

A look at current aerospace workforce investments and a comprehensive strategy to meet future industry and workforce needs

Proposed and submitted by:
***Choose Washington NMA Council
Workforce Development Work Group***

Background info

The NMA Choose Washington Council Workforce Development Work Group was formed to:

- **Evaluate the current education and workforce development system supporting career pathways into and within aerospace**
- **Propose strategies and policies to the full Choose Washington NMA Council that:**
 - **“meet the workforce needs of the aerospace industry in a rapidly evolving technological environment”**
 - **“while helping to win NMA work for the state, also serve the larger needs of our workforce and our communities”**

This presentation offers a “snapshot” of current aerospace workforce investments and serves as a summary of 70+ strategy and policy recommendations, within 12 improvement areas, vetted by the Workforce Development Work Group.

It is both a high-level and program-specific look at how Washington can build upon its education and workforce development strengths in support of aerospace and other industries. It is a work in progress as additional feedback is received from the aerospace industry and other stakeholders.

NMA Council Workforce Development Work Group

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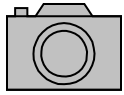
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Snapshot: existing support for aerospace workforce development

COMMUNITY & TECHNICAL COLLEGES and RELATED PROGRAM

22 CTCs state-wide provide aerospace related training in machining, electronics, engineering, material science, aviation/aerospace, composites, design, mechanical, and manufacturing

\$8 million awarded annually by the state to fund 1000 FTEs for high-demand aerospace programs

Washington Aerospace Training & Research (WATR) Center – Since 2010, 1,000 WATR Center graduates of short-term training were hired by Boeing, over 540 grads were hired by 110 other suppliers and over 600 incumbent workers received training

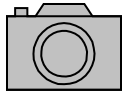
Aerospace Loan Program (WA Student Achievement Council) – Since 2011, 482 applicants funded to receive a low interest loan for short-term training in aerospace

MechaWA Partnership Project – Federally funded in 2016, includes 5 CTCs and 7 industry partners. The MechaWA grant helps CTCs adapt and implement competency-based Mechatronics Associate degrees

Air Washington – A consortium of 11 Washington CTCs received \$20 million in federal funding to strengthen aerospace workforce training; between 2011-2015, 3,806 individuals were trained

Center of Excellence for Aerospace and Advanced Manufacturing (SBCTC) – 1 of 10 centers across the state, it serves as a statewide link between business, industry, labor and education to create a highly skilled and readily available workforce

Aerospace & Advanced Manufacturing Pipeline Committee (SBCTC) – Industry-driven, studies aerospace skills gaps, guides investments in CTC training programs and evaluates programs for completion and job placement rates



Snapshot: existing support for aerospace workforce development

APPRENTICESHIPS, including YOUTH APPRENTICESHIPS

Aerospace Joint Apprenticeship Committee (AJAC) – Between 2012-2017, 954 apprentices were served in 9 aerospace occupations, including a youth apprenticeship occupation. AJAC apprentices earned an estimated \$65 million in wages while in training.

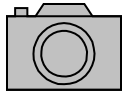
K-12

Core Plus – Core Plus provides a manufacturing and aerospace curriculum developed in partnership with The Boeing Company and the Manufacturing Industry Council. The first 540 hours of instruction relate to general manufacturing; the following 540 hours are specific to aerospace manufacturing. OSPI provided \$495,000 in 2017-18 to support Core Plus classrooms through grants for equipment and professional development.

CTE and Skill Centers – Fundamental manufacturing and aerospace programs are available in the K-12 system via career and technical education programming with instruction in grade levels 7-12. Currently, Core Plus aerospace programs are offered in 38 comprehensive high schools, and 14 regional skill centers. Annual state grants are available for start-up, expansion or maintenance of existing programs in aerospace and manufacturing.

Aerospace Assembler Competitions – SkillsUSA WA offers over 2,500 students the opportunity to participate in Aerospace Assembler Competitions across the state. Strong competitors at the first Skills WA state-level aerospace assemblers competition, hosted this year by Boeing at the 737 plant, were offered jobs at Boeing.

Robotics Competitions – Students in Washington have opportunities to engage in hands-on and mentor-based learning and competition through programs such as Washington *FIRST* Robotics, Mobile Robotics competitions through SkillsUSA, and VEX Robotics competitions through involvement in the Technology Student Association (TSA).



Snapshot: existing support for aerospace workforce development

4-YEAR UNIVERSITIES

The University of Washington, Washington State University, Western Washington University, Central Washington University and Eastern Washington University have numerous degree programs supporting the aerospace industry. They include, among others, engineering, business, accounting, science, advanced materials, aviation and information technology. The Boeing Company has also invested substantially in these institutions via endowments, mentorship programs, facility expansions, curriculum development and other sources of support. Boeing currently employs roughly 7,000 UW alumni, 2,500 WSU alumni and 1,300 WWU alumni (data wasn't provided for other universities). Between 2011-2015, undergraduate degree completions statewide grew by 72% in computer and information sciences and 30% in engineering and related fields.

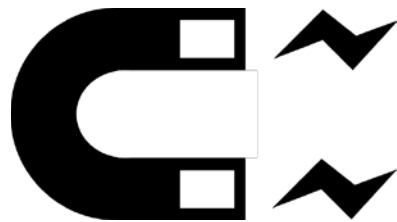
Recent aerospace-related initiatives at state universities include:

Joint Center for Aerospace Technology Innovation – In 2015-2017, JCATI received \$3 million in state funding to support joint industry-university research projects. 30 projects were funded at 4-year universities across the state, 135 students participated, and 12 aerospace companies partnered with JCATI for the first time. It was enacted by the state in 2012.

Boeing Advanced Research Center (UW) – BARC is 3 years old and focuses lab research on automation, robotics, mechanic assist tools and sensors and data analytics. Boeing-employed affiliate instructors work in the lab full-time with faculty and students on joint research projects.

WSU Everett – Since opening in 2014, WSU Everett offers BA degrees in aerospace-related fields that include mechanical engineering, electrical and software engineering, data analytics, and integrated strategic communications. A new 95,000-square foot building, including the company-supported Boeing Design Studio, opened in 2017.

High-level perspective: sources of an industry workforce

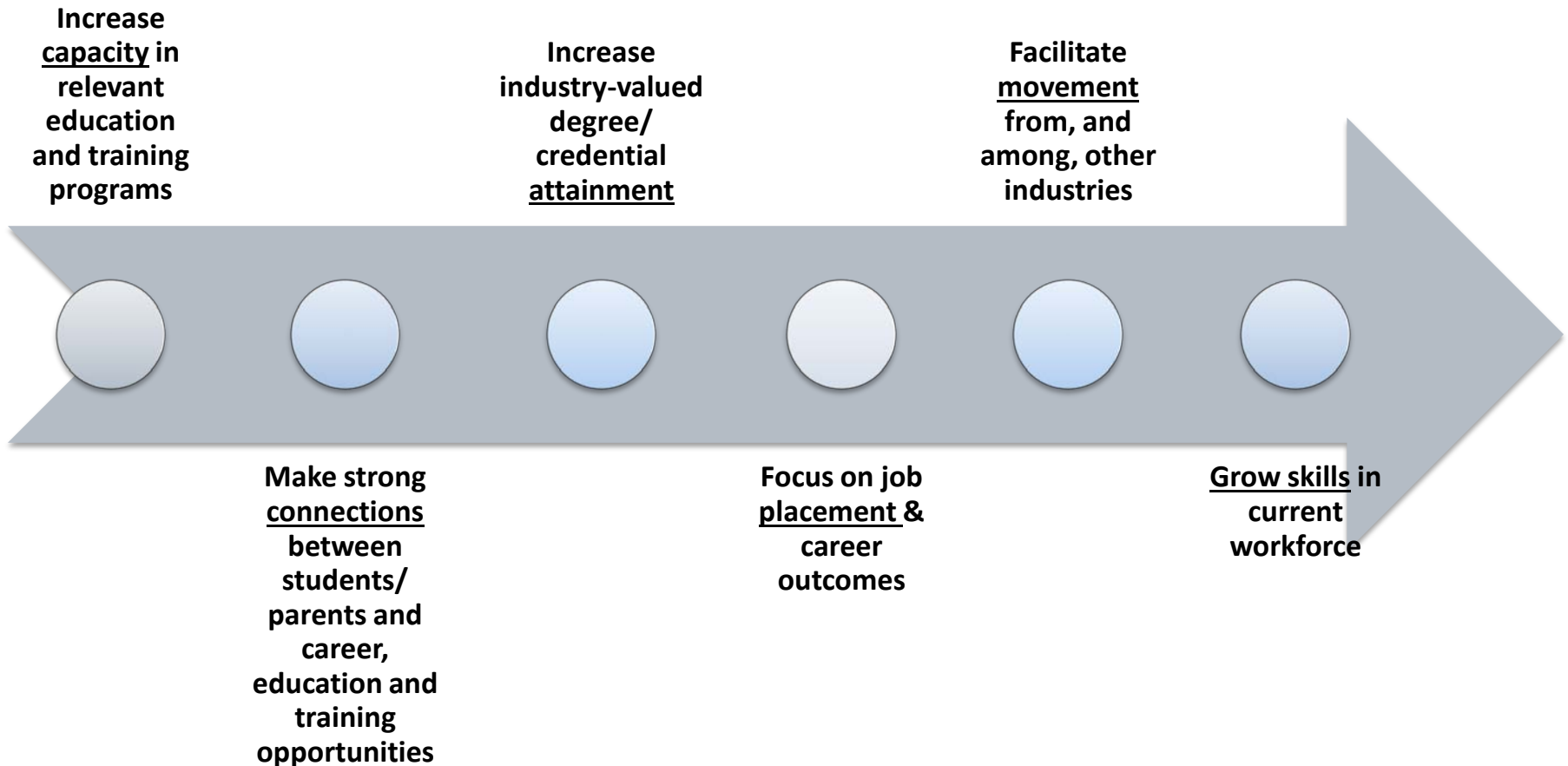


Recruitment from
other industries


Advancement of
incumbent workers

New industry hires

High-level perspective: strengthening the workforce for a growing/changing industry



Specific work group recommendations: increase capacity in relevant education and training programs



- **Expand high-demand degrees**, including engineering, and the facilities to increase high-demand degree production at the state's 4- year universities
- **Expand Community & Technical College programs via enrollment (FTEs) and non-enrollment driven investments** (facilities, professional development, etc.) in new and existing CTC programs supporting the aerospace industry
- **Expand the state's Skill Centers**, providing career and technical education for high school students, **and other aerospace pathways for high school students**

continued:
increasing capacity

- Grow Core Plus (*K-12/industry partnership*)**: increase allocation for manufacturing equipment and professional development grants for Core Plus instructors and fund dedicated OSPI staff (1 FTE) to serve as aerospace lead
- Support the efforts of the Governor's *Career Connect Washington Initiative***, a public-private initiative to expand entry into state-registered apprenticeships and other career-connected learning for high school students and young adults

continued: increasing capacity

- **Reauthorize and possibly expand the scope of the Joint Center for Aerospace Technology Innovation (JCATI)**, providing state university grants for students to research and develop technologies in direct partnership with aerospace companies
- **Expand research capabilities in aerospace** via programs like the Boeing Advanced Research Center (UW), the envisioned Washington Center for Advanced Manufacturing Innovation (WSU) and others
- **Ease movement from industry into education** for potential instructors

Specific work group
recommendations:
strengthening
student/parent
connections to career
training and education

- **Fund the ‘Awareness Campaign for Career and Technical Education’** to promote CTE among parents, teachers, counselors, school administration and the public (RCW 28A.700.080)
- **Expand *Washington MESA*** (Math, Engineering, Science Achievement), focused on building diversity, inclusion and retention in STEM fields via outreach to the K-12 and CTC system in partnership with universities
- **Expand organized visits by K-12 students to CTC campuses and support continued CTC outreach to K-12 schools**
- **Encourage cooperative learning and industry involvement in the classroom** (like the Microsoft TEALS and Aerospace Core Plus programs at the K-12 level)

continued:
**strengthening
connections**

- **Support current university outreach to the K-12 system** via university student clubs, engineering ambassador programs and engineering days on university campuses
- **Expand access to aerospace assembler competitions through SkillsUSA**, by supporting increased resources to Career and Technical Student Organizations.
- **Ensure K-12 credit requirements and professional development resources provided to teachers include career readiness skills**
- **Support *Career Connect Washington*** recommendations that facilitate the development and expansion of career-connected learning in aerospace (*see slide 10*)

Specific work group
recommendations:
increase industry-
valued
degree/credential
attainment

- **Enhance dual credits, articulation agreements and credit transferability** (between K-12, CTCs and 4-year universities) where they serve a purpose in advancing a student's career outcomes
- **Per above, develop a statewide articulation agreement to recognize aerospace-related Core Plus credits** toward CTC completion from aerospace-related programs
- **Work with industry to reinforce degree and credential completion** for students hired into industry from aerospace-related training programs prior to completion
- **Increase engagement with industry to affirm the value of specific curriculum and credentials**

continued:
increase
degree/credential
attainment

- **Include aerospace/advanced manufacturing as qualifying field to receive *Washington State Opportunity Scholarships***, a public-private partnership program to help students from low- and middle-income households attain degrees and technical training in high-demand fields
- Streamline discretionary Workforce Innovation and Opportunity Act (WIOA) funding, or provide another funding source, to **allow for childcare, transportation and other “wrap-around” support** while in training
- **Increase capacity in education and training programs** (*see slides 9-11*)
- **Build awareness of and “connections” to career training and education opportunities** (*see slides 12-13*)

Specific work group recommendations: focus on job placement and career outcomes

- **Grow state-supported paid internships in partnership with industry groups** – possible platforms include JCATI at the university level and the paid internship model included in the MechaWA grant for CTCs
- **Support *Career Connect Washington*** efforts that foster employment relationships via career-connected learning (*see slide 10*)
- **Develop greater recognition of the Core Plus certificate among aerospace suppliers** to increase direct/preferential hiring from the program
- **Dedicate effort and investment in greater tracking and analysis of education to workforce outcomes from aerospace-related programs** – to serve as a model that will better inform students, workers, industry, education/training providers and policymakers across industries

Specific work group recommendations: facilitate movement between industries

- Via multi-stakeholder approach, **invest in studying and better understanding the movement of workers among aerospace and other high-growth sectors**, with particular attention to portable skills and credentials obtained by workers and valued by industry
- Improve tracking and analysis of education to workforce outcomes**, to better understand where skills currently are in the workforce (*see slide 16*)
- Enhance industry-valued degree and credential attainment** (*see slide 14-15*)

Specific work group recommendations: grow skills in current workforce

- **Work with industry to reinforce degree and credential completion** for incumbent workers (*see slide 14*)
- **Expand on-the-job training programs for incumbent workers**, including existing models provided by CTCs and apprenticeship programs, as well as utilizing university professional certificate and degree programs for career development

Background info:

IMPROVEMENT AREAS CONSIDERED BY THE NMA COUNCIL WORKFORCE DEVELOPMENT WORK GROUP

- #1: Expanding interest and experience in aerospace and advanced manufacturing at the K-12 level**
- #2: Building and sustaining capacity in post-secondary education and training and K-12 career and technical education that successfully supports aerospace employers and workers**
- #3: Creating interest and actively connecting prospective students (K-12, unemployed, underemployed/incumbent) to available training/education programs that successfully support aerospace employers and workers**
- #4: Providing greater opportunities for on-the-job learning in aerospace training and education programs**
- #5: Facilitating successful connections between qualified, available workers (new and incumbent) and open aerospace job opportunities**
- #6: Growing diversity and equity within aerospace and advanced manufacturing**
- #7: Improving outcome data and education to workforce tracking and analysis within aerospace and related industries and occupations**
- #8: Greater coordination of programs, agencies and providers of aerospace-related training and education**
- #9: Increasing degree and credential attainment (e.g. articulation agreements, dual credit programs, work experience) from effective aerospace-related training and education programs**
- #10: Identifying skills and credentials that can move among other industries and the aerospace industry**
- #11: Developing strategies that proactively address innovation changes in aerospace**
- #12: Addressing barriers to entry into aerospace training, including necessary wrap around services (e.g. childcare, transportation)**

Next steps:

- get more industry and stakeholder input
- work with partner organizations developing similar recommendations
- identify budget, legislative, coalition-building and/or administrative needs

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