# Supplemental Information

- Website - http://uapathways.com/
- Videos - http://uapathways.com/
- News/Media
- Photos – see attached
- Industry Skills List
- Letters of Support
  - Salt Lake Community College
  - Governor's Office of Economic Development
  - UAP Partners – Orbital ATK

# Aerospace program to give high schoolers new pathway into industry

By Morgan Jacobsen
Published: Sept. 4, 2015 9:30 a.m.
Updated: Sept. 4, 2015 5:06 p.m.



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*Laura Seitz, Deseret News*

**Related Link**

Program offers good jobs and a way to grow manufacturing in Utah

WEST VALLEY CITY — This year, students in Bill Catnull's wood shop class at Granger High School will be building graphite longboards, guitars and wooden safes. When they graduate, they could be building parts for the F-35 fighter jet, rocket engines with Orbital ATK or Boeing 757s.

That's the hope of teachers, state leaders and several aerospace companies who plan to give students a more direct and accelerated pathway into some of Utah's largest industries.

The Utah Aerospace Pathways program being piloted this year will allow high school seniors to get paid internships, graduate with a certificate in aerospace manufacturing and immediately begin a career, the Governor's Office of Economic Development announced Friday.

"It's exciting, the potential," Catnull said. "I'm a woodworker, but at the same time, I'm giving these guys a chance to move into a field that they would never otherwise have."

Next door to Catnull's wood shop, Chuck Murillo is passing out safety glasses to students in his welding class prior to introducing them to the shop. He sees a similar potential for his students as they learn the basics of what could become a profitable career through the pathway program.

"It's a great way to get kids started, learn responsibility, learn the tools, get out in the industry and be able to take charge when they get out of high school. Then they have a career path," Murillo said.

Collaboration began in March between several state agencies, education leaders and six industry partners: Boeing, Harris, Hexcel, Hill Air Force Base, Janicki and Orbital ATK. Since then, education leaders worked with the companies to develop academic coursework that

# Aerospace Program to Give Utah High-Schoolers Path Into Industry

Students will get opportunities to work in one of the state's largest industries.


A Boeing employee works on a vertical fin assembly for a Boeing 787 Dreamliner at Boeing, in Salt Lake City. When Utah students graduate, they could be building parts for the F-35 fighter jet, rocket engines with Orbital ATK or Boeing 757s. Rick Bowmer/AP

U.S.News STEM Solutions

MORGAN JACOBSEN
Deseret News

WEST VALLEY CITY, Utah (AP) - This year, students in Bill Catnull's wood shop class at Granger High School will be building graphite longboards, guitars and wooden safes. When they graduate, they could be building parts for the F-35 fighter jet, rocket engines with Orbital ATK or Boeing 757s.

That's the hope of teachers, state leaders and several aerospace companies who plan to give students a more direct and accelerated pathway into some of Utah's largest industries.

# Pathways program connects high school grads with high-tech jobs

By Art Raymond @DNTechHive
Published: April 23, 2017 4:30 p.m.
Updated: April 23, 2017 4:35 p.m.



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Nicole Boliaux, Deseret News

*An employee works on a composite in the linear room at the Orbital ATK manufacturing facility in Clearfield on Thursday, April 20, 2017.*

SALT LAKE CITY — Much has been made recently about unmet job demand in Utah and across the country, being the direct result of a workforce that simply doesn't have the skills to engage the employment opportunities available.

Now, thanks to a program launched under Gov. Gary Herbert's Talent Ready Utah effort, a small but growing number of Utah students are getting trained for and connected with job placements in advanced industry companies directly out of high school.

And it's an effort that's become the envy of the country.

In just its first two years of implementation, the Utah Aerospace Pathways program has earned national attention as a model for best practices and even been the subject of congressional testimony, according to Governor's Office of Economic Development deputy director Ben Hart.

"These direct employment programs have been tried before in many places but have had poor success records," Hart said. "Here in Utah, our model has demonstrated a very high level of success."

The key, he said, has been building a ground-up, collaborative effort that connects educators, advanced industry companies, and ultimately students in a system that works toward shared successes for all involved.


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# Manufacturing 1 & 2 Skills List
## Introduction/Core

**Environmental Health and Safety (integrated into everything)**

- Safety Culture (includes empowerment – speaking up)
- General OSHA Safety Requirements
- Care for others
- PPE – Respirator Training
- Clean rooms
- Foreign Object Debris
- Safety Data Sheets (SDS)
- Interpret Safety Sheets
- Identify unsafe procedures
- Identify impaired, unsafe coworkers
- TAG Out / Lock Out
- Overall awareness workplace violence
- Behavior Based Safety
- Task Specific Safety
- Confine space entry/exit training
- Foreign object damage

**Responsibilities of an Employee**

- Attendance -- timekeeping
- Accountability
- Organizational Awareness
- Ethics and Integrity
- Following Procedures with exactness
- Teamwork/Collaboration
- Accuracy and Quality
- Reliability
- Communications (verbal, written, interpersonal, electronic)
- Electronic devices – appropriate use
- Understand how to send electronic communication
- Pride in workmanship
- Customer service
- Exhibiting professionalism - respect for employer/co-workers (loyalty)
- Preparation Set-up
- Reporting / Providing Feedback
- Job Seekers
- Basic rules of Worker's Compensation
- Appropriate dress  PPE

**Organizational Awareness**

Teamwork – Helpfulness versus individual achievement
Functions: Mgmt., Quality, Operations, Engineering, Finance, etc.
Basic Company Finance, e.g. costs, pricing, revenues, profits
Process Optimization through collaboration
Vision and value of end product & company mission
Personal input in product
Where you as an employee fit in to company vision and mission
Coordination of meetings/ Leadership head groups
Leadership Skills
Corporation Governance
Company structure / Organizational charts
Sox Compliance (whistle blower)

**Manufacturing: How does a ~~high tech~~ advanced manufacturing facility work?**

Poke Yoke --Lean, Continuous Improvement, Problem Solving, Standard Work
Basic understanding of how to measure averages, failure rates, ranges, meeting requirements
~~Assembly lines~~, product flow
Quality control
Industry requirements and specifications
Attention to detail
Different regulatory agencies

**Applied Math**

Addition, Subtraction, Multiplication, Division
Unit Conversions: Standard to Metric; Metric to Standard
Fractions to decimals; Decimals to fractions
Adding and subtracting fractions and decimals – written in $1000^{th}$ inch
Moving decimal places
Ratios and proportions
Percentages
Scalability
Applied Geometry and trigonometry
Measure Blueprints
Basic ~~Understand~~ Blueprints
Read drawings
Able to read a measuring tape
Ability to measure
Basic 7 & 8 grade math
Hand calculations
Dimension / draw parts

**Reading, Interpretation, comprehension of technical information**

Basic reading of technical documentation -- **comprehension**
Blueprints, drawings, computing software
Manuals, specifications, procedures
Manufacturing work orders
Basic geometric dimensioning and tolerances, tolerances (+/-)
**Tolerance Stack Ups**
Inspection of features (good/bad)
Following a procedure, record key data accurately
Following testing procedures
Following basic SOPs (Standard Operating Procedures
**HMI Screens / clipboards**

**Computing applications and Computing Simulation**

Microsoft Excel for data collection and basic operations
Databases Software -- SAP
Access
Basic equipment phones
Basic drafting and measuring
Introduction to various manufacturing software
Into to Computer Aided Manufacturing
Full Microsoft Office
Emails – Outlook/Gmail
Navigation of File Structure
Research and identifying information (e.g. boolean search on Google)—how to know if they are valid
Certifications are not necessary

**Quality**

Basic Statistical Process Control (what are: bell curve, mean, standard deviation, average, applied stats)
Inspection basics
**Common defects in composites structures: FOD, resin pooling, voids, etc.**
Responsibility of quality stamp
Quality assurance
Why and how we do things and what happens if not done right
Exercises: hole quality, paperwork
Different kinds of certifications
Basics of ISO certification –GFSI – (Food cut)
Following testing procedures
Troubleshooting – understanding end product
Tolerances – Reducing Variations
Use and Variations

**Precision Measuring Instruments/Basic Metrology**

- Safety – The Why (don't remove guard, etc.)
- Calipers, gauges, protractors, micrometers, torque wrenches, etc …
- Laser trackers
- Faro arms or other touch sensor technologies
- Other advanced measuring instruments and techniques
- Measurement tool selection
- Angles
- Drill conversion
- Tool Usage
- Compressors
- Comprehension measuring tools
- Calibration of measuring tools
- Veneer style

**Tool Usage and Safety – General examples**

- Hand (non-powered) tools
- Hand (pneumatic) tools
- Floor mounted tools
- Types of tools
- Lifting, rigging tools (overhead crane, chains, pivot points – where you use what
- OSHA
- Presses
- Lasers
- Tool Makers
- Use a laser machine programmed to cut tools
- Tooling
- Power Tools
- Cutting Tools
- Machine Tools
- Related PPE / Safety

**Introduction to Composites**

Basics of Composites – types, benefits, basic strengths, and design
Materials and Material Forms: e.g. resins, carbon fiber, fiberglass; weaves, directional fiber
Overview of Carbon Fiber, resin, and pre-preg manufacturing
Types of Processes: (autoclave, RTM, braiding,...)
Composites uses in various industries
Current and future technologies
Career options
Tours of Industry

**Composite Fabrication**

Hand lay up
Automated manufacturing, including machine tape lay up
Vacuum bagging
Resin infusion
Ovens and autoclaves
Benefits of using different techniques

**Machining**

Industry nomenclature
Types of machining centers
Setups and fixtures
Basic operations: lathes, mills, drills, water jets, etc.
Familiarization: How machine tools work: materials, speeds and feeds, cutters,
Introduction to NC programming

**Assembly**

Tolerances, stack up, interference, lean methods
Determinant assembly (familiarization)
Drilling, reaming, and countersinking in metals, composites and stack ups
Fastener installation
Fastener removal
Sealing
Self inspection

**Certifications ------**

1. Lean
2. Yellow Belt
3. 6 Sigma
4. Machining

Salt Lake Community College

November 14, 2017

To Whom It May Concern:

On behalf of Salt Lake Community College (SLCC), I am excited to recommend the Granite Technical Institute Composites Program for the Advance CTE Excellence in Action Award. Granite School District has taken the work of the Utah Aerospace Pathways (UAP) partnership to a new level in the design and implementation of coursework and a facility at the Granite Technical Institute.

Granite has created a facility for student instruction and preparation for industry employment at the secondary level. SLCC has been an active partner in UAP and has worked with Granite to implement content in current classrooms in the district. In addition, SLCC provides the required postsecondary articulation of training for GSD in the aerospace pathways.

Granite's implementation of a centralized training program at the Granite Technical Institute increases opportunities for students from all high schools in the district and the impact of manufacturing and composites curriculum in secondary schools. A strong training program at the GTI in Granite School District provides a pipeline of students for industry as well as students prepared to enter SLCC manufacturing and composites programs.

SLCC is excited to recommend the Granite Technical Institute in Granite School District for the Advance CTE Excellence in Action Award and looks forward to continuing the partnership with Granite School District in this workforce development effort.

Sincerely,

Rick Bouillon
Associate Provost
Workforce & Economic Development
Salt Lake Community College

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Q. VAL HALE
*Executive Director*

November 14, 2017

To Whom It May Concern:

The Utah Governor's Office of Economic Development (GOED) strongly supports the **Utah Aerospace Pathways (UAP)** and Granite School District's continuing role in training and implementation of these pathways. Granite's efforts make them an excellent candidate for the Advance CTE Excellence in Action Award.

Aerospace manufacturers in Utah are looking for workers with skills and an interest in working in the manufacturing industry. The aerospace industry provides great benefits to their workers and careers with the possibility of advancement. A clear focus for these aerospace companies is the need for composite technicians.

GOED played an integral role in the initial implementation of UAP bringing industry and education together to address the critical workforce need in industry. Granite was one of the initial education partners and has worked closely with GOED to make UAP a success.

GOED continues to support the efforts of UAP implementation and the Granite Technical Institute and is committed to convening the partners needed for continual success and growth of training programs in education. The Advance CTE Excellence in Action Award is well deserved by Granite for their participation in making UAP a vibrant program in the State of Utah.

The Utah Aerospace Pathways program has created momentum in the state that has led to additional pathways in areas of life science, diesel and information technology. In addition, the Governor recently announced an initiative called Talent Ready Utah with 2018 being slated as the year of CTE in the state. Granite has been an active partner in these initiatives. The Utah Governor's Office of Economic Development strongly supports Granite School District in receiving the Advance CTE Excellence in Action Award.

Sincerely,

Kimberlee Carlile, Director of Talent Initiatives
Governor's Office of Economic Development

November 14, 2017

To Whom It May Concern:

This letter is to confirm our ongoing support of **Granite Technical Institute's (GTI)** implementation of the **Utah Aerospace Pathways (UAP)** certification program and to support them in receiving the **Advance CTE Excellence in Action Award**. Granite School District has created a state-of-the-art composites facility that supports creation of a talent pipeline that feeds into several aerospace companies that are a part of the Utah Aerospace Pathways Program. The aerospace companies in this program have committed to continue to provide the support needed to make education in secondary schools relevant to the aerospace industry. We believe continued industry support is critical for the program to maintain a clear alignment of curriculum that builds the skills currently needed in our workforce. Development of a workforce pipeline is critical for all companies participating in the UAP.

Albany Composites, Boeing, Hexcel, Janicki, Orbital ATK and Hill Air Force Base have provided critical expertise in setting up and maintaining the program in the Granite Technical Institute in the following areas:

- Supporting curriculum implementation
- Offering advice on facility design, equipment and tools necessary for curriculum implementation
- Providing suggestions for hands-on projects that can be used as part of the curriculum
- Providing guest speakers and field trips for students, counselors, and instructors to learn more about the aerospace industry
- Providing externship opportunities for high school students

The partners in the Utah Aerospace Pathways program are excited to lead this workforce development effort and to provide continued support for Granite Technical Institute's composites training program. The Advance CTE Excellence in Action Award is well deserved by Granite School District and the other partners of Utah Aerospace Pathways. UAP has not only led to talent for the aerospace industry, but has also become a model for pathways in the State of Utah.

Sincerely,

Kayleen Campbell – Orbital ATK
Utah Aerospace Pathways Industry Program Leader