FLY UTAH

UTAH AERONAUTICS CONFERENCE

2023

# Meeting of the Minds: An Update with UAMMI & UADA

Tulinda Larsen and Brian McCann

# Platinum Partnership

# Gold Partnership

SLC INTERNATIONAL

SUU AVIATION

ELECTRIC POWER SYSTEMS

# Silver Partnership

Redtail JET CENTER

DroneUp

NORTHERN UTAH ECONOMIC ALLIANCE

NBAA

AOPA
your freedom to *fly*

Deloitte.

HORROCKS ENGINEERS

Governor's Office of Economic Opportunity

# Bronze Partnership

ARMSTRONG
A LOCHNER COMPANY
PROUD OF OUR PAST. FOCUSED ON THE FUTURE!

QWIKFLIGHTS

CENTURY WEST
ENGINEERING

J·U·B
J·U·B ENGINEERS, INC.

ANRA
TECHNOLOGIES

discover davis

UCAA
Protecting Our Aviation Future
UTAH GENERAL AVIATION ASSOCIATION

# Exhibitor Partnership


















## Mobile App Partner

X-FACTOR STRATEGIC COMMUNICATIONS

## Snack Break Partner

SILENT FALCON™

## Attendee Bag Partner

STATE U | UtahStateUniversity

## Evening Reception Partner

WSP

## AOPA Rusty Pilots Seminar Partner

AXIOM AVIATION

# Speakers

Tulinda Larsen

Brian McCann

uammi

UTAH ADVANCED MATERIALS + MANUFACTURING INITIATIVE

# UAMMI & UADA Elevating Aerospace & Defense in Utah

Dr. Tulinda Larsen, President

June 21, 2023

# UAMMI Applauds Creation of UADA

- Utah has long focused on Silicon Slopes
- It is time to focus on the economic benefits of Aerospace & Defense, driven by the community that has developed around Hill Air Force Base

# Non-profit, Public Private Partnership no-Fee Membership organization

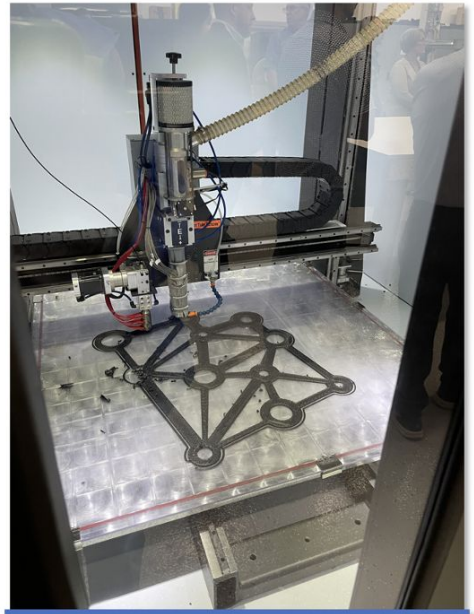
## Vision

*To ensure that Utah is a global leader in advanced materials & advanced manufacturing.*

## Mission

*We promote collaboration, identify business opportunities, share knowledge resulting from research, accelerate the success of small businesses, establish a skilled and trained workforce, and are a thought leader in advanced materials*

# Expansion of Utah's Advanced Manufacturing Industry



3D Printing


Robotics

Carbon Fiber

Polymers

Aerospace & Defense

Medical Products

Outdoor Rec

# Utah Leads in Defense Advanced Materials

**(Swim Lanes)**

Awards and Recognition: Made in Utah

Workforce/Apprentice

Safety Training

Industry 4.0/Automation

Engr Capstone Projects

Federal Funding Admin

Non-MEP Partnership

Advanced Materials and Manufacturing

Federal & State Grants

DEIA

International Sales

Imports

SBA STEP Grants $1M in 2022

CONNEX Utah

State Funding Admin

Outdoor Products – Development and Lean

Direct Grant Admin

ISO/AS/Food Quality Systems

Leadership/Structures

Domestic Sales

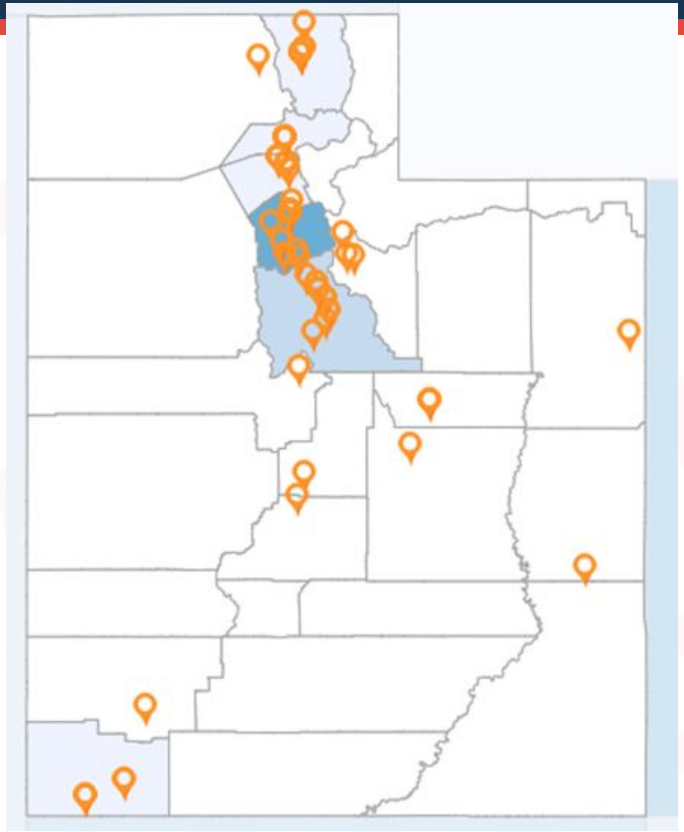
Cybersecurity

Operational Excellence

# Dept of Commerce - MEP National Network

# Utah-MEP Engagements Over the Past 4 Quarters

| 2022: UTAH-MEP Total Impacts | |
|---|---|
| Manufacturing Clients Served | 125 |
| Jobs Created or Retained | 4,721 |
| Additional Employee Wages Earned | $294.6 Million |
| Additional State Tax Revenue Collected | $30.8 Million |



# Current UAMMI Grants

- SBA Regional Innovation Cluster Program
  - Small business support
- DOD Defense Manufacturing Community Support Program
  - Sub-recipient to GOEO
  - Multiple programs – Workforce, Supply Chain, Research & Small Business programs
- Department of Energy
  - Carbon Ore Rare Earth & Critical Minerals (CORE-CM), subrecipient to University of Utah
- Department of Commerce
  - Subrecipient for Utah-MEP Alliance
- EDA
  - Northern Utah Accelerator program, now acceler8wasatch, subrecipient to Weber State
  - Cut & Sew feasibility study
- GOEO
  - Manufacturing Modernization Grant Program
  - Industrial Assistance Account focused on DEIBA & Rural programs

# Utah Defense Manufacturing Community Results

- In total, UMDC programs have reached **8,200 students**, worked **with 156 schools, 170 apprenticeships/training, filled almost 500 jobs. assisted roughly 200 companies, offered 157 courses/workshops/seminars, assisted in submitting in at least 19 STTRs and 63 new research projects that support defense manufacturing.**
- Worked with the State Legislature to fund new graduate program in advanced materials – 2 graduated in May 2023, with 6 in the program
- Based on research under UMDC related to Reshoring manufacturing, Utah Governor Cox adopted a program, "Reshore Utah" and the State funded the Manufacturing Modernization Grant Program, which includes $10million for grants to companies reshoring manufacturing to the United States.
- Stimulated discussion on the challenges of qualifying and certifying advanced materials for USAF and commercial aircraft. Released a white paper on the need for modernization of the processes to qualify advanced materials for USAF and commercial aircraft, highlighting the challenges and proposing solutions, resulting in the formation of the Missile & Energy Research Center
- Held 3 Defense Manufacturing Research Symposiums & CrossTalk:A&D opportunities for Small Busines
- Expanded the UMDC Coalition from 70 participants to almost 100.
- Provided small business support services to more than 100 small businesses within our manufacturing community.
- Utah is most proud of the collaboration that has resulted from the creation of the UMDC Consortium, and the innovations stimulated by open discussions and exchanges amongst members.
- Overall, the UDMC has been successful in elevating the DoD defense manufacturing in Utah.

# Missile & Energy Research Center Vision: FUNDED- $20 million State Appropriation

## Utah's aerospace industry is asking for help:

- Advance the Technology Readiness Level (TRL) and Manufacturing Readiness Level (MRL) from Level 4 to Level 6-8 (ready for technology transfer) for lower cost, high throughput high temperature materials
- Automation and advanced manufacturing development pending
- Functional prototype fabrication
- High temperature material testing and qualification
- Develop next generation of operators, technicians, scientists and engineers in high temperature materials and evaluation

MERC

uammi
UTAH ADVANCED MATERIALS + MANUFACTURING INITIATIVE

# MARS/MERC APPROPRIATIONS

## $20M ONE-TIME FUNDS

**$4 M Foundational Talent**
- 3 Year Runway Establishing Talent

**$16 M Equipment & Infrastructure**
- Specialized Processing Equipment
- High Temperature Testing
- Infrastructure (Power, Ventilation)

**Leverage Funding Sources**
- UAMMI
- Weber State University
- EDA Grant
- Private Industry
- DoD & National Labs

**Sustainability**
- Private Industry Contracts
  - Pilot Scale Manufacturing
  - Unique Testing
  - Talent Development

*7 TO 10 YEARS:*

$50M/YR & 100+ JOBS

**Return**

# DoD Collaboration

- Signed an MOU with Johns Hopkins Applied Research Lab
  - Interested in WSU system engineering Students(Internships)
  - Collaborating on high temperature material projects

- Signed an MOU with Idaho National Labs
  - INL sits on the industry advisory board
  - Interested in applied research collaborations

- Signed Educational Partnership Agreement (EPA) with Hill Air Force Base
  - Hiring WSU students
  - Solving Critical applied research problems
  - Leveraging each organization talent and equipment

# Current Projects

| | |
|---|---|
| Coal tar pitch testing (MERC related) | Cal-Nano pucks, additional pucks (pitch), hemisphere or cone molding, wetting trials (unsized fibers), CBAM sheet pickup trials, pitch pellets(?) |
| Halcium wind turbine testing | Generating wind turbine power curve. Equipment to be delivered March 2. Getting Bryce Johnson hired to start project. |
| CBAM solder pallets | Printing solder pallets for potential collaboration with IO. Hill folks are also using these pallets. |
| CBAM rocket nozzles | Printing rocket nozzles using CBAM |
| CBAM projects with Juhyeong Lee | Fiber reclamation for recycling, other ideas |
| Pitch matrix for tape placement | Make a limited amount of tape placement material using coal tar pitch matrix. ORNL has a tape machine that they're willing to run pitch on. |
| Windmill blades | Repurposing windmill blades as sound barriers or snow fences |
| Recycled CF hackathon | A student competition to take advantage of outcomes form carbon fiber recycling project to create products |
| Actively cooled hammer mill | Senior project |
| Backing removal device | Senior project |
| Fiber pullout with compliant material | How to test at high temperatures? |
| Coal to Carbon Fiber | Investigation into economics and mechanical properties of pitch-based carbon fiber |
| Carbon Fiber Recycling | Feasibility study into recycling of pre-preg scraps into a usable form factor without pyrolysis or solvolysis |

# Private Equity Fund: Roadmap FUNDED!!

Technologies requiring Advanced Materials and Manufacturing is currently being paced by SBIR, Title III and other government funding

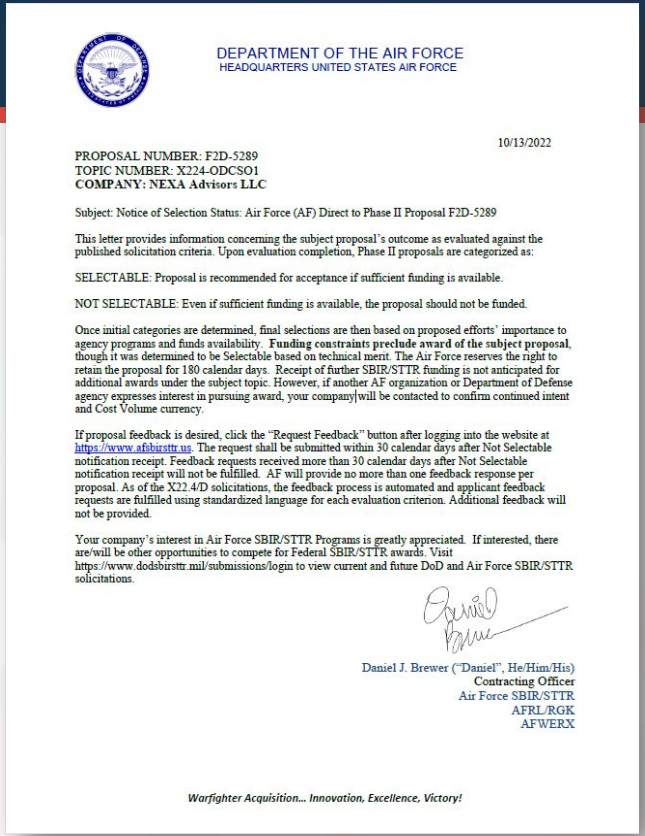
-Hypersonics

-Ballistic Re-entry vehicles

-Low cost materials and manufacturing methods for attritible and AAM applications

Solution: Large investment fund, leveraged with Federal Loan Guarantees

- $1B Fund – 20% Equity/80% Debt (supported by FLG)
- Scoped to finance companies and technologies supporting advanced materials
- UAMMI & NEXA Proposed SBIR II to fund this first fund and road map was accepted by AFWERX as Selectable on technical merits, but not currently funded
- Funding has now been provided by Global Strike Force
- Congressman Chris Stewart is leading Loan Guarantees for DOD



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

10/13/2022

PROPOSAL NUMBER: F2D-5289
TOPIC NUMBER: X224-ODCSO1
**COMPANY: NEXA Advisors LLC**

Subject: Notice of Selection Status: Air Force (AF) Direct to Phase II Proposal F2D-5289

This letter provides information concerning the subject proposal's outcome as evaluated against the published solicitation criteria. Upon evaluation completion, Phase II proposals are categorized as:

SELECTABLE: Proposal is recommended for acceptance if sufficient funding is available.

NOT SELECTABLE: Even if sufficient funding is available, the proposal should not be funded.

Once initial categories are determined, final selections are then based on proposed efforts' importance to agency programs and funds availability. **Funding constraints preclude award of the subject proposal**, though it was determined to be Selectable based on technical merit. The Air Force reserves the right to retain the proposal for 180 calendar days. Receipt of further SBIR/STTR funding is not anticipated for additional awards under the subject topic. However, if another AF organization or Department of Defense agency expresses interest in pursuing award, your company will be contacted to confirm continued intent and Cost Volume currency.

If proposal feedback is desired, click the "Request Feedback" button after logging into the website at https://www.afsbirsttr.us. The request shall be submitted within 30 calendar days after Not Selectable notification receipt. Feedback requests received more than 30 calendar days after Not Selectable notification receipt will not be fulfilled. AF will provide no more than one feedback response per proposal. As of the X22.4/D solicitations, the feedback process is automated and applicant feedback requests are fulfilled using standardized language for each evaluation criterion. Additional feedback will not be provided.

Your company's interest in Air Force SBIR/STTR Programs is greatly appreciated. If interested, there are/will be other opportunities to compete for Federal SBIR/STTR awards. Visit https://www.dodsbirsttr.mil/submissions/login to view current and future DoD and Air Force SBIR/STTR solicitations.

Daniel J. Brewer ("Daniel", He/Him/His)
**Contracting Officer**
Air Force SBIR/STTR
AFRL/RGK
AFWERX

*Warfighter Acquisition... Innovation, Excellence, Victory!*

# Markers of Success

**Phase 0 ( now- June 2024)**

-Operations planning (Advisory Board, administrative structure, partnerships, etc.)

-Installation of Equipment and hiring of talent including students

-1 DOD Grant Awarded(@ 500,000) and 1 Industry Contract ($350,000)

**Phase 1 (June 2024 -2025)**

-Program fully operational

-2+ DOD grants($500,000) and 2+industry contracts ($350,000)

-15 million from Funding from AFRL/NDAA

**Phase 2 ( July 2025- July 2026)**

- Fully Sustained by DOD grants and industry contracts

# Thank You!

Dr. Tulinda Larsen

President

UAMMI

tlarsen@UAMMI.org

443 510 3566

INTERGALACTIC

AN AEROSPACE COMPANY

# INTERGALACTIC

# WHO ARE WE?

## COMPANY CORE VALUES ::

### IMPACT

We have an insatiable appetite to go big.

### HUMILITY

It’s about getting it right, not being right.

### PRECISION

Thorough and detail-obsessed because every-little-thing-matters.

### FUN

Serious work can still be enjoyable.

### INVENTION

We reverence and protect a culture of discovery and innovation.

INTERGALACTIC

AN AEROSPACE COMPANY

## WE’RE THE FASTEST GROWING THERMAL SYSTEMS INTEGRATOR ::

We’ve experienced massive growth through word of mouth – no marketing or advertising to date. Heat is an urgent problem in space and aerospace, and traditional suppliers can’t solve it.

# SMALL. LIGHT. INTELLIGENT.

## HUGE HEAT REJECTION IN A SMALL PACKAGE

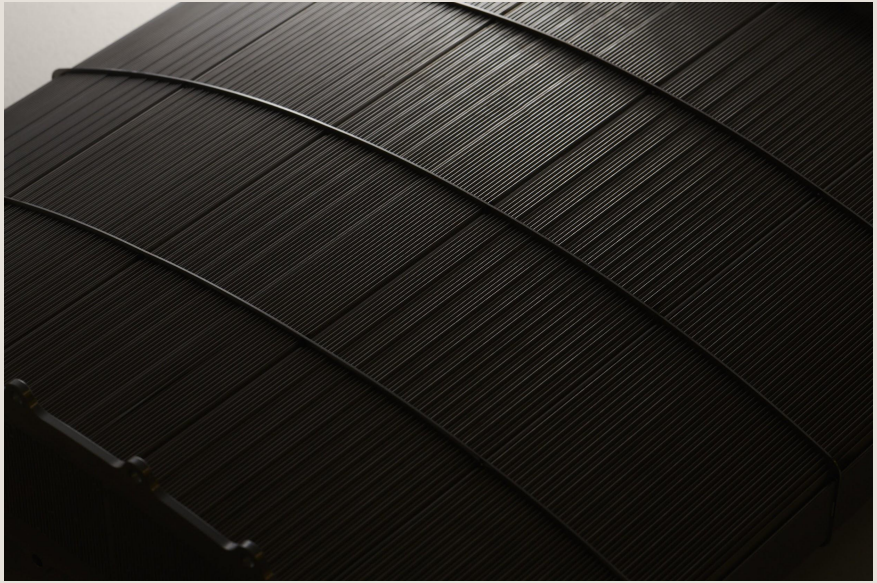
**Aircraft cabin conditioning**

- Cooling – oil-less vapor cycle or air cycle
- Heating – electric, bleed air, or heat-pump waste heat recovery via vapor cycle (exclusive to AECS)
- Eliminate bleed air heat to improve engine and air vehicle performance • Ventilation, fresh-air intake, water separation, smoke evacuation
- Integrated or distributed architectures – enabled by modular system design
- Seamless communication and control integration with all common Flight Management Systems or stand-alone controls

**Liquid chillers – ‘active’ vapor cycle or ‘passive’ liquid to ambient**

- Liquid to liquid, liquid to air
- Vapor cycle, passive (liquid to air)
- Compatible with all common coolants (PAO, glycols, water, etc.)
- Precision temperature control over variable loads (+/- 0.1 °C)

# YOU CAN’T BUILD TOMORROW’S BREAKTHROUGHS WITH YESTERDAY’S TECHNOLOGIES



# PROPRIETARY MICROTUBE HX

PATENT-PENDING THERMAL BREAKTHROUGH

- Best in industry heat rejection per weight and volume
- World-class size, weight, and pressure drop characteristics over ‘traditional’ brazed plate-fin technology
- Engine, hydraulic, gearbox oil coolers
- Refrigerant evaporator and condensers (air and liquid exchange)
- Liquid to air, air to air (including air cycle machine heat exchangers)
- Significantly lower size and weight of next best technology (brazed plate fin)
- Precision laser welded
- Low tube and shell side pressure drops reduces compressor, pump, and fan power
- Fouling resistant and easy to clean

# INTEGRATED SUBSYSTEMS

## PRECISION ENGINEERED AND INTELLIGENTLY CONNECTED

**Oil-free idler-shaft scroll compressor technology**

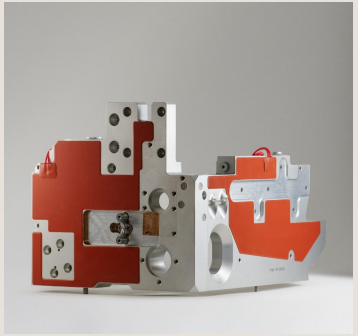
- Oil-free operation allows continuous operation in any orientation or G loading
- No risk of compressor oil starvation and premature failure
- No oil acidification and subsequent vapor cycle system corrosion
- Best in class isentropic and volumetric efficiency minimizes power draw

**Native high voltage DC capability (no power conversion)**

- Designed to accommodate more electric platforms
- Built in test, predictive health management feedback
- Eliminate bleed air for improved engine and air vehicle performance

**“Smart” thermal management**

- System only cools or heats as needed; variable speed compressor and fans
- Minimize power draw and noise generation based on loads and conditions
- Dynamic feedback loop- “pushed” to end-user



# GS1-SX STARSCREAM

Lightweight, efficient, and highly rugged precision liquid chiller with broad applications in air, space, land, and sea. Ideal for extreme vibration and temperature environments.

Key specs:

- Size: 10”x 10”x 28”
- Weight: 115lbs
- Cooling capacity: 5 kW below ambient
- Active cooling
- Extreme vibration and temperature survival

# WE BREAK BARRIERS ACROSS EVERY AERO AND ASTRO SECTOR::

## OUR TECH SOLVES A CONSTRAINING PROBLEM:

Legacy solutions can't handle the heat generated by next-gen mechanical, computing, and physical stressors. We've taken a completely novel approach to removing heat barriers.

# CHECK OUT OUR DIGS

AEROSPACE-GRADE FACILITIES

**Current Intergalactic HQ**
Located within RAM Company's 250k Sq Ft Complex in St. George Utah.
(14 acres, including 20K Sq Ft of CL 10K cleanroom space.)

**Future Intergalactic HQ**
In 2020, we purchased land in St. George, Utah and plan to begin construction on a new 90k sq ft building by 2026


INTERGALACTIC

AN AEROSPACE COMPANY


UADA

UTAH AEROSPACE & DEFENSE ASSOCIATION

# UADA X AEROSPACE INDUSTRY:: GENERAL INFORMATION

- **AEROSPACE AND DEFENSE: 20% OF UTAH'S GDP**

UADA:

- FASTEST GROWING ASSOCIATION IN UTAH
- EST. 100 PARTICIPATING COMPANIES
- FOCUS: AAM, CYBER INTELLIGENCE, MFG, AND WORKFORCE DEVELOPMENT
- FOUNDED IN PARTNERSHIP WITH THE GOVERNOR'S OFFICE OF ECONOMIC OPPORTUNITY
- REPRESENTS ONE OF THE FIVE CORE INDUSTRY CLUSTERS IN UTAH

**UADA'S MISSION IS TO BUILD THE WORLD'S PREMIER ECOSYSTEM FOR AEROSPACE AND DEFENSE COMPANIES IN UTAH**

UADA
UTAH AEROSPACE & DEFENSE ASSOCIATION

# UADA X AEROSPACE INDUSTRY:: INDUSTRY INFORMATION

## OVER 100 EXISTING BUSINESSES IN UTAH INVOLVED IN “NEW SPACE”
- ACTIVELY DOING BUSINESS WITH SPACEX, BLUE ORIGIN, AND NASA
- POSITIONING UTAH AS AN IMPORTANT HUB FOR SPACE EXPLORATION

## UADA IS ACTIVELY ENGAGED WITH UTAH’S UNIVERSITIES
- WORK FORCE DEVELOPMENT-CRITICAL

## UTAH IS UNIQUELY POSITIONED TO LEAD THE WORLD IN AAM
- NIMBLE LEGISLATIVE APPROACH
- PROPENSITY TO PARTNER
- EDUCATED WORKFORCE
- KEY PARTNERSHIPS WITH BOEING, FORTEM, ZIPLINE, DRONE HIVE, AND OTHERS

**UTAH’S AEROSPACE INDUSTRY HAS A VOICE!**

UADA
UTAH AEROSPACE & DEFENSE ASSOCIATION

INTERGALACTIC

AN AEROSPACE COMPANY

# VISION:: UTAH

## Why we chose Utah::

- Leverage “low cost” living
- Differentiate
- Untapped potential/workforce
- Business friendly

## Utah’s Potential::

- A&D disruption
- eVTOL/New Space dominance
- Technology hub
- Start-up ecosystem