Room 403
Juneau, AK 99801
Phone (907) 465-3879
Fax (907) 465-2069
rep.charisse.millett@akleg.gov

Rep. Doug Isaacson

State Capitol Building, Room 13
Juneau, AK 99801
Phone (907) 465-4527
Fax (907) 465-2197
rep.doug.isaacson@akleg.gov

AGENDA

State Capitol Building, Room 124
Juneau, Alaska

Monday, March 3, 2014, 8:00 a.m. – 10:00 a.m.

Joint hearing with the House Special Committee on Economic Development, Trade and Tourism.

- + Michael Smith, *CEO, Merged Energy Solutions (teleconference)*
- Kurtis Zell, *Development Coordinator (teleconference)*
- “Multi-Industrial Greenhouse Facility” and “Transforming Alaska”

If you or your staff has any questions please contact Katherine Eldemar at (907) 465-4527 (katherine.eldemar@akleg.gov) or Jeff Turner at (907) 465-6588 (jeff.turner@akleg.gov).

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MES

MERGED ENERGY SOLUTIONS

**Merged Energy Solutions
Multi-Industrial Greenhouse Facility**

Vision and Mission



Generating tomorrows growth today

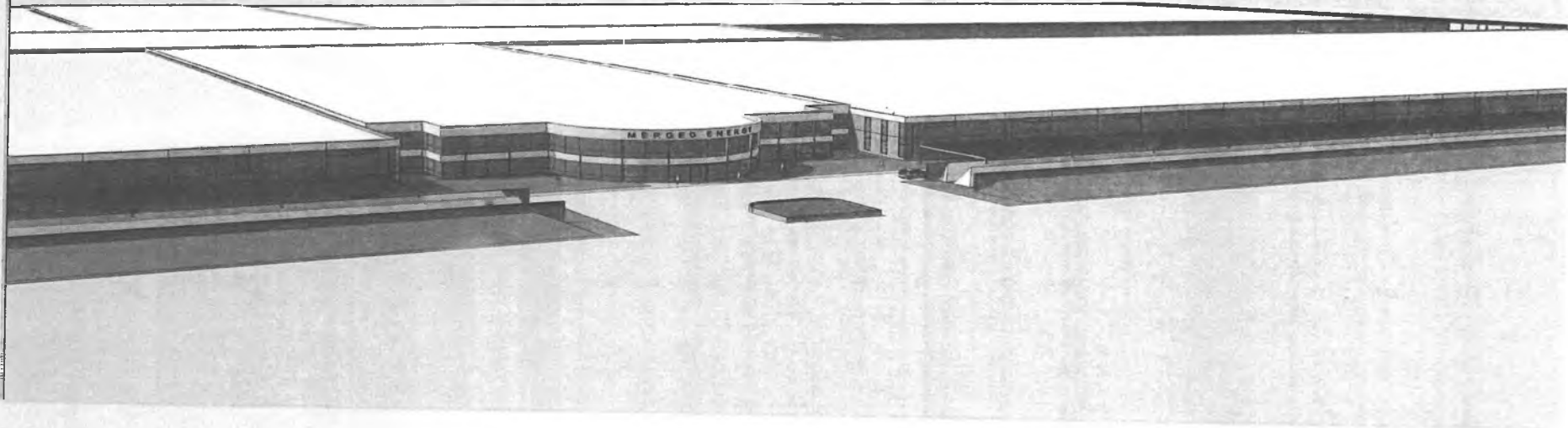
Mission Statement

Our mission is to **renew** and **build** a **sustainable** Earth by **empowering** and **educating** people throughout the world. We **collaborate** with **nature**, **technology**, and people to create sustainable **energy** and **food**. We realize our vision by committing **cutting-edge** technology, building **state-of-the-art** clean energy and agriculture projects, and **investing** in the **education**, **health**, and **well being** of **people** throughout the **world**.



MERGED ENERGY SOLUTIONS

Multi Industrial Greenhouse (MIG)

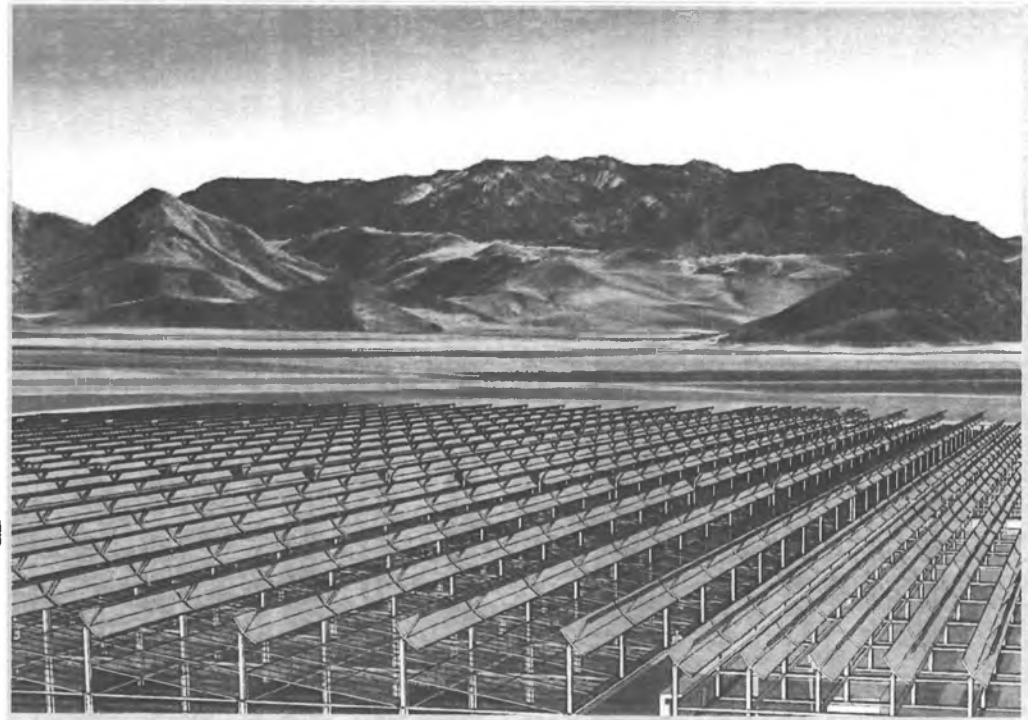


MERGED ENERGY SOLUTIONS

Multi Industrial Greenhouse (MIG)

Components

- Concentrating Solar Thermal
- Advanced Biomass Gasification (ABG)
- Geo Thermal
- High-Density Vertical Farm
- Aquaculture
- Water Desalination & Purification
- Academy of Advanced Technical Science



MERGED ENERGY SOLUTIONS

Concentrating Solar Thermal



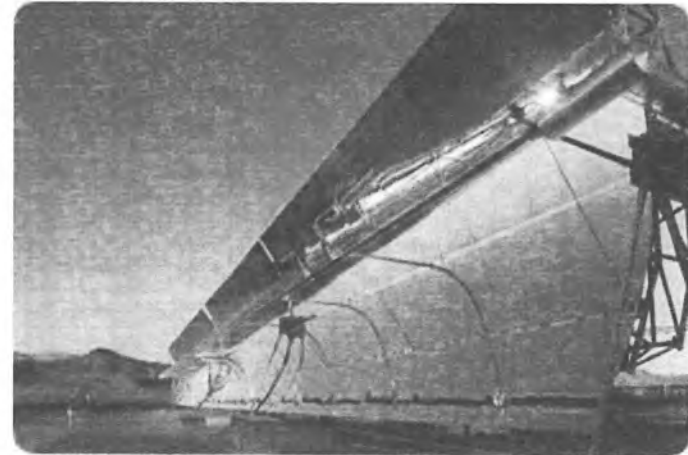
Why Concentrating Solar Thermal?

The Process

A Concentrating Solar Thermal Roof (**CSTR**) produces electric power by converting the sun's energy into high-temperature heat, which is then channeled through a conventional generator.

Efficiency

The CSTR is one of the most efficient and dependable producers of solar energy available today. The CSTR is rated at **34-38% efficiency** in terms of translating the direct solar energy to electricity and has a useful life of 50 years.



Heating & Cooling

The thermal energy can also be used directly for heating and cooling purposes; running it to absorption chillers for cooling and a heat exchanger for heating.

Energy Storage Capability

Trough designs can incorporate thermal storage—setting aside the heat transfer fluid in its hot phase—allowing for electricity generation several hours into the evening.

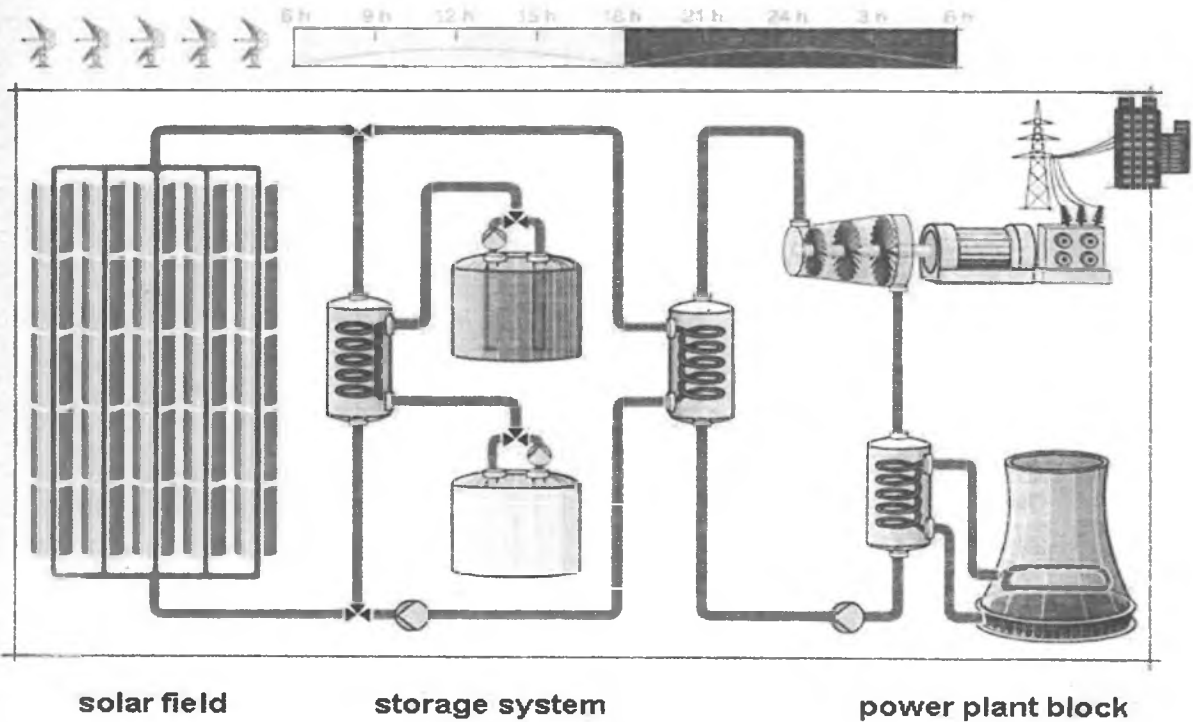


MERGED ENERGY SOLUTIONS



Concentrating Solar Thermal

How it Works...

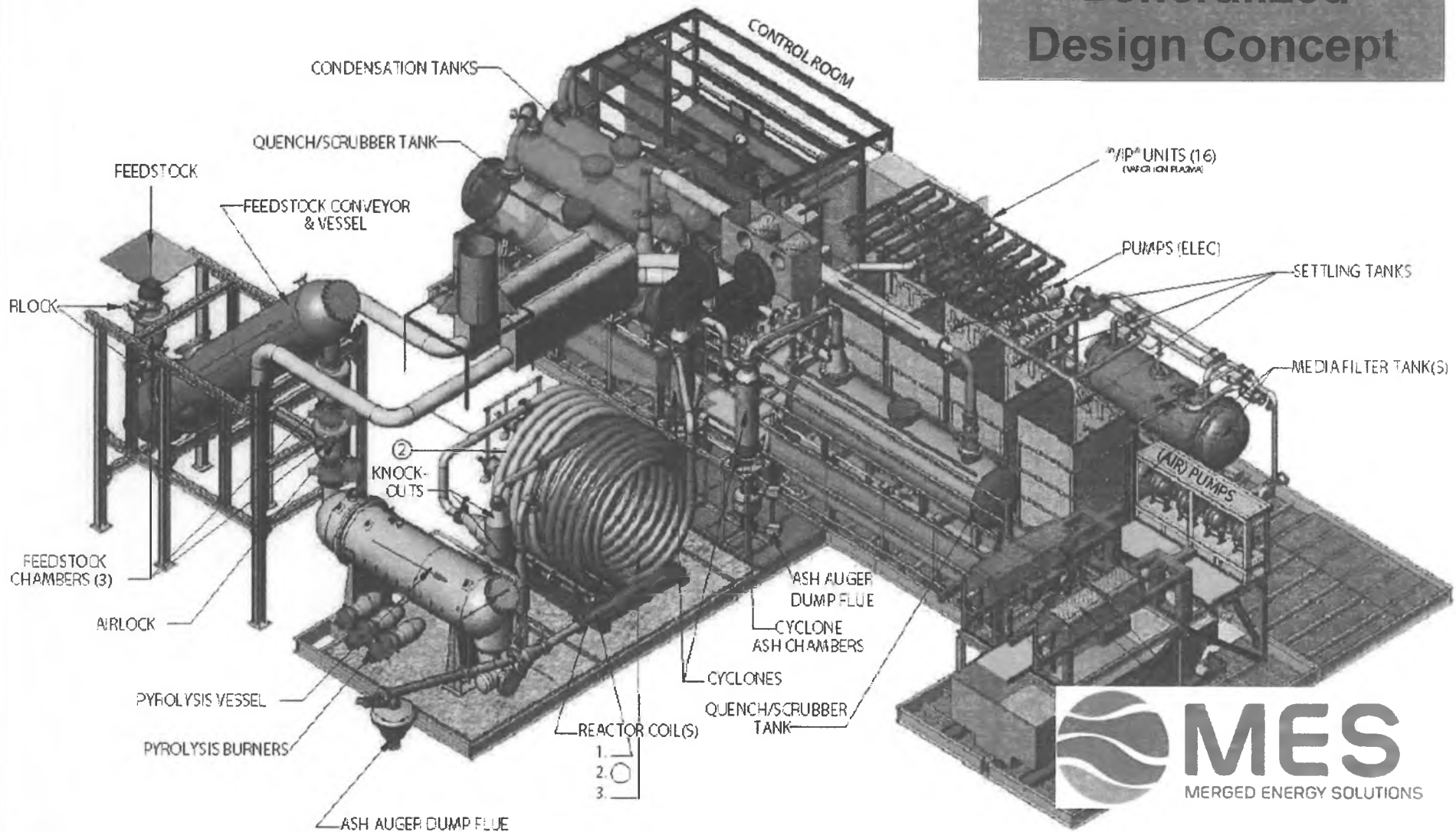


Advanced Biomass Gasification (ABG)



Advanced Biomass Gasification (ABG)

Generalized Design Concept



Advanced Biomass Gasification (ABG)

Products

Syngas

- Electricity
- Synthetic Diesel

Ash

- Soil Conditioner

Purified Water

Feedstock

- Agricultural or Municipal Waste
- Low Feedstock Cost
- Plant Adaptable to Any Location



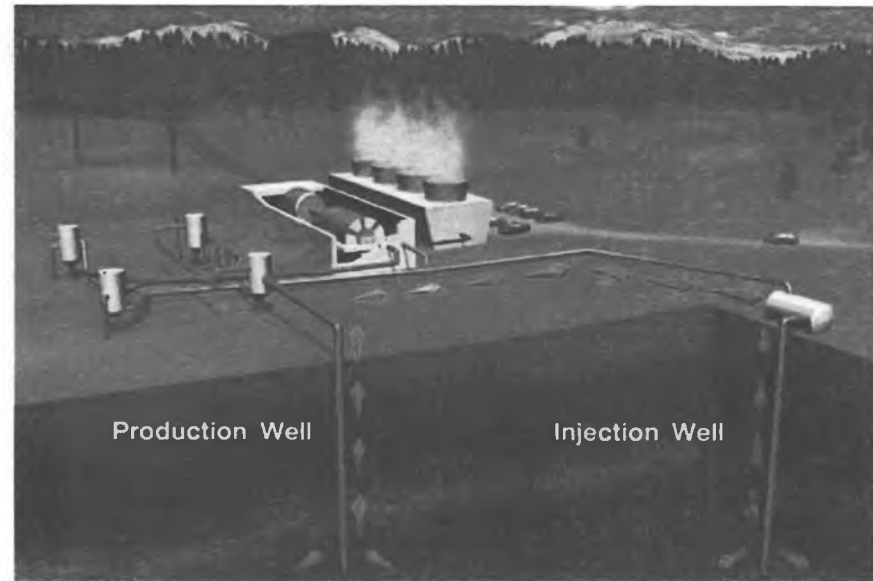
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Geo-Thermal

Hydrothermal Power Systems

There are three geothermal power plant technologies being used to convert hydrothermal fluids to electricity - **Dry Steam**, **Flash**, and **Binary Cycle**. The type of conversion used depends on the state of the fluid (whether steam or water) and its temperature.

Flash steam plants are the most common type of geothermal power generation plants in operation today. They use water at temperatures greater than 360°F (182°C) that is pumped under high pressure to the generation equipment at the surface. Binary cycle geothermal power generation plants differ from Dry Steam and Flash Steam systems in that the water or steam from the geothermal reservoir never comes in contact with the turbine/generator units.



Dry steam power plants systems were the first type of geothermal power generation plants built. They use the steam from the geothermal reservoir as it comes from wells, and route it directly through turbine/generator units to produce electricity.



MERGED ENERGY SOLUTIONS

Power Generation - Summary

Between the **Concentrating Solar Thermal, Bio-Mass, and Geo-Thermal** outputs, a 150 acre MIG facility can generate **20 to 40 megawatts** of power. The MIG would consume approximately 3 to 4 megawatts.

One (1) megawatt will provide **power for approximately 2,400 average-sized homes**. This means an average of **28,000 to 85,000 homes** can be serviced by one facility, and can be taken off the power grid.

This is important when it comes to security because by being **independent from the grid**, earthquakes, tsunamis and other natural or man-made disasters will not impede the MIG from producing energy, water, fresh produce and fish .

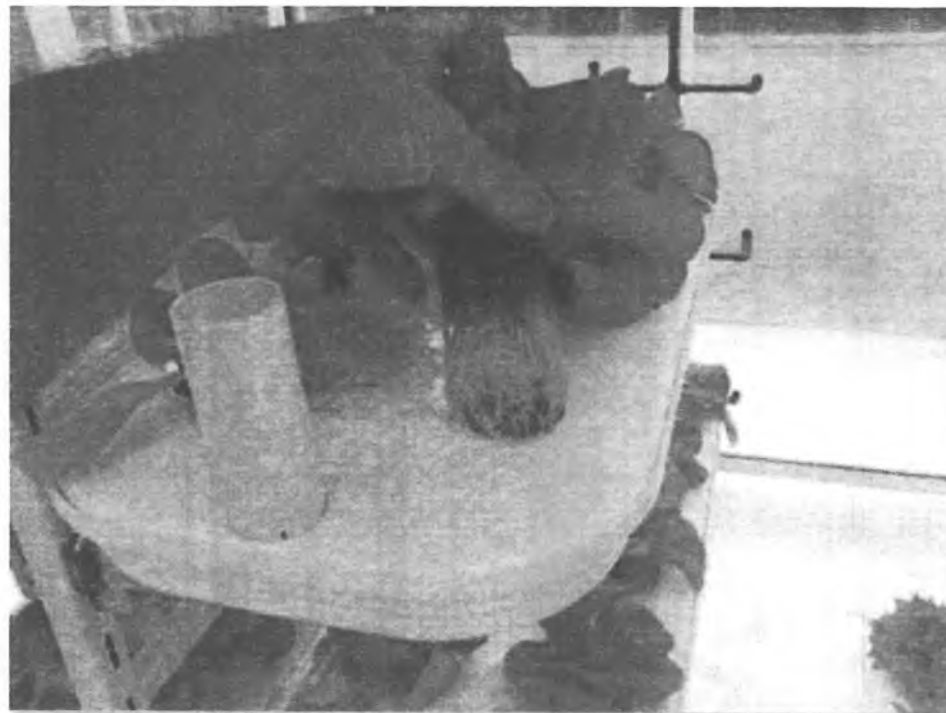


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Advanced High-Density Vertical Farming

The **Advanced High-Density Vertical Farming (AHDVF)** or hydroponic growing system does not use soil. The crops are either suspended in water or a water mist is periodically sprayed on the plant root structures of the crops. The water is infused with nutrients like those naturally found in the soil.

This system uses no pesticides or fertilizers in this growing environment. Additionally, for example, bees will be introduced into the system to provide a natural pollination cycle. Unlike any genetically modified organisms (GMOs), the seeds are free of any genetic alterations and use only a natural nutrient solution that will allow for organic certification of all the produce.

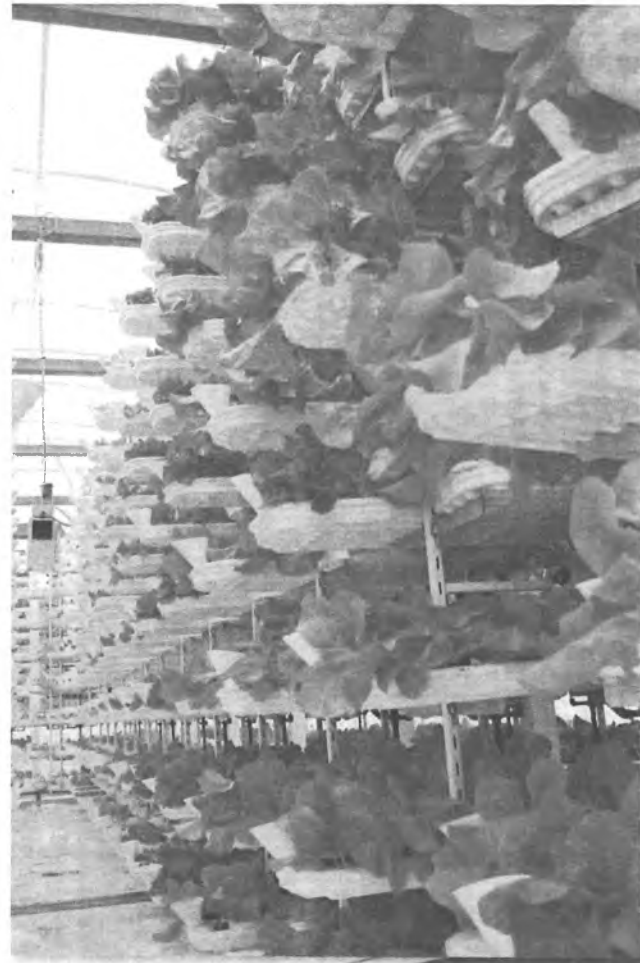


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Advanced High-Density Vertical Farming

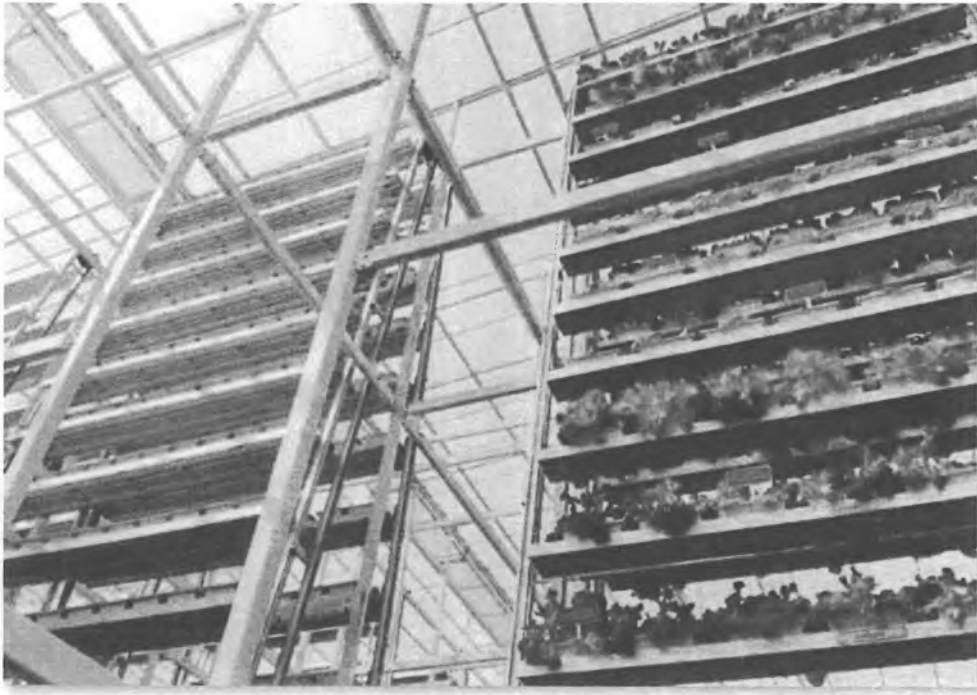
The current generation of hydroponic greenhouse technology in North America produces fresh tomatoes, bell peppers & cucumbers in sufficient quantities to market all over the country. The **MIG System** offers immense variety over and above that current level and type of production, including lettuce, herbs and some fruits, such as strawberries.

Quadrants of each greenhouse may be organized to maintain a specific growing environment, which will support the crops suited to that environment. The diversification of production will allow for a more balanced and complete produce offering to suit each market served.



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Advanced High-Density Vertical Farming



The annual production level of the ADHVF described here is projected, at normal operation, to be approximately **90 million pounds** - enough produce to feed an average **population of 300,000 people** or **60,000 families**.



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Water Desalination

MES recognizes that, today, **water** is a **precious commodity** and with water shortages around the world, it is essential that we are aware of how we can best utilize our resources.



With this in mind, we have created a water treatment system known as Alpha Water that will desalinate, reclaim, purify and produce over **one and a Half million gallons** per day for use by the MIG and for neighboring city use.

By incorporating this **critical element**, we are reducing the amount of water that we use in our facility (or take from other users) and that we are producing the **highest quality** drinking water possible.

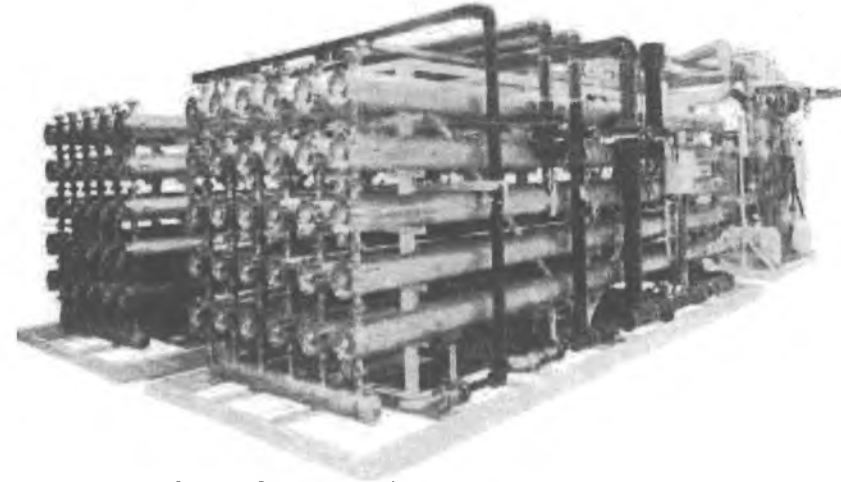


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Water Purification

Applying the Technology

Until now, no one desalting process has **proven itself** as “the best.” A variety of factors have come into play in choosing the appropriate process for a particular situation.



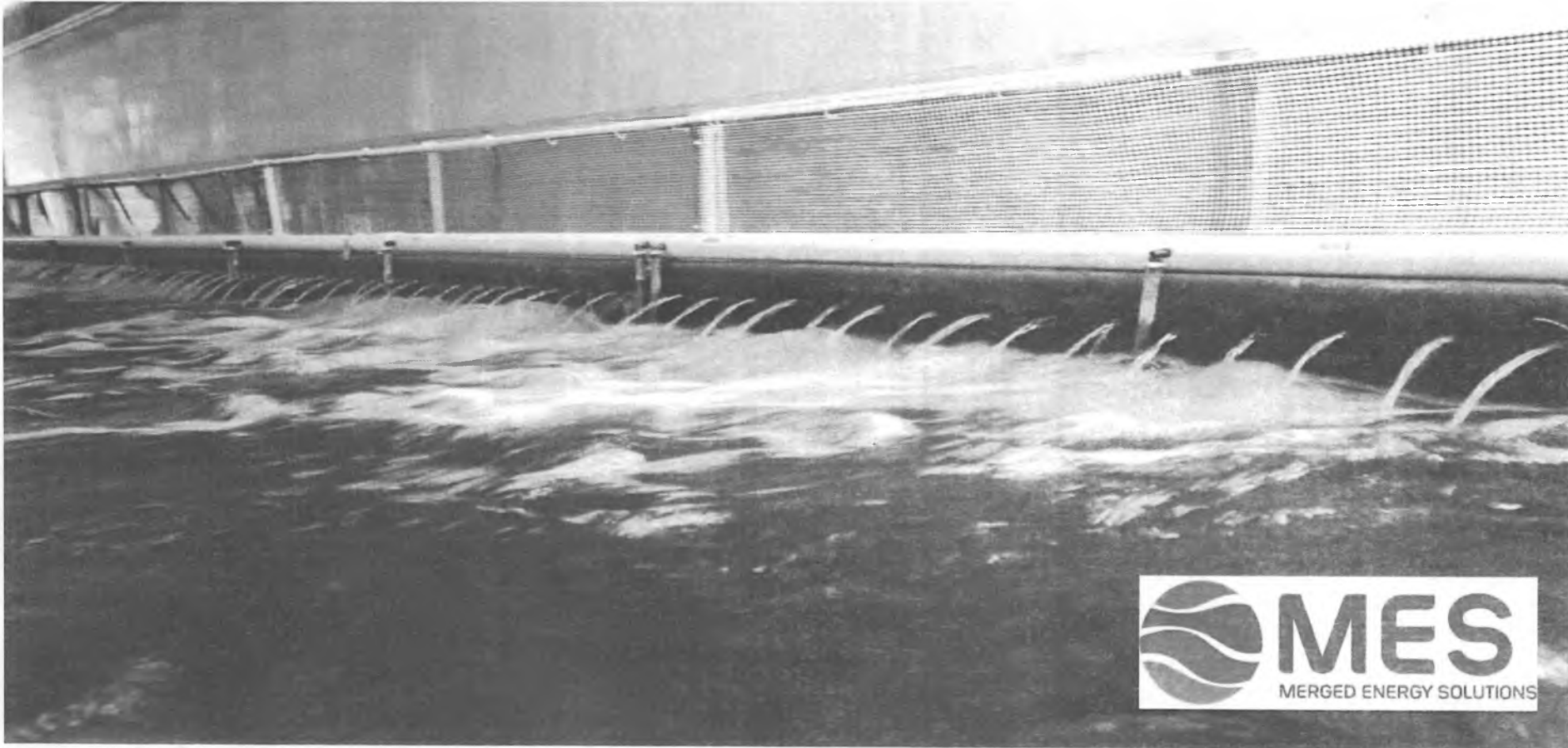
These factors include the quality of the source water, the desired quantity and **quality of the water produced**, pre-treatment, energy and chemical requirements, and methods of concentrate disposal. MES, however, has developed the most **advanced and unique** system, *regardless of the water source*, by applying additional multiple-step **procedures**, including the use of quantum mechanics and a plasma bioreactor system. Due to the proprietary nature of this process, it is not detailed in this presentation.



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Aquaculture: Opposing Flow Technology

The unique and patented “Opposing Flow” technology depicted below also creates a continual current in the culture tank. After the biofilter, the purified water is evenly distributed back into the culture tank, entering from both sides of the tank **causing the fish to align themselves** in the current, constantly swimming “upstream” facing either side of the 40’ long tank. With this constant swimming motion, **the fish can metabolize the high protein feed into flesh which produces a higher yield**, compared to fish grown in circular aquaculture tanks.



Why Produce and Fish?

Prior to the early twentieth century, virtually all produce grown was what we now consider organic. No pesticides were used and the only fertilizer available was natural and nutrient rich manure and biodegraded foliage. The soil was also rich from years of continued farming. At that time, the variety of produce varied greatly – for example, there were some 4,000 varieties of potatoes and approximately 7,000 varieties of apples in the 1800s. Today, we are lucky to have maybe four different varieties of potatoes and apples commonly available.

After World War I, agriculture started using nitrogen fertilizer in mass quantities - a development derived from the nitrogen explosive used in bombs – to increase crop production. If that wasn't enough, we developed DDT from poison nerve gas to use as an insecticide.

By the mid 20th century, we moved into the period called the “Green Revolution” which was an attempt to **systematize the growing industry and increase food production**. However, this led to the dramatic **reduction in variety, often to a single crop type, causing further vulnerability to insects and disease**. **With more insects and disease**, the industry was forced to use more pesticides. This ultimately led to the Genetically Engineered seed that would be resistant to the pesticides.

All this engineering of nature's bounty is clearly not a positive development. One prime example of the negative effects of this process is the tomatoes today. These vegetables may be big and red, but they lack the taste and nutrients of naturally-produced tomatoes.



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Why Produce and Fish?

Continued...

The same companies who developed the most common pesticides were also the first companies to patent the first genetically engineered or genetically modified organisms (GMOs), seeds that were immune to the pesticide.

Our obesity problem today is not necessarily based primarily on inherited genes and/or our poor eating habits. Rather, the prevalence of GMO products being grown under specific control have lost most of their nutritional value; in order for the human body to obtain its required nutrients, a person must eat more. In turn, by eating more we are taking in excessive calories, which turn to fat and, hence the contribute to the proliferation of obesity.

It is time we get back to basics... The **Advanced High Density Vertical Farming System** that is an integral part of the MIG System, is designed to grow these vegetables **the way nature meant them to be grown**, with all the nutrients and great taste and without any type of GMO or pesticide use. This is especially **important for the health and well-being** of the younger generation and for the generations to come.



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Why the Combination?

Reduced Land Area – Commercial-scale greenhouses produce as much as **30 times the yield** of conventional agriculture. That means a 100-acre greenhouse is equal 3,000-acres of horizontal farming production.

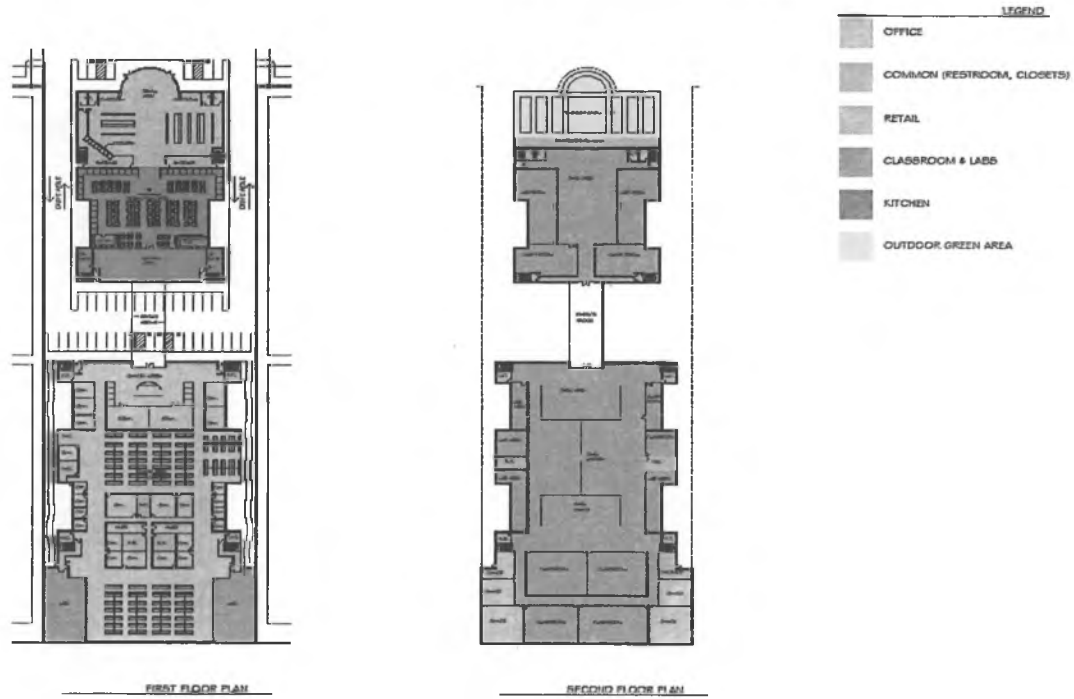
Reduced Water Consumption - Produce grown in a Multi Industrial Greenhouse (MIG) requires **10% of the amount of water** that conventional agriculture consumes. This is primarily due to the technology and management systems employed in the system.

The Synergies of Combining Solar, Geo-Thermal and Bio-Mass Energy Systems – Combining these creates particularly high levels of heat, which is required to make steam. This steam drives a turbine that generates electricity. The high-heat generation of the combined system significantly reduces the initial capital costs of the system. Also, while the solar or geo-thermal system is operational during daylight hours, the system requires less bio-mass to fuel the system.



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Academy of Advanced Technical Science (TAATS)



Merged Energy
Solutions

CONCEPTUAL FLOOR PLANS - 120 ACRE

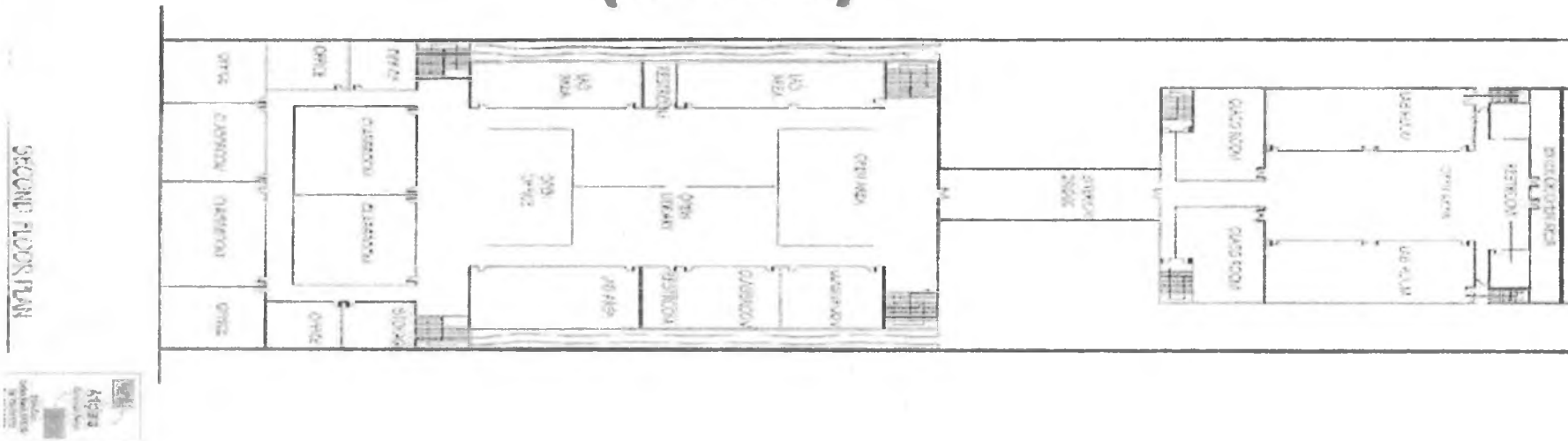


Academy of Advanced Technical Science



MERGED ENERGY SOLUTIONS

Academy of Advanced Technical Science (TAATS)



The Academy of Advanced Technical Science (**TAATS**) will be a **120,000 square-foot institute** located on the second floor of the main MIG facility.

TAATS will be devoted to **teaching students** of all walks of life the importance of combining the latest technology with a variety of applications such as agriculture, farming, water treatment, alternative energy, and sustainability, to name just a few.

It is our belief that in order for the younger generation to thrive they must become proactive in **creating new strategies to enhance mankind's general advancement**. We will provide that training and **encourage creative thinking to bring new technologies to life**.



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MIG Production – 120 acre

Annual Production

- **9 million** gallons Synthetic Fuel
- **40 MW** Electricity
- **90 million** pounds Organic Produce
- **5 million** pounds Fish
- **1.5 million** gallons Potable Water per day



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MIG Employment

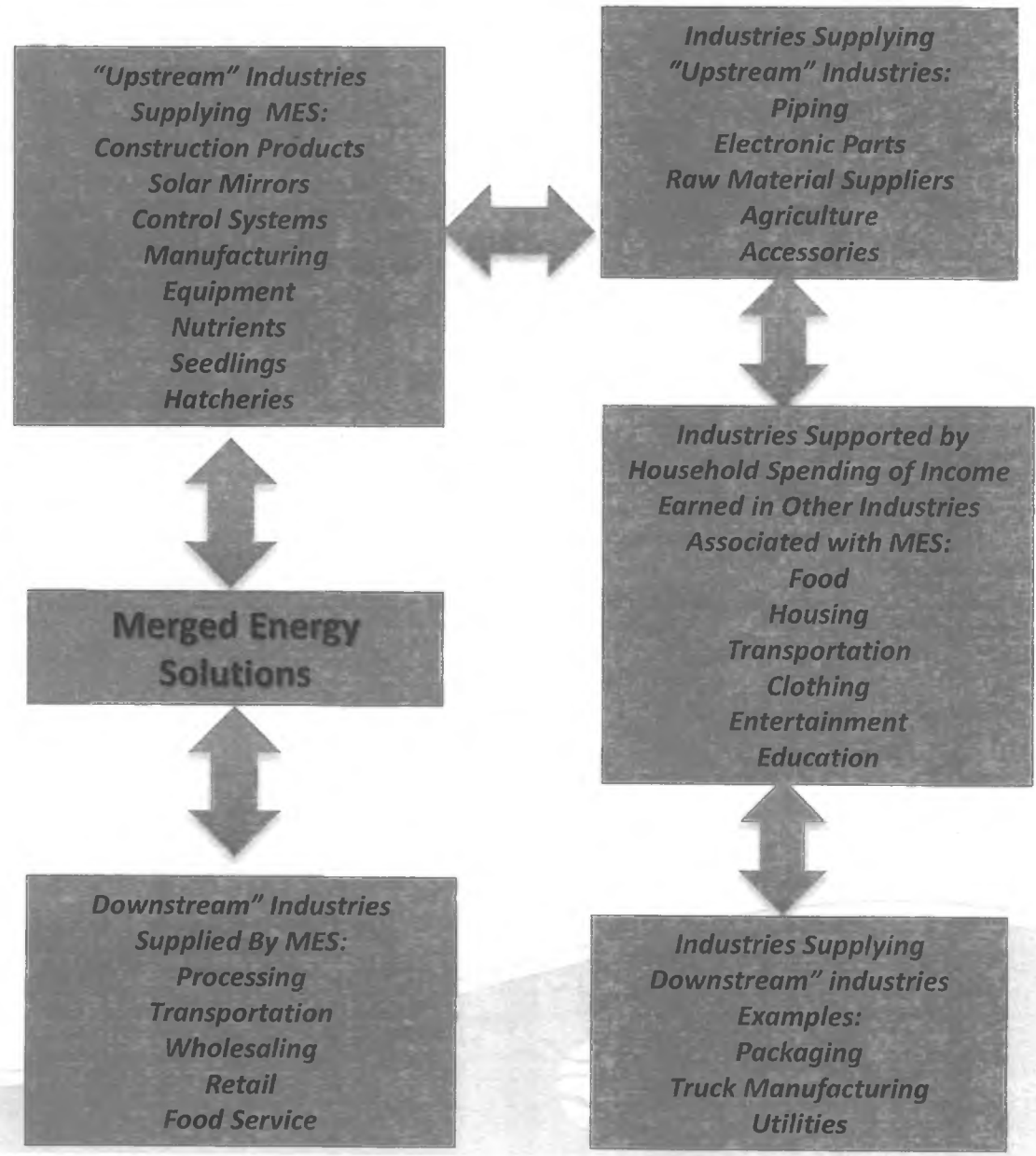


Number of Employees



■ Water :	20
■ Bio-Mass:	25
■ Solar:	25
■ Greenhouse	300
■ Packing	80
■ Sales & Mktg	20
■ Trucking	20
■ <u>Aquaculture</u>	50
Total	540

Employment is based on the averages for the type of industry and the size of the facility. These figures are also based on the facility operating 24 hrs a day, 7 days a week and 50 weeks out of the year. This does not take into account the branch jobs created up stream. The anticipated wages for this facility are estimated at \$12 to \$20 per hour, excluding upper management and technical positions.



Contact Us



R. Michael Smith – CEO

Los Angeles, California

Phone: +1-714-262-6839

email: michael@mergedenergy.com



MERGED ENERGY SOLUTIONS

TRANSFORMING ALASKA

THROUGH INOVATIVE TECHNOLOGIES IN:
AVIATION, RE ENERGY, SUSTAINABLE FOOD,
CLEAN WATER, BIO FUELS AND
HARDENED DATA CENTERS



BENNEFITS TO ALASKA

- * **ECONOMIC GROWTH**
- * **LOWER OPERATING COSTS Vs FIXED WING**
- * **MORE PRODUCTIVITY**
- * **NEW JOBS**
- * **SAFER TRANSPORTATION**
- * **EXPANDED COMMERCE DOMESTIC & INTERNATIONAL**
- * **CLEANER ENVIRONMENT**



ECONOMICS

- * **MINING**
- * **ALTERNATIVE SHIPPING**
- * **OIL AND GAS**
- * **ALTERNATE TRANSPORTATION**
- * **SURVEILLANCE AND MAPPING**
- * **ON THE SPOT MEDICAL RESPONSE**



ECONOMICS

- * **TOURISM INDUSTRY**
- * **DISASTER RELIEF**
- * **SEARCH AND RESCUE**
- * **FISHING**
- * **FIRE FIGHTING CAPABILITIES**
- * **TIMBER / LOGGING INDUSTRY**



MINING



Infrastructure Costs

- Roads
- Rails
- Power
- Equipment
- Trucks
- Earth movers



SHIPPING - TRANSPORT



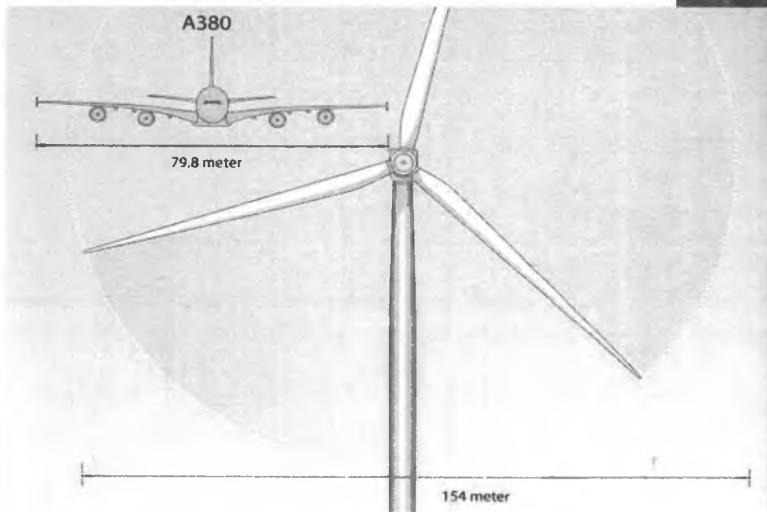
ICE ROAD TRUCKING

Ice roads are a common feature across Alaska & Canada, and are typically the only way to access the most remote communities via ground transport.



SPECIALTY TRANSPORT

B75 Quantum Blades are solid one-piece and 187 ft. long!



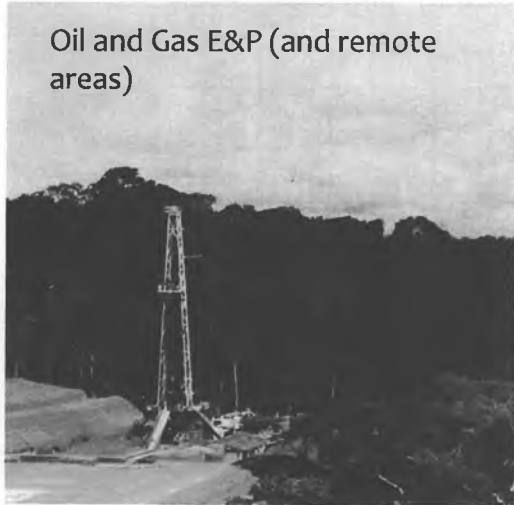
Each blade weighs about 25 tons



IT'S ABOUT THE PAYLOAD, AS WELL AS THE PLATFORM



Transportation

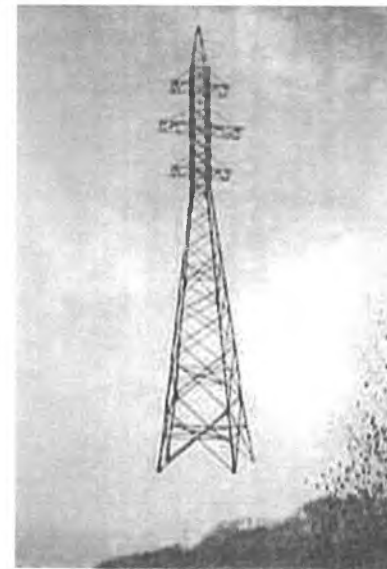


Oil and Gas E&P (and remote areas)

Mining



Power Grid/Cell Towers



Alaskan North Slope Oil & Gas Potential Production & Today's Market Value

ALASKA FACTS

- **First Major Oil Discovery:** 1957.
- **Industry Investment:** \$50B+ to date.¹
- **State Production:** 16+ billion barrels of oil (bbo).¹
- **North Slope Oil Fields:** 4 of 10 largest in US; 12+ currently producing.¹
- **North Slope Estimates:** ultimate recoverable oil reserves of 22.2 bbo; up to 124 trillion cubic feet (tcf) of natural gas.¹
- **Prudhoe Bay Field:** 1,000+ wells; largest oil field in North America & largest producing US oil field; site of large natural gas processing plant.²
- **Prudhoe Bay Estimate:** 2.5 billion barrels of recoverable oil & 426 million barrels in reserves.¹
- **Pipeline Infrastructure:** 800-mile Trans-Alaska Pipeline System (TAPS); 1.5+ million barrels per day of spare capacity; supplying American energy to Americans without environmental risks or 'dirty oil' associated with Keystone Pipeline.
- **Ongoing Development:** major operators such as Exxon Mobil (NYSE:XOM | Market Cap: \$410.84B), BP (NYSE:BP | \$139.96B) and ConocoPhillips (NYSE:COP | \$71.86B) investing heavily in oil and gas-related projects.

1. Resource Development Council for Alaska (website), Oct. 18, 2012.

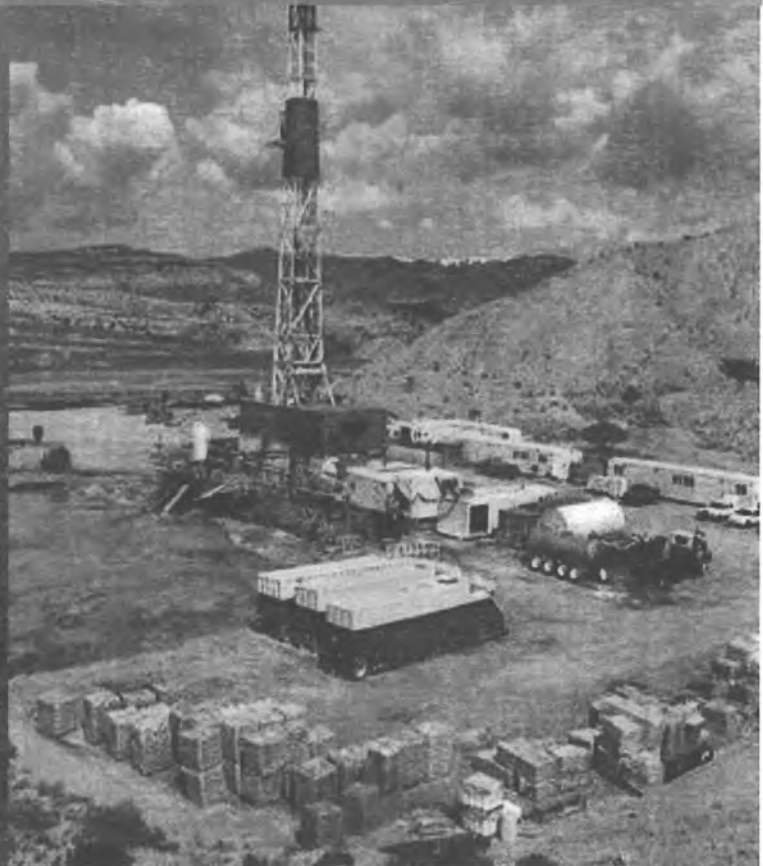
2. ConocoPhillips (website), Oct. 18, 2012.

Today's Estimated North Slope Oil Reserves of up to 22.2 billion barrels of oil are valued at \$2.3 trillion at today's prices

Today's Estimated North Slope Natural Gas Reserves of 123 Trillion Cubic Feet (TCF) are valued at \$459 billion at today's prices



OIL AND GAS - 1



OIL AND GAS - 2

MACONDO INCIDENT

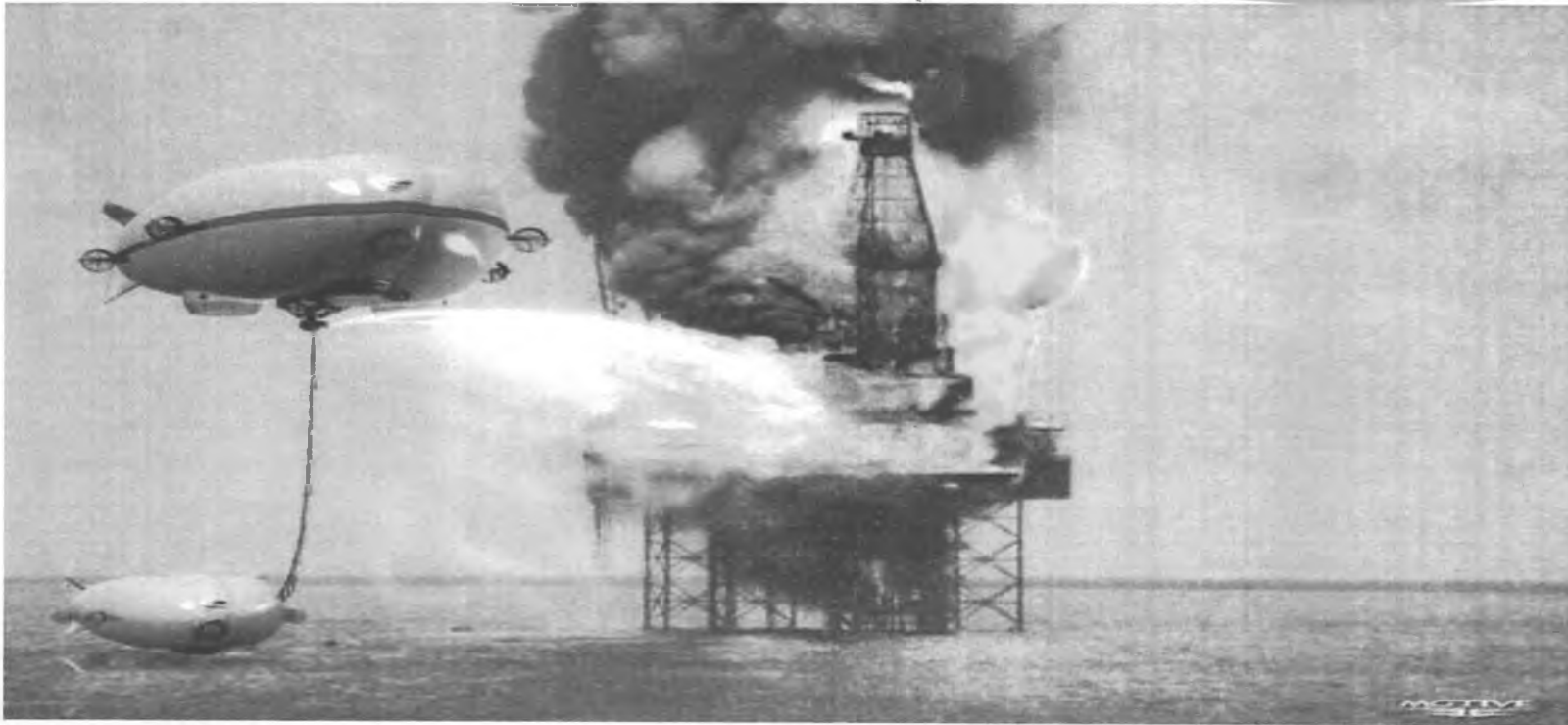
It is critical to get a craft onsite as quickly as possible for command & control, well control, SAR, firefighting/suppression, oil spill containment & collection

98% of water used
in firefighting is
wasted.
Until Now!



APPLICATIONS OIL & GAS RAPID EMERGENCY RESPONSE

Emergency Response, Firefighting, Containment, Collection, Search & Rescue (Could have be on scene at Macondo Incident in 1 1/2 hours)



APPLICATIONS OIL & GAS RAPID EMERGENCY RESponse

Emergency Response, Firefighting, Containment,

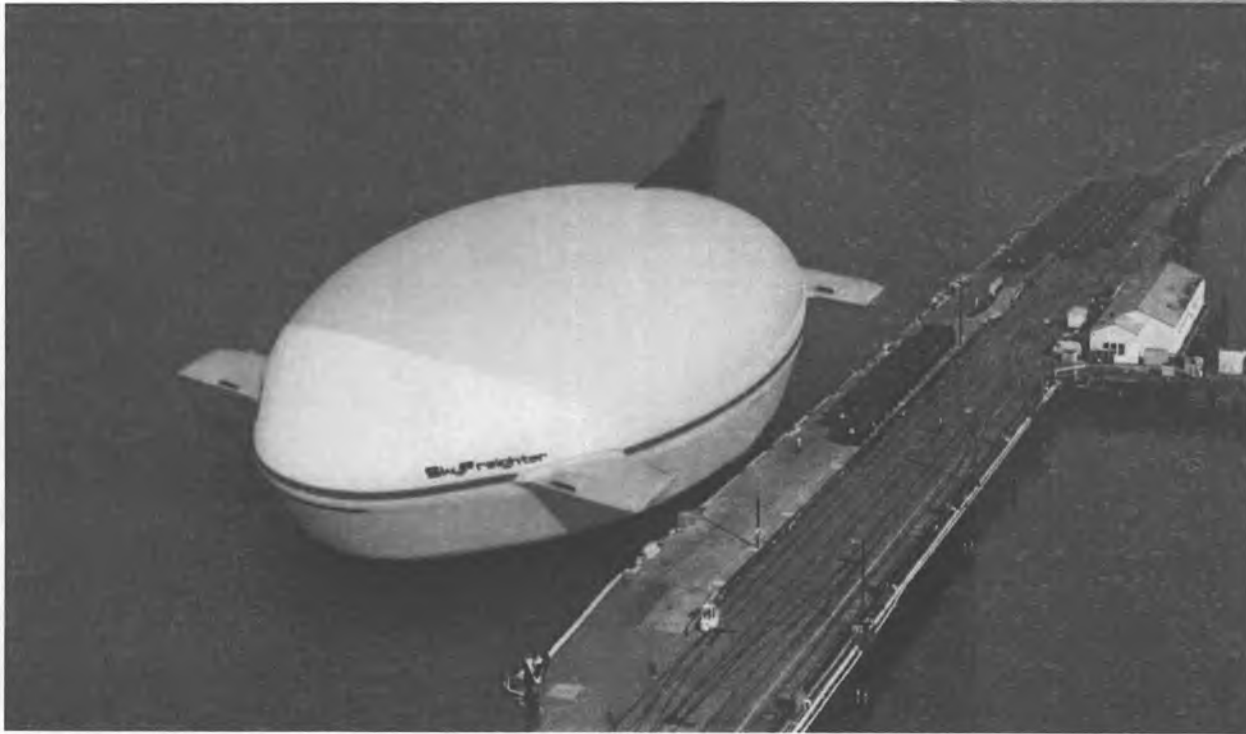


Innovative Nozzle
Technology

New technology to lift & apply modified seawater



LNG TRANSPORT



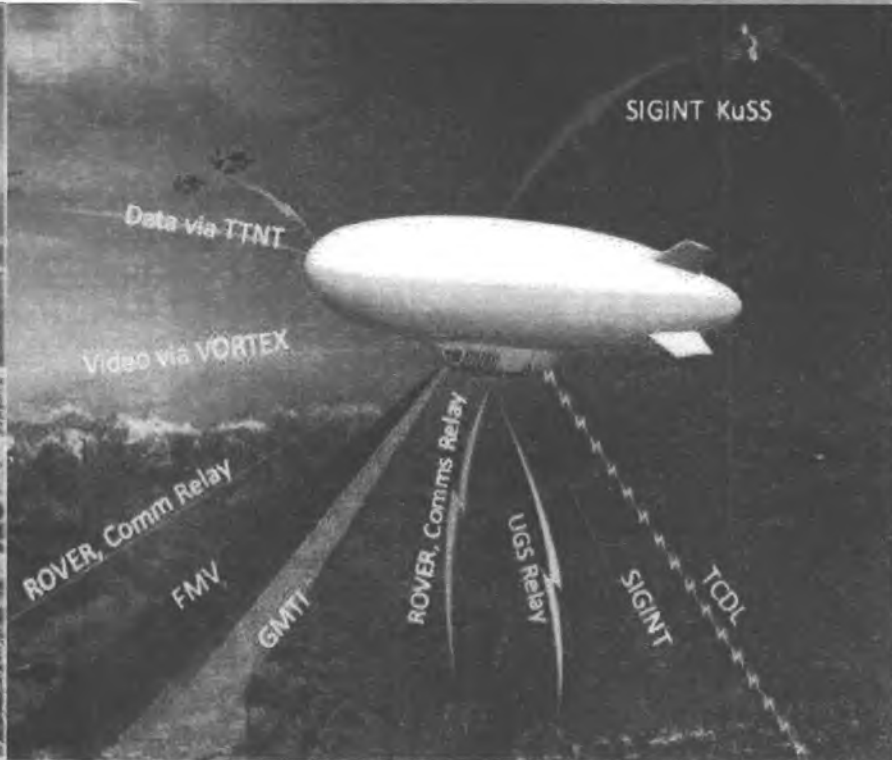
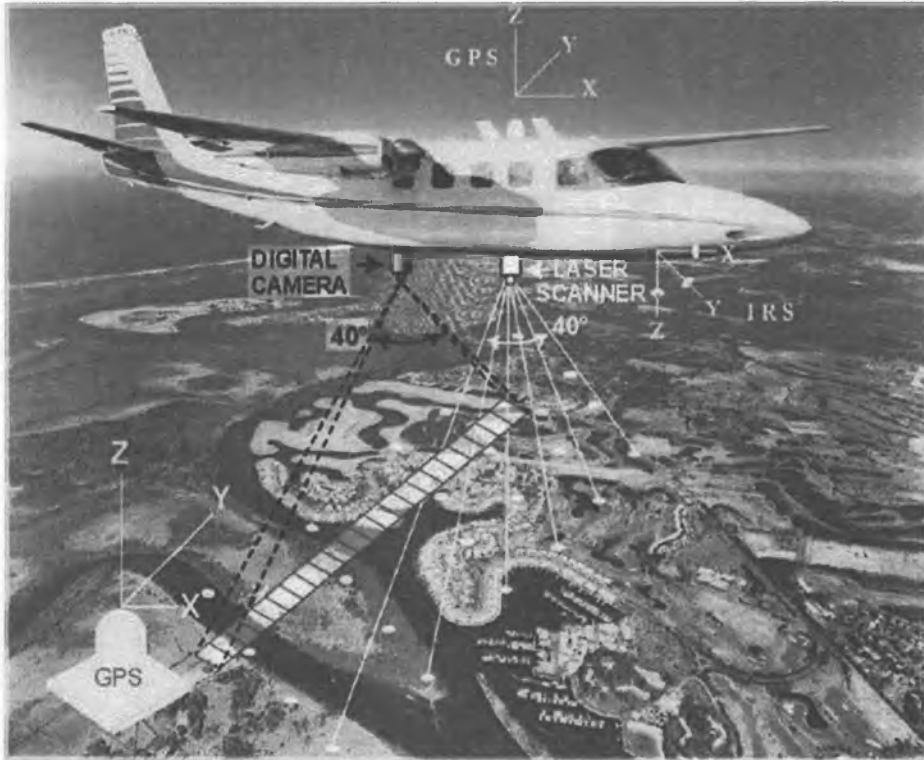
LNG GAS IS QUICKLY BECOMING A HIGHLY NEEDED COMMODITY BUT BEING ABLE TO DELIVER IT QUICKLY AND BE COST EFFECTIVE HAS BEEN AN ISSUE. ITS NOW POSSIBLE WITH THE SKYLIFT TANKER TO LOAD FROM ANY LOCATION AND DELIVER EASILY TO ALMOST ANYWHERE, MAKING THE USE OF LNG MORE PRACTICLE AND ECONOMICAL.



ALTERNATE TRANSPORT



SURVEILLANCE AND MAPPING



courtesy: U.S. Air Force



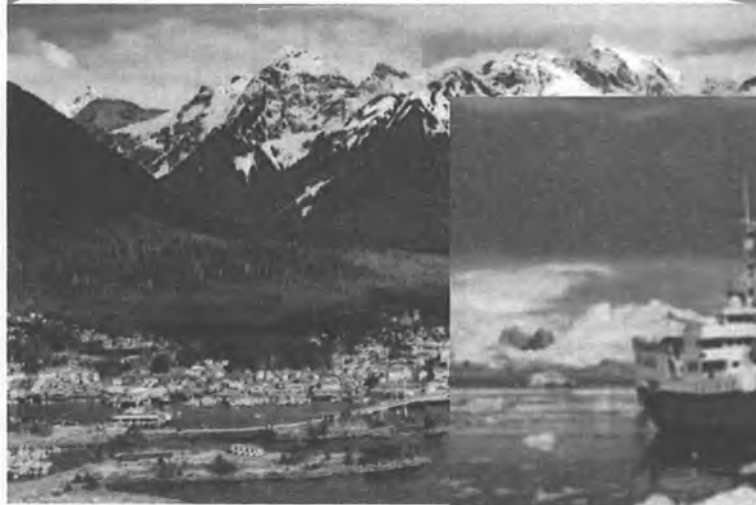
ON THE SPOT MEDICAL RESPONSE

100 TON VARIANT

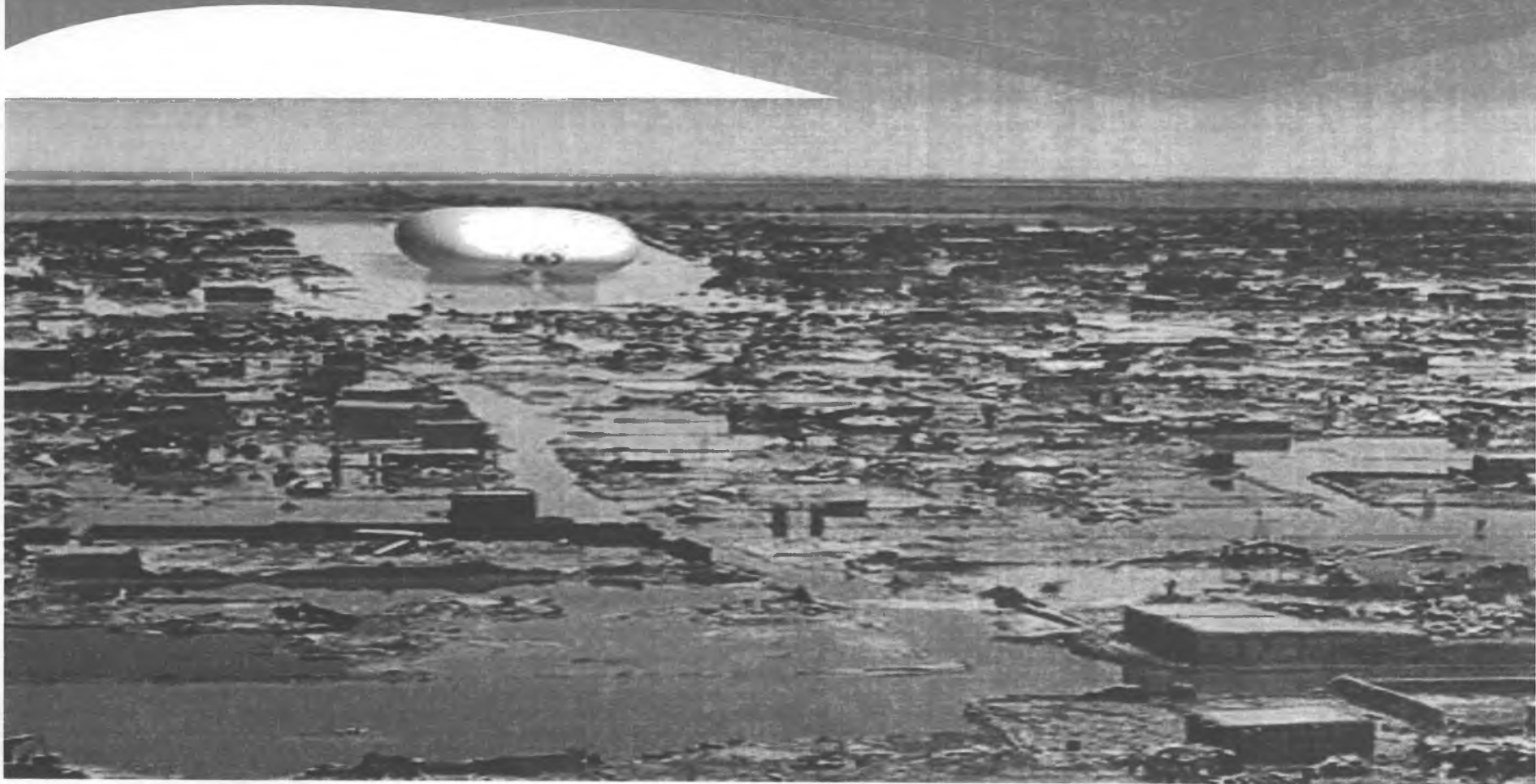
WHEN TIME IS NOT AN OPTION



TOURISM



DISASTER RELIEF



DISASTER RELIEF

Hurricane Katrina



- 1,836 people died in the hurricane and
- An estimated \$90 billion worth of damage.



DISASTER RELIEF

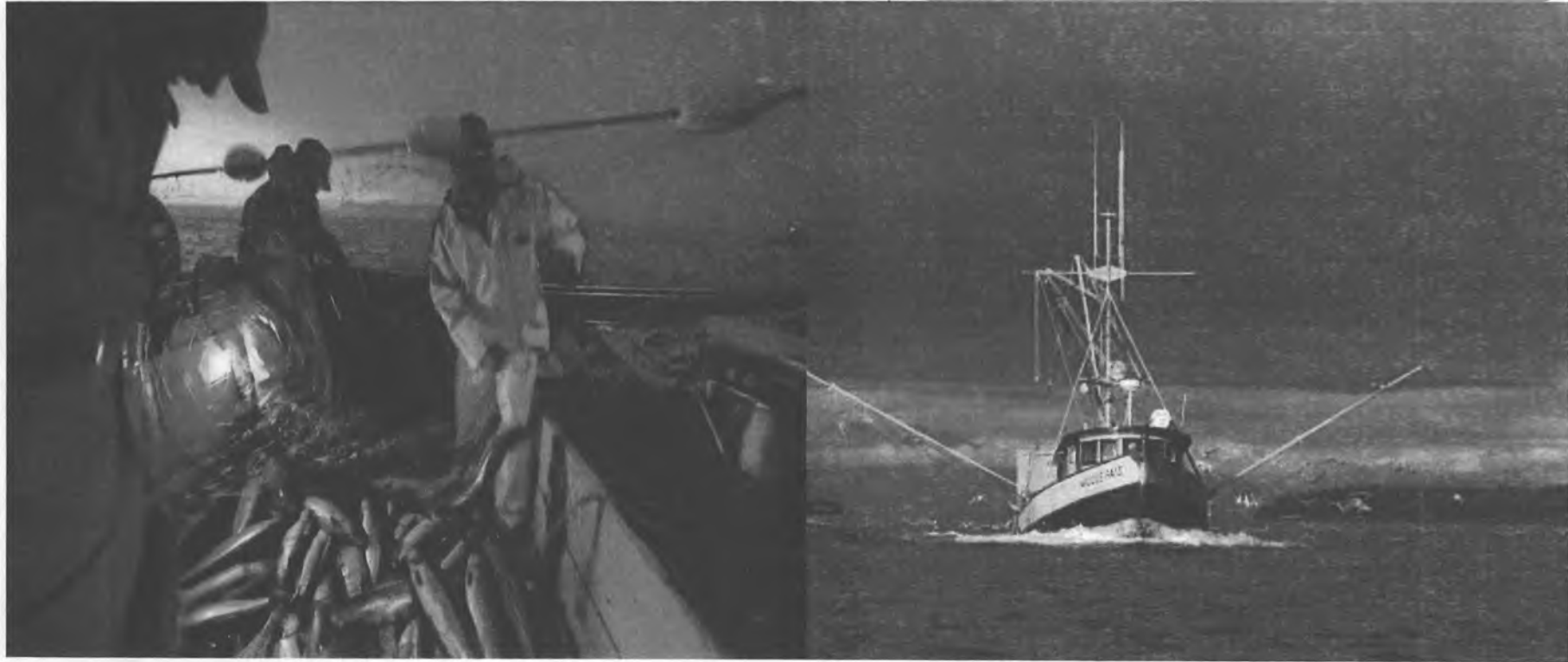
Hurricane Katrina – A few people at a time by helicopter



SEARCH AND RESCUE



FISHING ENHANCEMENT



FIRE FIGHTING

Wildfire Air Tanker Concept

An average of 50 Tankers are needed, but only 7 are operating*
Wildfire fighting experts agree 50 additional planes are needed
to complement ground crews overwhelmed by the number and
intensity of wildfires during the fire season.

The Cost of putting out wildfires is over \$1.65 billion/year.

*July 3, 2012 Disaster Relief & Reuters, 2012



HYBRID AIRCRAFT WILDFIRE AIR TANKER CONCEPT



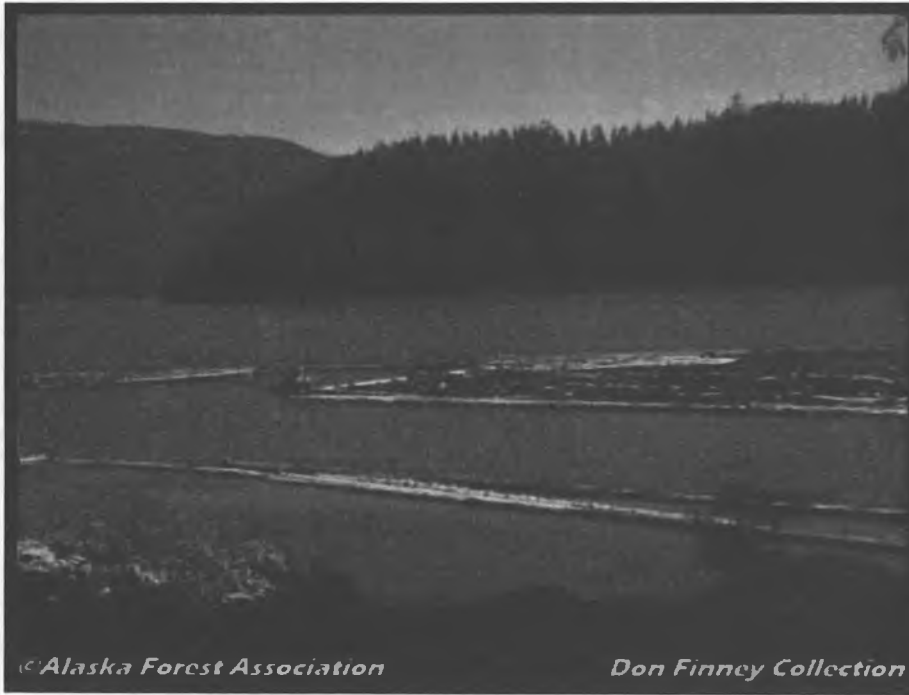
NOT JUST A TANKER! A New Disruptive Firefighting System



FOREST MANAGEMENT



TIMBER AND LOGGING



©Alaska Forest Association

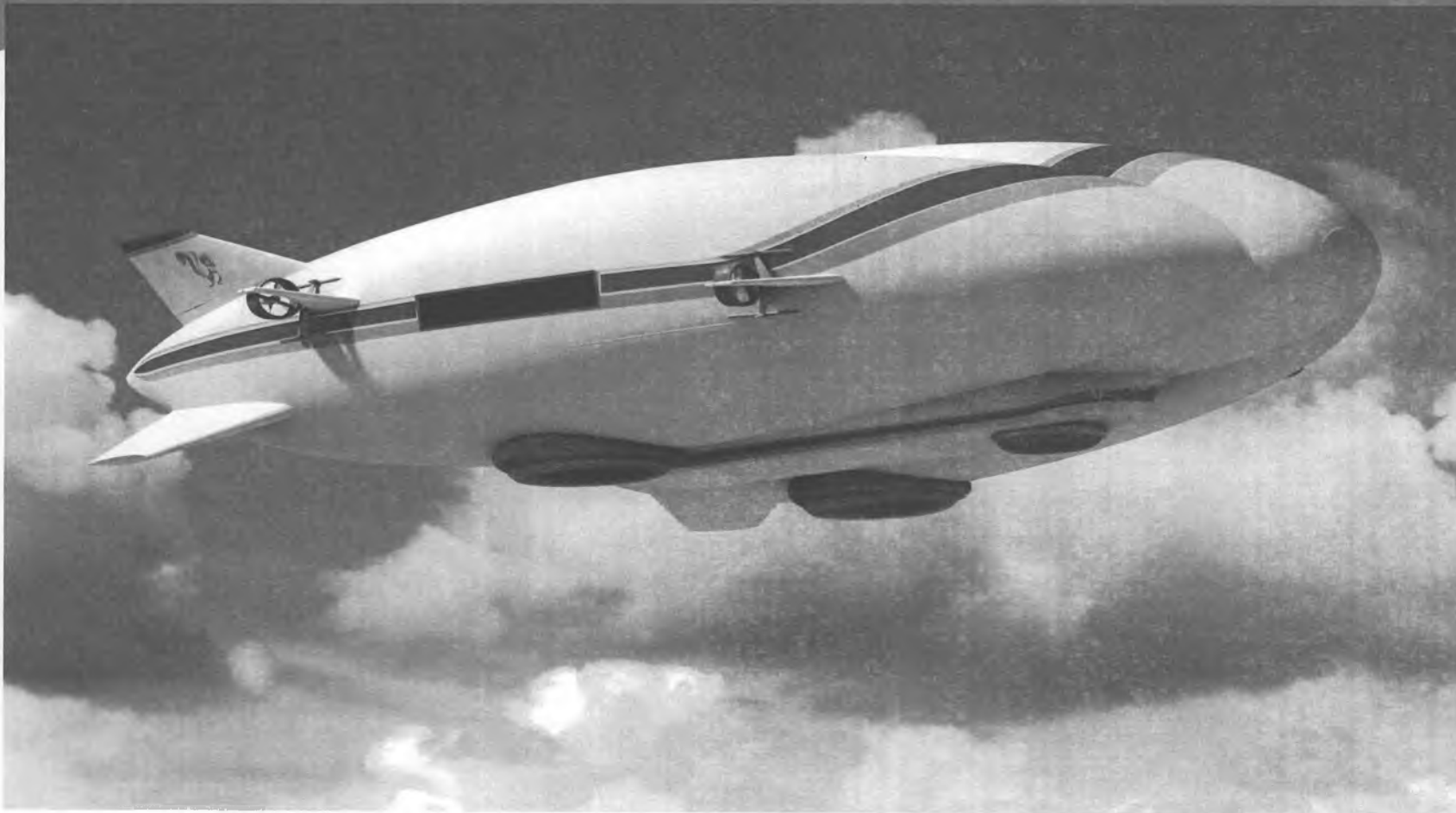


Don Finney Collection ©Alaska Forest Association

Don Finney Collection

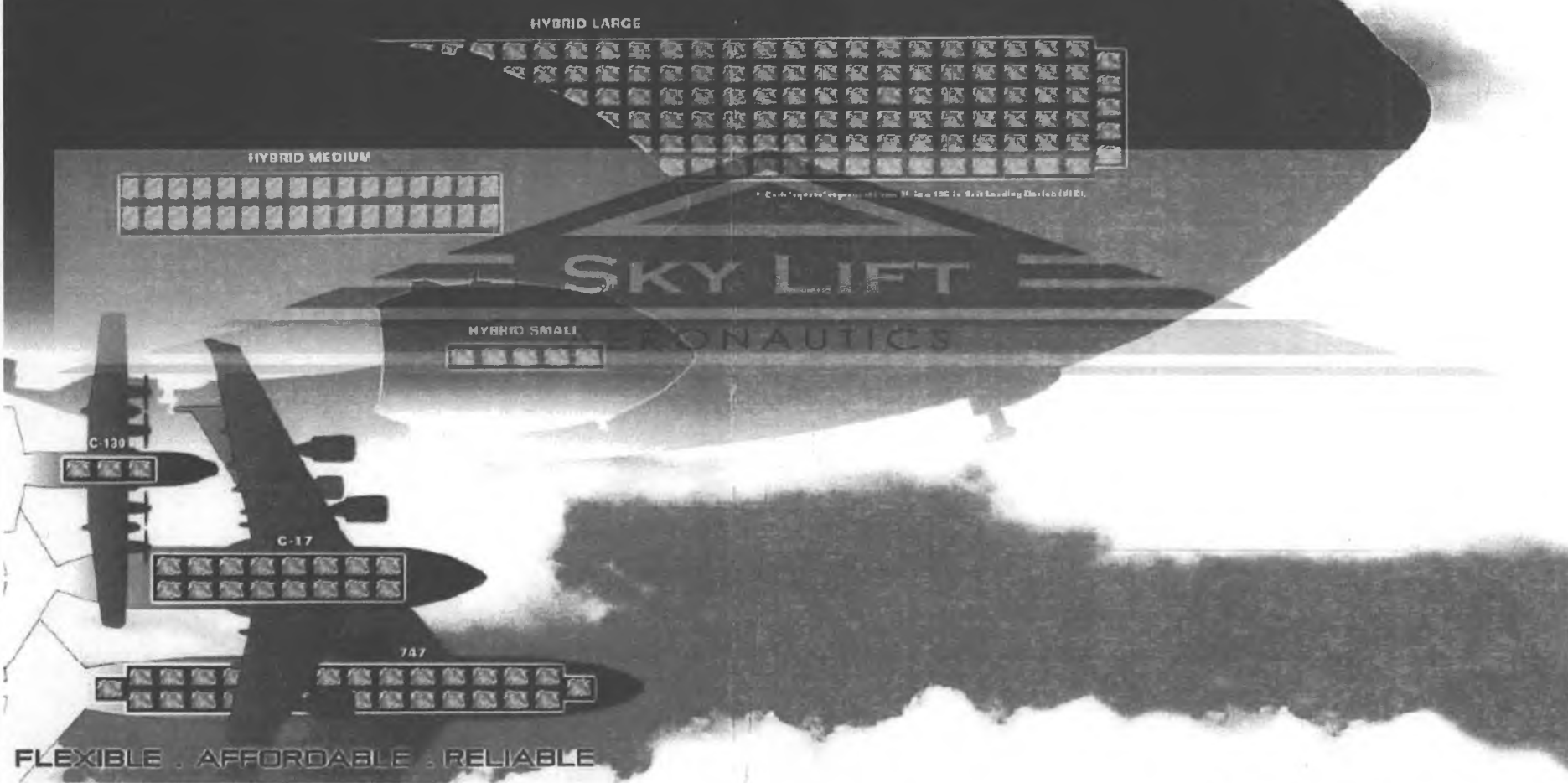
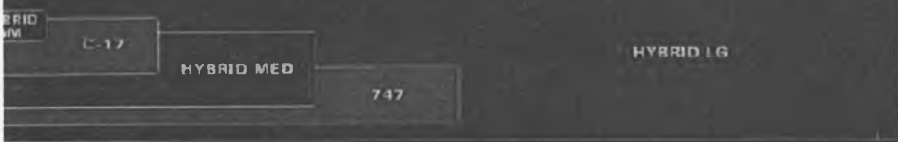


SKYLIFT HYBRID AIRCRAFT



CARGO BAY COMPARISONS

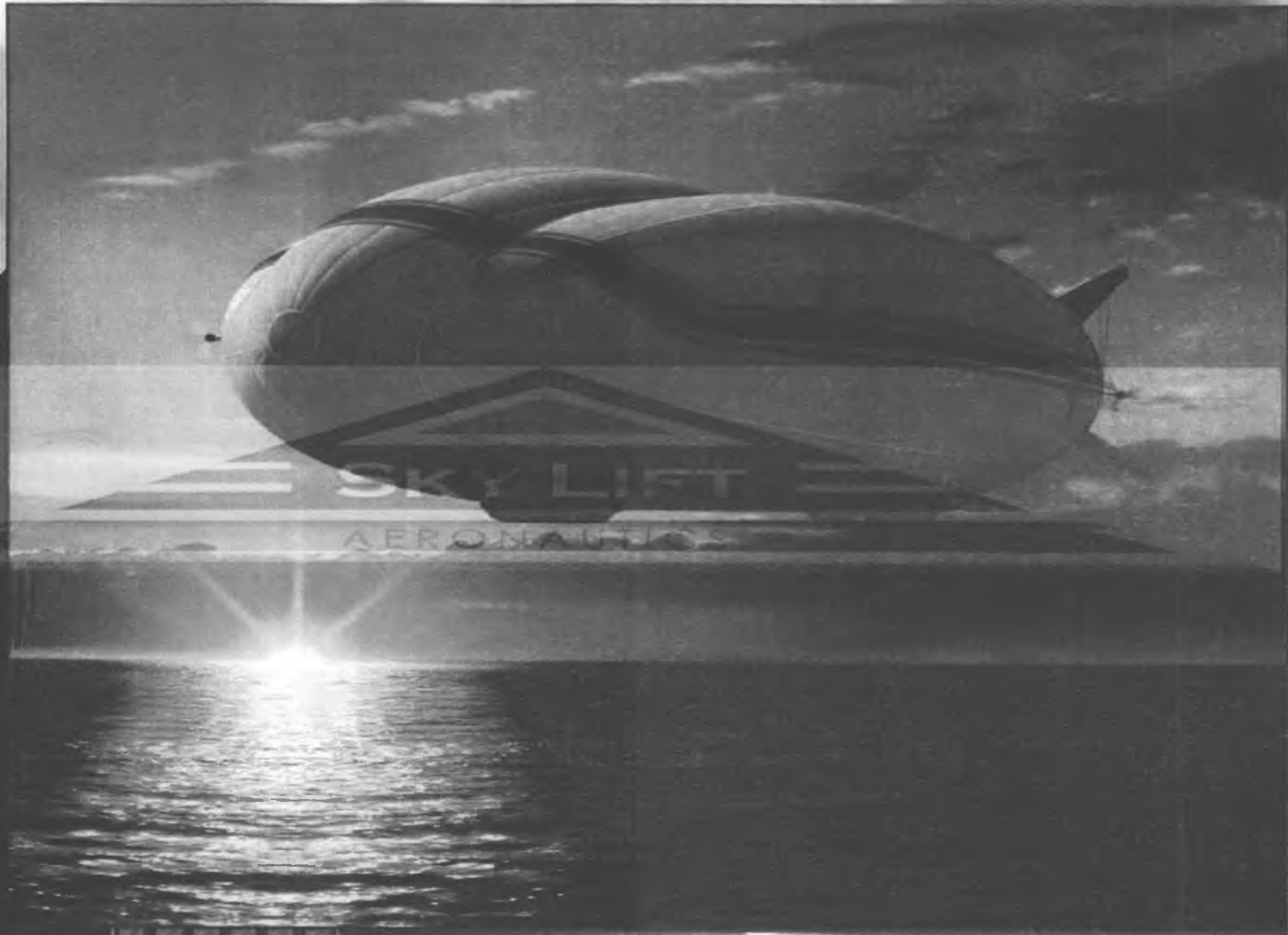
HYBRID MATTERS



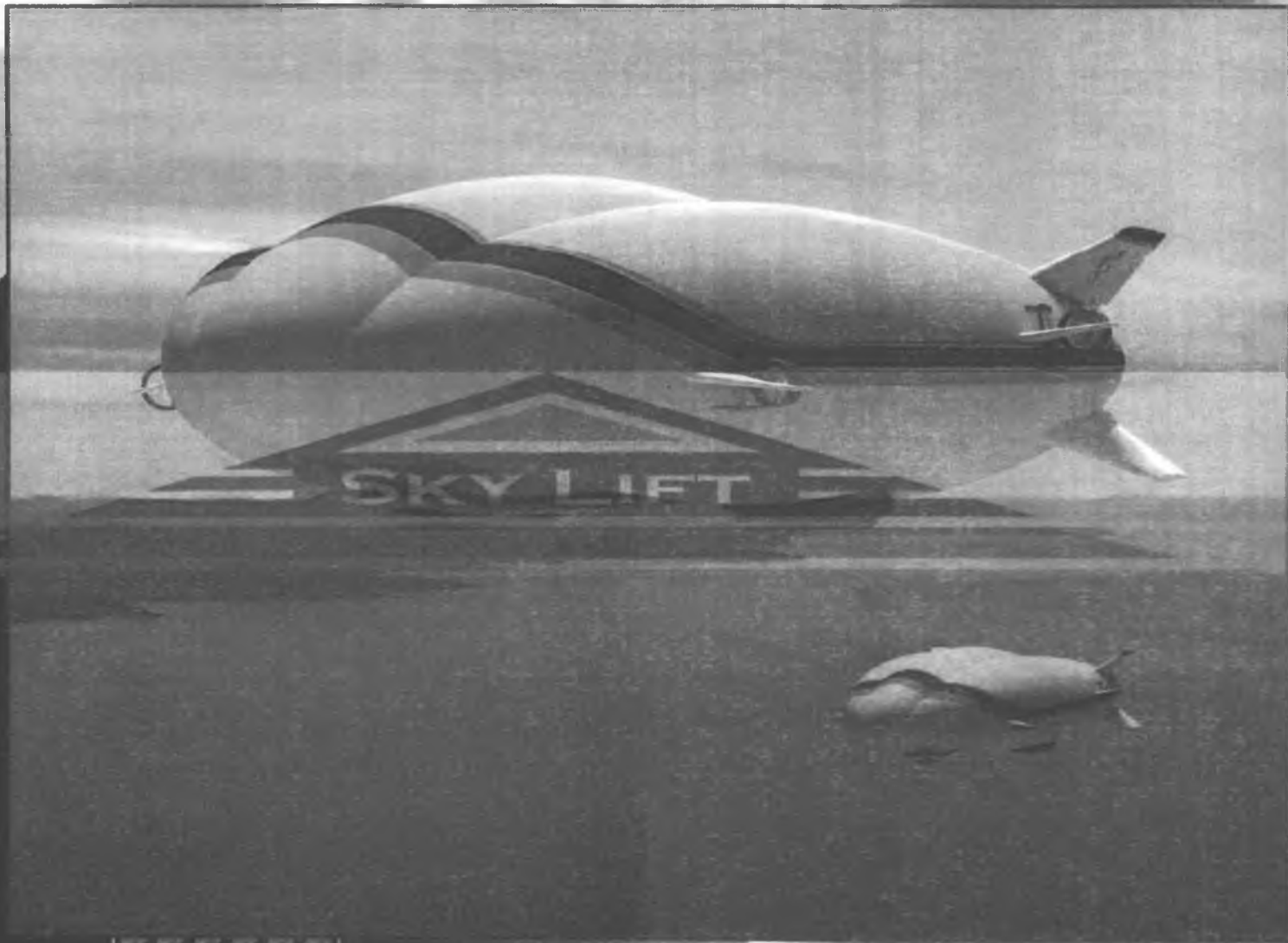
FLEXIBLE . AFFORDABLE . RELIABLE



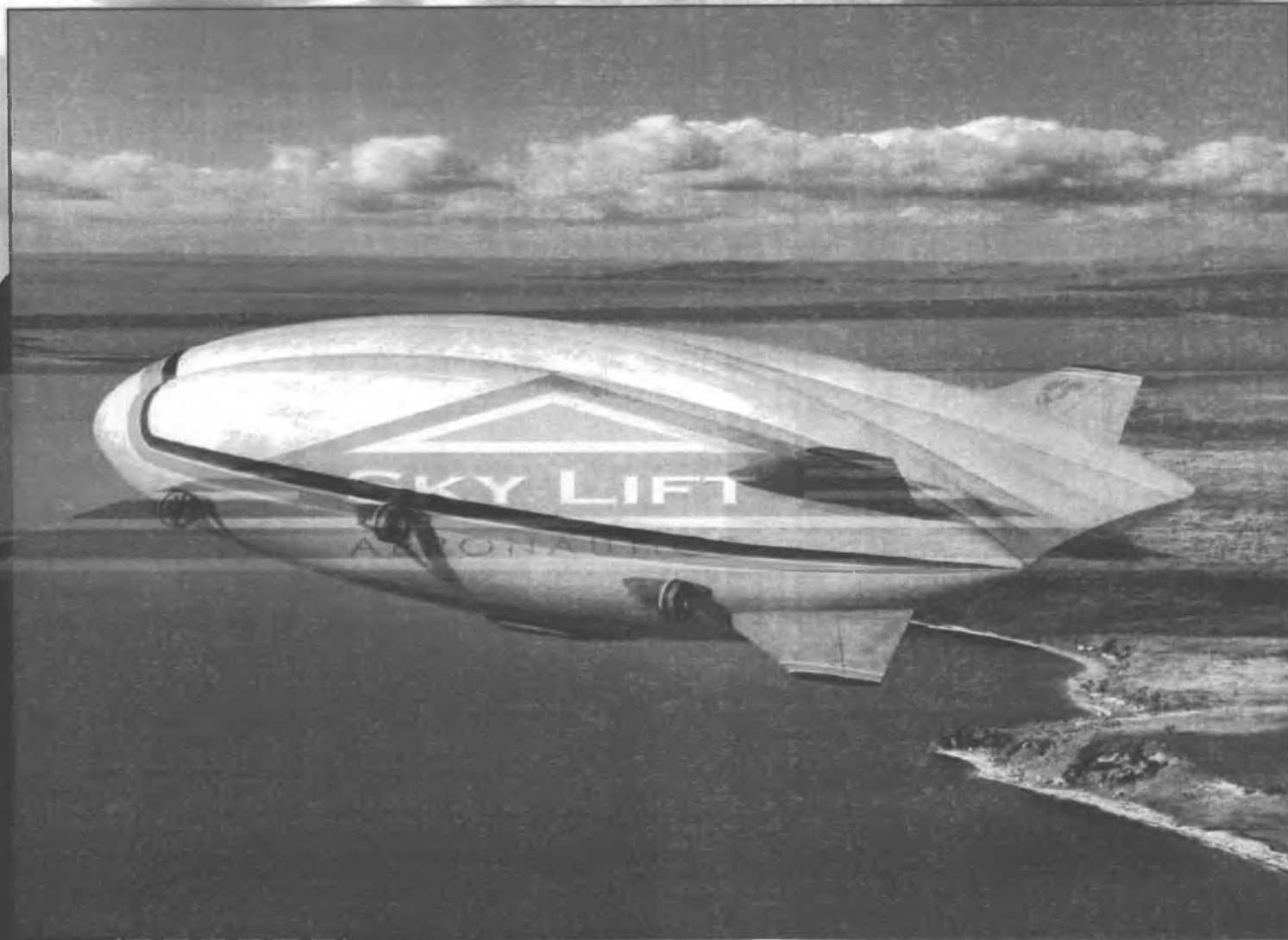
HYBRID SMALL



HYBRID MEDIUM



HYBRID LARGE



4 Proven Technologies Merged Into 1 Transformational Technology



Helicopter

Vertical
Airlift



Cargo Airplane

Deltoid Shape
Aerodynamic Lift

Hybrid Aircraft



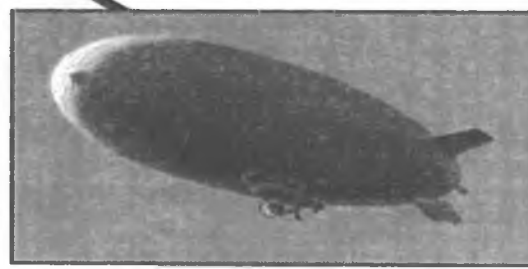
Vectored
Thrust



Hover Craft

Air
Cushion
Landing
System
(ACLS)

Helium
Filled
Envelope
Up to 80%
Vertical lift



Airship (Blimp)



FOR MORE INFORMATION

ON HOW TO ORDER THE AIRCRAFT AND OR SPECIFICATIONS

HYBRID VARIANTS

20 TON CAPACITY
100 TON CAPACITY
500 TON CAPACITY

CONTACT:

R. MICHAEL SMITH
Michael.smith@skyliftaero.com
1-714-262-6839

Kurtis Zell
Kurtis.zell@skyliftaero.com
1 702 232 9029

