

ACCELERATING UTAH'S

AEROSPACE
& DEFENSE
INDUSTRY



Utah Cluster Acceleration Partnership Spring 2010



Accelerating Utah's Aerospace and Defense Industry



These strategies are designed to accelerate the growth of Utah's Aerospace and Defense Industry.

About this Report



This report presents specific strategies designed to accelerate the growth and expansion of Utah's Aerospace and Defense Industry. These strategies are the work product of a number of dedicated leaders from within Utah's Aerospace and Defense Industry as well as community, academic and business leaders who have directly participated in this project. Each of these participants has contributed his or her time, expertise, and in-sight to this collaborative effort that sets the direction for the expansion and acceleration of this vital industry in Utah.

This Cluster Acceleration Partnership has been authorized and sponsored by the Utah System of Higher Education, the Utah Department of Work Force Services, the Utah Governor's Office of Economic Development, and Weber State University who has led the project and served as the primary convener.

The project team from Grow Utah Ventures, who served as strategic economic and acceleration advisors on the project, has directed this effort.

For more information on this and other Cluster Acceleration Partnerships, please contact Grow Utah Ventures.





A comprehensive strategy to enhance workforce talent, expand and recruit companies, and provide industry leadership and advocacy.

Executive Summary



The Aerospace and Defense Cluster Acceleration Partnership is committed to sustain and grow one of the most critical industry clusters to the state of Utah. Through the work summarized in this report we have assessed the strategic importance of the cluster and agreed to a high level plan of action that can guide our collective efforts both in the short and long term. Our major conclusions include the following:

- The aerospace and defense cluster employs over 42,000 Utah workers, generating \$5.4 billion annually in revenue within the state.
- Utah has deep strengths and opportunities in maintenance, repair, and overhaul (MRO); Unmanned Aircraft Systems (UASs); and space propulsion systems.
- Significant growth opportunities exist in new MRO contracts, UASs, new NASA mission capabilities, and battlefield management systems.

As a result of these findings, the Utah Cluster Acceleration Partnership recommends a comprehensive strategy that includes enhancing the state's workforce talent, and applied and basic research capabilities. Furthermore, efforts to expand existing companies and to specifically target outside firms for recruitment will be essential to growth. Finally, to carry out this strategy, and to provide ongoing leadership and advocacy for the cluster, an industry coalition should be created.

Letter of Conveyance

As members of Utah's Cluster Acceleration Strategy Steering Committee, we express our support for the recommended actions and strategies that are outlined in this report.

Utah's Aerospace and Defense Industry employs over 42,000 workers statewide and has combined revenues of \$5.4 billion generated within the state. Our ranks are filled not only by notable major corporations that have had a longstanding operational history in Utah, but also by the numerous small and mid-sized business suppliers and subcontractors that have achieved their success by increasingly meeting the needs of an expanding base of aerospace and defense customers. We collectively represent the bright talent that pursue careers in our industry, the businesses that create innovative technologies and solutions to our industry's most pressing challenges, and our large corporate and defense institutions whose significant investment forms the important aerospace and defense infrastructure in our state.

We are proud of our legacy in Utah and the contribution our industry has made to Utah's economy in the past. However, we are even more compelled by a future of continual expansion, increased job opportunities, and the economic impetus that will drive Utah's economy in the future. We feel strongly that the acceleration strategies included in this report will lead to these results.

The partnerships between our industry, academia, and the public sector are vital to our future success. We express our appreciation to those leaders who have demonstrated the foresight to undertake this initiative and to their continued commitment to support these efforts. We stand ready as industry representatives to continue to fully engage with these leaders on the issues that matter most to a coordinated and cooperative industry sector.

Finally we are confident that our combined efforts will yield the individual, corporate and statewide results that will be of great benefit to all as we accelerate the expansion of Utah's Aerospace and Defense Industry.

Members of the Acceleration Strategy Steering Committee

Weber State University Convening Institution

Special recognition and appreciation to Weber State University for serving as the convening and host institution for this project.

Aerospace and Defense Industry

Kori Ann Edwards-Logistics Specialties, Inc.
Julianne Grant-L-3 Communications
Rick Hartle-Boeing

Steve Moore-Barnes Aerospace
David Riemer-ATK

Mark Johnson-Hill Air Force Base

Public Sector

Gary Harter-Governor's Office of Economic Development

Steve Avery-Utah Department of Workforce Services

Education

Dr. Jack Brittain-University of Utah

Jim Marshall-Space Dynamics Laboratory

Cameron Martin-Utah System of Higher Education

President F. Ann Millner-Weber State University

Curt Roberts-Weber State University and USTAR

Economic Development

Jeff Edwards-Economic Development Corporation of Utah

Kent Sulser-Davis County Economic Development

Project Consultants

T. Craig Bott-Grow Utah Ventures

Christian Volmar-Grow Utah Ventures

Strategy Review Committee

The following leaders provided critical insight to the finalization and refinement of the Aerospace and Defense Acceleration Strategies and the detailed action items that are part of the implementation.

Aerospace and Defense Industry

Brad Angus-Setpoint Systems, Inc.

Lori Belnap-Northrop Grumman

Kori Ann Edwards-Logistics Specialties, Inc.

Mary Ann Flinders-L-3 Communications

Julianne Grant-L-3 Communications

Rick Hartle-Boeing

Mark Johnson-Hill Air Force Base

Ried Leland-Leanwerks

Steve Moore-Barnes Aerospace

Steve Parton - Lockheed Martin

David Riemer-ATK

Public Sector

Gary Harter-Governor's Office of Economic Development

Steve Avery-Utah Department of Workforce Services

Education

Dr. Jack Brittain-University of Utah

Rose Defa-Miller Business Resource Center

Lewis Gale-Weber State University

Warren Hill-Weber State University

President Mathew Holland-Utah Valley University

Michael Jacobsen-Weber County School District

Cameron Martin-Utah System of Higher Education

JoAnn Matern-Davis Applied Technology College

Collette Mercier-Ogden-Weber Applied Technology College

President F. Ann Millner-Weber State University

Val Peterson-Utah Valley University

Curt Roberts-Weber State University and USTAR

Jim Taggart-Ogden-Weber Applied Technology College

Daryl Thompson-Salt Lake Community College Composites

Ned Weinschenker-Utah State University Technology Commercialization Office

Noel Zabriskie-Ogden City School District

Dr. Kyle Wagner-Salt Lake Community College

Economic Development

Tom Christopoulos-Ogden Community and Economic Development

Jeff Edwards-Economic Development Corporation of Utah

David Hardman-Ogden-Weber Chamber of Commerce

Paul Larsen-Brigham City Economic Development

Kent Sulser-Davis County Economic Development



Utah's Aerospace and defense industry today has dramatically shifted from its historically stable base.

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Introduction



The Utah Cluster Acceleration Partnership (UCAP) is an initiative focused on increasing the economic impact of Utah's critical industry clusters and the contribution made by the various institutions of higher education that support the economic clusters with training and unique forms of research.

Utah's higher education institutions are strong drivers of economic development in the communities they serve. They do this primarily by educating a well-qualified workforce for local employment. However, the entire system of higher education strives to do more to drive economic development. This UCAP initiative reflects the commitment to do more in driving the expansion of Utah's economic base.

SPONSORING PARTNERS

Key sponsors of the UCAP initiatives include the Utah Department of Workforce Services, the Utah System of Higher Education and its member institutions, the Governor's Office of Economic Development, and critical private employers in high priority industry clusters across our state.

For the Aerospace and Defense Cluster, Weber State University has served as the project lead and host convener.

PROJECT SCOPE

An economic cluster acceleration strategy must address the wide range of facets that contribute to the rapid expansion of an industry. In this project, attention has been given to many of these facets. However, primary focus has been placed on two significant elements:

Talent and Workforce Development—determining what skill sets the industry cluster needs to drive expansion.

Innovations and new Technologies—idea/technology development and advancements that are essential for future cluster expansion.

In order to achieve these general purposes, the UCAP initiatives have been organized into two specific phases of effort.

Phase I—Cluster Assessment

The first phase has focused on conducting a strategic assessment of the cluster to determine the overall value, economic status, growth potential, and competitive positioning of the cluster.

Phase II—Acceleration Strategies

The second phase has focused on developing acceleration strategies with specific emphasis on strategies for developing talent and ideas that both support and further drive expansion of the cluster.

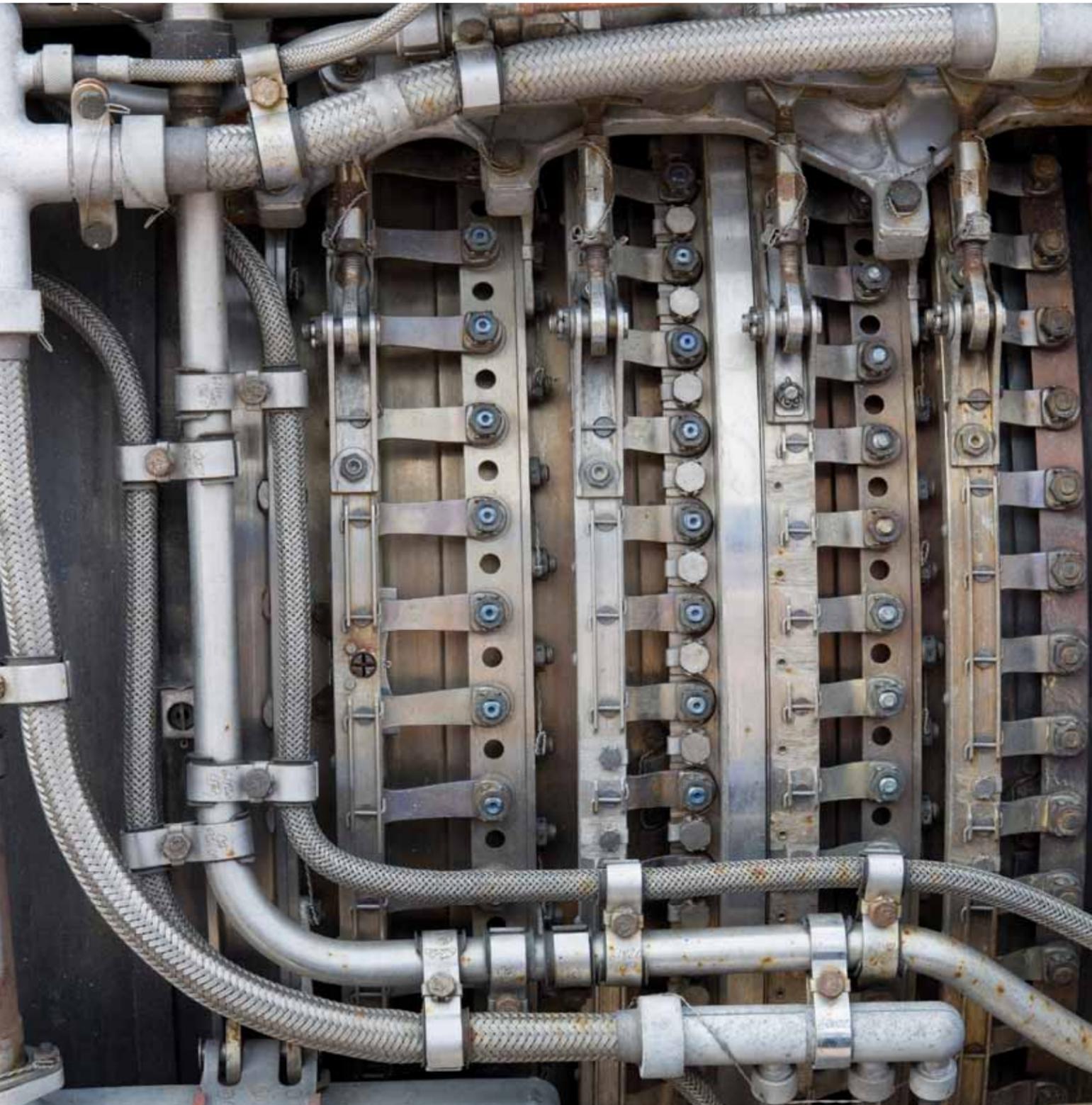
PROJECT LEADERSHIP

The UCAP initiatives are under the direction of an oversight committee consisting of the Executive Director of the Utah Department of Workforce Services, the Executive Director of the Governor's Office of Economic Development, and the Commissioner for the Utah System of Higher Education.

In addition, a steering committee has been organized by Weber State University comprised of industry leaders representing various businesses and defense installations across the state as well as certain key public and higher education leaders.

Grow Utah Ventures has provided project leadership in strategic economic and acceleration consultation.

Cluster Acceleration Strategies



The headlines report a mixed story. On a given day the news is about new aerospace and defense companies relocating jobs and business operations to Utah. On another day, headlines declare the somber message of contracts lost, funding restricted, and businesses cutting jobs.

Always a significant segment of Utah's overall economy, this once stable sector that could be counted on year in and year out for its solid contribution to Utah jobs and wages, is now in flux. The Utah aerospace and defense industry of today has dramatically shifted from its historical roots that defined it as stable, constant, and always to be counted on industry, to a segment that is now affected by national and global markets, changing government priorities, widely fluctuating military and space budgets, and the overall economic turmoil that characterizes today's U.S. economy.

With a commitment to collectively consider what can be done, this UCAP Initiative was begun to layout a strategy for accelerating the growth of the industry and in particular to determine how to provide the manpower, and the research-based technologies required to meet industry needs. The overall goals of the project are to:

Accelerate and Drive Economic Growth—Accelerate the growth of Utah's Aerospace and Defense industry to provide employment and career opportunities in the future and expand the State's economy overall.

Create a Talent Development Strategy—Define specifically the workforce and talent base needed to expand and grow the industry. This includes developing a sufficient, qualified talent base essential to attracting significant businesses to the state, expanding the state's current industry employers, and creating new entrepreneur led businesses.

Develop an Idea Generation Strategy—Provide direction to an overall strategy for academic research in areas that will contribute to the growth and expansion of this cluster by discovering and advancing new research based ideas and technologies as well

as finding new applications of research and technology pertinent and beneficial to the industry.

Enhance Alignment—Enhance the alignment and coordination of higher education, industry, and work force training. The objective will be to improve the relevant training and education services that directly contribute to a qualified workforce. This workforce should be capable of contributing to the acceleration of the aerospace and defense cluster.

For this project, Weber State University, serving as the project convener, invited a group of industry leaders representing the various segments of Utah's Aerospace and Defense Industry to form a Cluster Acceleration Partnership Steering Committee. These leaders, along with representatives from higher education and the public sector participated in a series of facilitated strategy work sessions. Each work session was designed to identify the strategic drivers that influence the expansion of this cluster and to determine actionable strategies that could be implemented to accelerate the growth of the industry.

Specific research and industry analysis was conducted to further assess unique elements of the industry and to determine the specific skill sets the industry will require in its future employees. While this research led to the refinement of specific strategies, it is not meant to be a comprehensive economic study of the industry. Instead, the collective expertise, years of experience, and in-depth understanding of the industry by the Steering Committee members served as the major source of insight and influence in shaping the final acceleration strategies.

The following describes in detail the recommended Aerospace and Defense Cluster Acceleration Strategy.

Supporting details and charts are included in the latter sections of this report (See illustration 1—Utah’s Aerospace and Defense Cluster Acceleration Strategy).

GROWTH OPPORTUNITIES

Three achievable horizons for cluster growth are defined, each reflecting an increasing level of opportunity with a corresponding increase in risk.

Sustain the Core—This category represents the specific industry opportunities that are essential to sustaining the core of Utah’s current aerospace industry.

Drive Growth Accelerators—This category represents the most important short term opportunities which have the potential to expand the overall growth of the cluster.

Explore Future Opportunities—This category represents the future opportunities in the longer term in which Utah has a strong likelihood of succeeding. The successful capture and development of these opportunities will further drive the expansion of the cluster. The specific acceleration opportunities associated with each of the growth opportunities are described in the following:

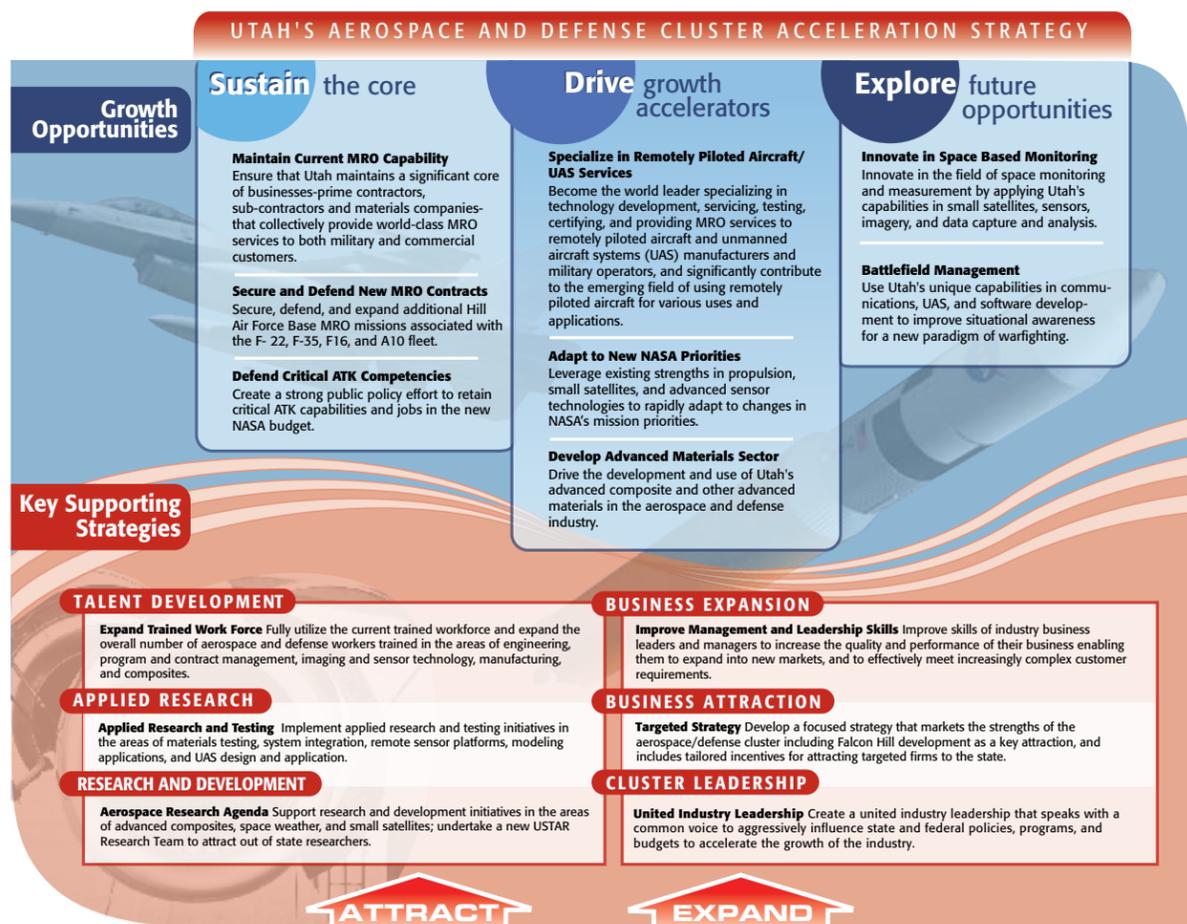
Sustain the Core

Maintain Current MRO Capability

Ensure that Utah maintains a significant core of businesses, prime contractors, subcontractors, and materials companies that collectively provide world-class MRO services to both military and commercial customers.

Secure and Defend New MRO Contracts

Secure, defend, and expand additional Hill Air Force Base MRO missions associated with the F-22, F-35, F-16, and A-10 fleet.



Defend Critical ATK Competencies

Create a strong public policy effort to retain critical ATK capabilities and jobs in the new NASA budget.

Drive Growth Accelerators

Specialize in Remotely Piloted Aircraft/UAS Services

Become the world leader specializing in technology development, servicing, testing, certifying, and providing MRO services to remotely piloted aircraft and unmanned aircraft systems (UAS) manufacturers and military operators; and significantly contribute to the emerging field of using remotely piloted aircraft for various uses and applications.

Adapt to New NASA Priorities

Leverage existing strengths in propulsion, small satellites, and advanced sensor technologies to rapidly adapt to changes in NASA's mission priorities.

Develop Advanced Materials Sector

Drive the development and use of Utah’s advanced composite and other advanced materials in the aerospace and defense industry.

Explore Future Opportunities

Innovate in Space Based Monitoring

Innovate in the field of space monitoring and measurement by applying Utah’s capabilities in small satellites, sensors, imagery, and data capture and analysis.

Battlefield Management

Use Utah’s unique capabilities in communications, UAS, and software development to improve situational awareness for a new paradigm of war fighting.

KEY SUPPORTING STRATEGIES

Underlying the pursuit of each of these opportunities is a set of supportive strategies that are fundamental to the success of the entire acceleration strategy. Each of these supportive strategies is described in the following:

Talent Development

Expand Trained Work Force

Fully utilize the existing workforce and expand the overall number of aerospace and defense workers trained in the areas of engineering, program and contract management, imaging and sensor technology, manufacturing, and composites.

Applied Research

Applied Research and Testing

Implement applied research and testing initiatives in the areas of materials testing, system integration, remote sensor platforms, modeling applications, and UAS design and application.

Research and Development

Aerospace Research Agenda

Support research and development initiatives in the areas of advanced composites, space weather, and small satellites; undertake a new USTAR Research Team to attract out of state researchers.

Business Expansion

Improve Management and Leadership Skills

Improve skills of industry business leaders and managers to increase the quality and performance of their businesses enabling them to expand into new markets and to effectively meet increasingly complex customer requirements.

Business Attraction

Targeted Strategy

Develop a focused strategy that markets the strengths of the aerospace/defense cluster including the Falcon Hill development as a key attraction and includes a tailored incentives package for attracting targeted new firms to the state.

Cluster Leadership

United Industry Leadership

Create a united industry leadership that speaks with a common voice to aggressively influence state and federal policies, programs, and budgets to accelerate the growth of the industry.

CLUSTER DEVELOPMENT

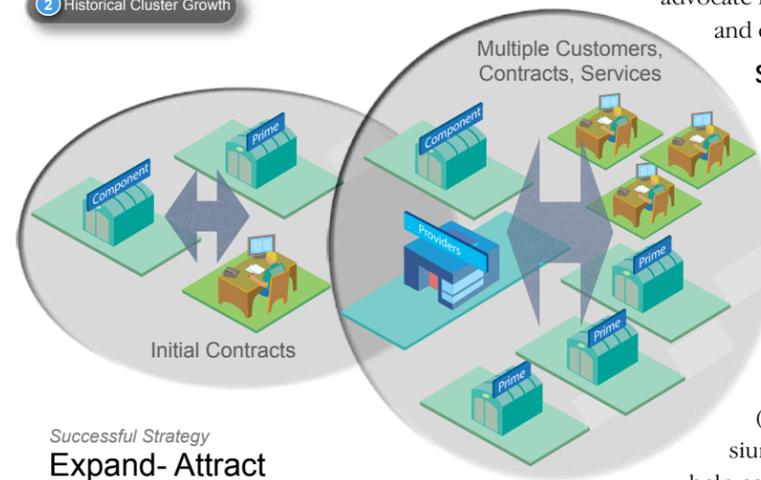
The development of any economic cluster comes down to three specific areas of emphasis:

Create—Grow the cluster by creating new, innovative businesses that can achieve success in a relatively short time frame.

Expand—Encourage and facilitate the expansion of current businesses by increasing their capacity to service a broader segment of the industry.

Attract—Undertake aggressive outreach efforts to

2 Historical Cluster Growth



Successful Strategy Expand- Attract

relocate within the state successful businesses that are currently located elsewhere.

Historically, Utah's Aerospace and Defense industry has grown primarily through business expansion as existing businesses have increased the number of contracts and customers they have been able to serve. (See illustration 2—Historical Cluster Growth)

After careful consideration of each of these development strategies, we feel that Utah's Aerospace and Defense industry will best be developed by emphasizing the following two main strategies:

Expand Utah's Aerospace Businesses

Increase the capability of existing Utah companies to effectively meet increasingly complex customer requirements and offer a wider array of services and products.

Attract Aerospace/ Defense Companies to Utah

Attract to the state key divisions of prime aerospace and defense contractors, UAS manufacturers, and suppliers, suppliers to the MRO value chain, and emerging space monitoring companies.

SHORT-TERM ACTIONS

The success of the Cluster Acceleration Strategy hinges on accomplishing both short-term and continued actions. The following describe the specific actions that are recommended in each of these sections.

Sustain the Core

Strategic Support for Hill Air Force Base

Collaborate with the Utah Defense Alliance to

advocate for and promote the continuation and expansion of the HAFB mission.

Secure Space Funding

Secure a continuation of the NASA exploration mission.

Drive for Growth

UAS Topical Expertise

Work with L-3 to increase Utah's participation with the Rocky Mountain Chapter of the Association of Unmanned Vehicle Systems International (AUVSI). Explore additional symposiums, conferences, and events that help establish Utah's emerging expertise in UAS platforms, systems, and support.

Explore the Future

Obtain New Funding

Obtain federal funding for environmental monitoring and climate change research that can be performed in Utah.

Talent Development

Aerospace and Defense Career Pathways

Provide students with clearly identified Aerospace and Defense Career Pathways in the following fields:

- Aerospace and Defense Contract Management
- Manufacturing Engineering Technology
- Material Science Engineer Logistics/ Supply Chain Management
- Business Administration
- Computer Science/Software Engineering
- Electronics Engineering
- Mechanical Engineering

(See Appendix—Career Pathways- Utah Aerospace and Defense Cluster)

Meet Immediate Technical Hiring Needs

Meet the immediate workforce needs of HAFB to satisfy current contracts by encouraging second and third year students at Weber State University and other institutions to pursue a tailored physics/computer science major.

Develop Stronger Industry Management Talent

Implement an aerospace emphasis in MBA degrees with a focus on specific competencies required for leadership in the aerospace industry.

Establish Training for Aerospace/Defense Program Manager

Establish a new Aerospace/Defense Program Manager curriculum at Weber State University and other institutions that provides the multi faceted skills required of today's program managers to lead teams, define and correlate requirements, and manage programs over their full life cycle.

Increase Regional Engineering Education Capacity

Increase regional engineering education capabilities to better serve the specific needs of the aerospace and defense industry. Specific educational emphases should include electronics engineering, software engineering, and composite structural engineering.

Re-Train and Re-Engage Existing Work Force

Implement effective outreach, retraining, and re-engaging initiatives that are targeted at the industry-trained workforce recently laid-off.

Market and Promote Job Opportunities

Aggressively market and promote industry job opportunities.

Business Management Training

Provide management training programs that improve the skills of industry business leaders and managers to increase the quality and performance of their business enabling them to expand into new markets, and to effectively meet increasingly complex customer requirements.

Industry Leadership

Organize an Industry Association

Organize an association for Utah's Aerospace and Defense Industry that will create a forum for dialogue and communication. This association will enable clear communication of needs and requirements by the industry to academic and public sector support entities.

Advanced and Applied Research and Testing Aerospace Research Forum

Formally create an industry forum where all Utah research related to the industry can be shared and research needs and interests communicated to the state's tier 1 research universities.

Aerospace Directed Research

Engage the UCAP Committee and the various universities to undertake a more coordinated and emphasized

research strategy that combines the input from both industry and higher education to specifically address the unique requirements of this cluster.

Industry Research Incentives

Incentivize Utah researchers in related fields.

Utilization of Unique Assets

Falcon Hill and East Gate Development

Collaborate with the Military Installation Development Authority (MIDA) and the City of Layton to ensure optimal development and utilization of Falcon Hill and the East Gate development.

Expand and Attract

Industry Incentive Package

Create a business re-location incentive package tailored to meet the needs of targeted Aerospace companies considering locating in Utah.

Targeted Campaign

Initiate a campaign to attract aerospace and defense related companies that fit into Utah's value chain with specific emphasis on MRO, and the emerging field of using UAS vehicles for military and commercial cargo hauling, and remote monitoring.

Vendor Data Base

Create a database to identify businesses in Utah's aerospace and defense supply chain that promotes interaction and new business opportunities.

Expand Contracts

Continue to assist small and new manufacturers to obtain source approval to secure new contracts in the market and retain more HAFB workload in the state.

IMPLEMENTATION RESPONSIBILITIES

The responsibility for implementing the recommendations that are a part of this strategy are assigned to the following agencies: the Aerospace and Defense Industry Association (Industry), Utah System of Higher Education (USHE), Department of Work Force Services (DWS), the Governor's Office of Economic Development (GOED), the Utah Science Technology and Research initiative (USTAR), and other implementation agents (Other). (See Appendix—Cluster Strategy Implementation Responsibilities)

Utah's Aerospace and Defense Cluster Today



This section presents a current overview of Utah's Aerospace and Defense industry, its value chain, where future opportunities lie, and the overall jobs and revenue impact by the industry on the state.

Strategic insights of the key factors that are affecting the growth and expansion of the industry are also included.

CURRENT VALUE CHAIN

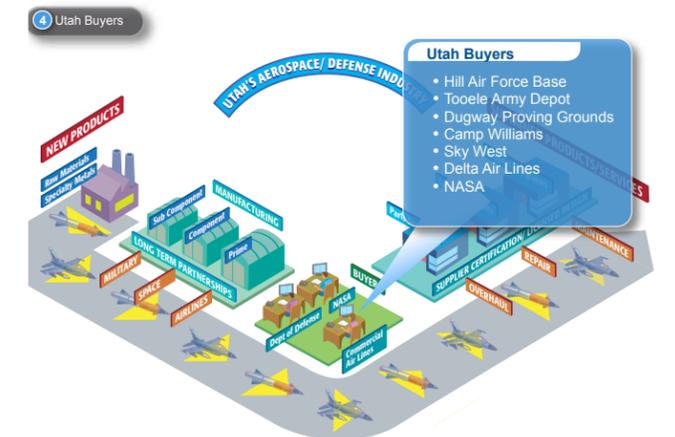
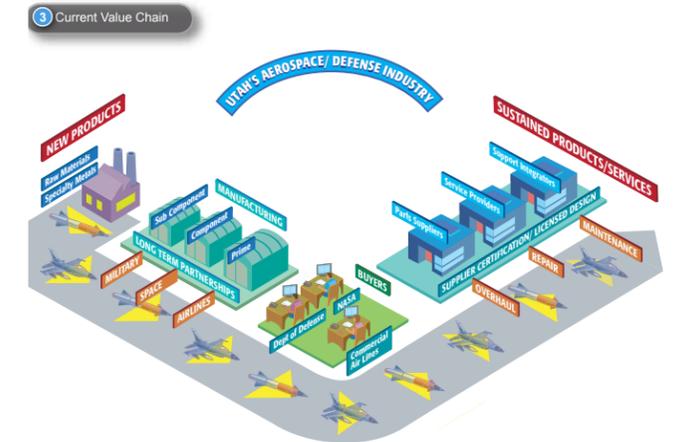
Utah's Aerospace and Defense Industry can best be defined by considering the value chain—the cycle of where value is created and added in the course of supplying the industry.

The following illustration highlights the value chain for Utah's Aerospace and Defense Industry. (See Illustration 3—Current Value Chain)

Buyers—The industry in Utah is driven by a set of buyers that formulate product and services requirements and that purchase solutions to these requirements. In Utah these buyers include the various governmental agencies representing the Department of Defense and NASA. Also included are the commercial airlines. All of these begin the value chain by requesting components and products that comprise the work of the industry. (See Illustration 4—Utah Buyers)

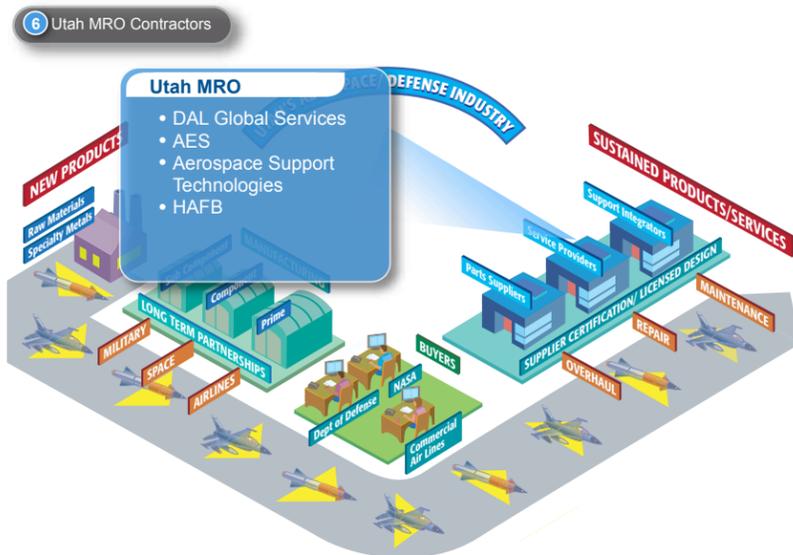
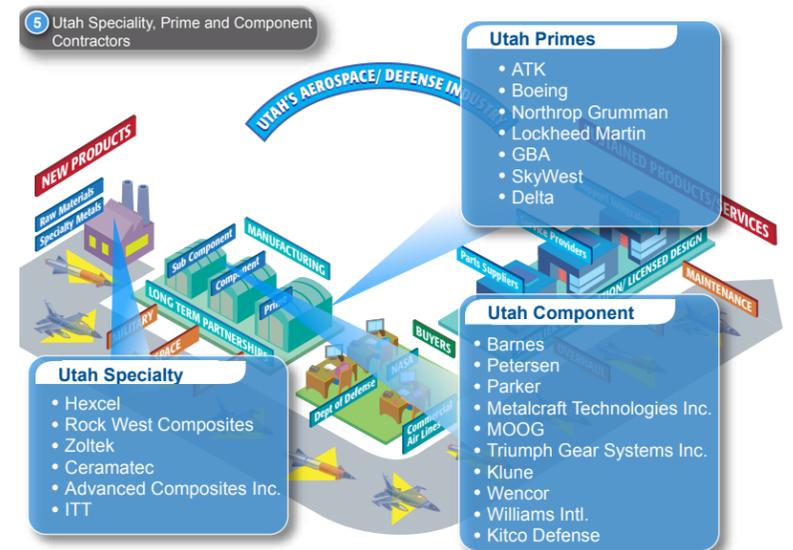
New Products-Materials—The value chain for buyers often begins with requirements for the development of new products and specialized raw materials which are supplied by many Utah companies that produce composite and specialty materials used in the industry. A representative listing of new material providers in Utah is illustrated. (See Illustration 5—Utah Specialty, Prime and Component Contractors)

Component and Sub-component Manufacturers—The industry is managed through long-term contracts, which are formed between key buyers and major prime contractors, many of whom are



represented in Utah. These contractors establish sub-contracts with both component and sub-component companies that provide a wide range of products and services that are included in the final products. These companies range from those conducting advanced research, systems integration and software programming to machining and welding. (See Illustration 5—Utah Specialty, Prime and Component Contractors)

MRO—The ongoing maintenance, repair and overhaul of the aircraft and missile fleet and support systems are provided by a set of separate companies as well as Hill Air Force Base itself. These organizations provide the needed parts, services, and support integration necessary to not only maintain, but also to upgrade the fleet with the latest materials and electronics needed to extend the useful life of the aircraft. (See Illustration 6—Utah MRO Contractors)



Cluster Support Providers—This general category consists of companies that provide necessary services and support to cluster businesses by providing trained staff and temporary workers as well as other key supplies and services.

ECONOMIC VALUE OF THE CLUSTER

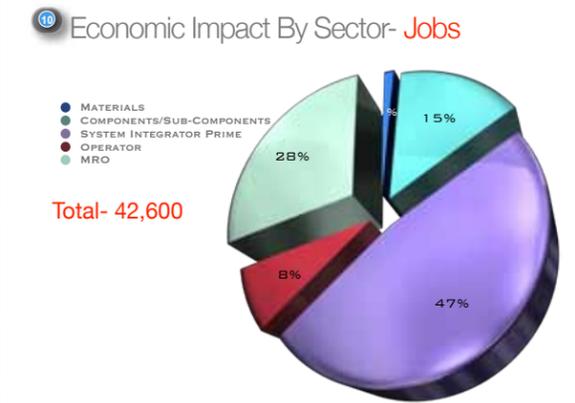
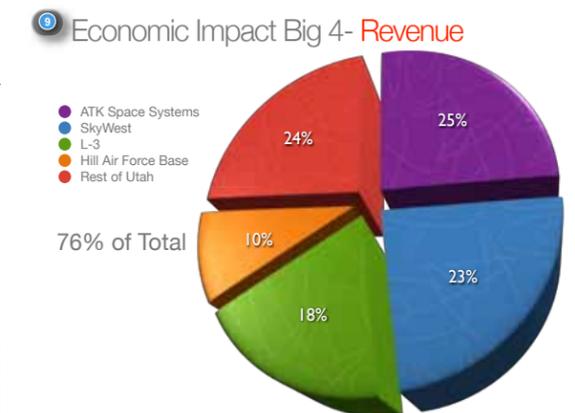
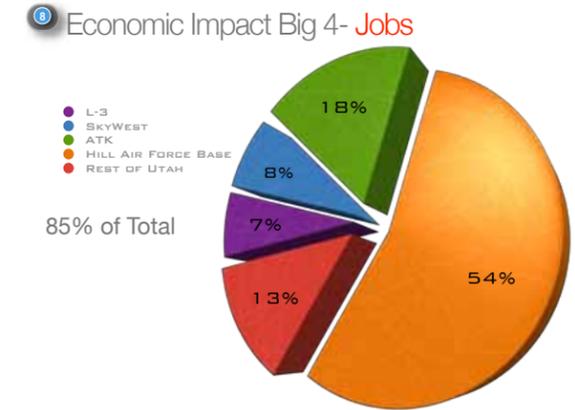
Utah's Aerospace and Defense Industry has combined annual revenue generated within the state of Utah of \$5.35 billion and employs some 42,600 workers. (See Illustration 7—Current Economic Impact)

Four major employers, (ATK, SkyWest, L-3 Communications and Hill Air Force Base), dominate Utah's cluster. These four comprise 85 percent of the total jobs and 76 percent of the total revenue. (See Illustration 8—Big 4 Jobs and Illustration 9—Big 4 Revenue)

The majority of jobs are with System Integrator prime contractors. The second major category is MRO. (See Illustration 10—Economic Impact: Jobs by Sector)

Illustration 7—Current Economic Impact

Materials	Employees	Revenues
Hexcel	250	\$70,000,000
EDO Fiber Science	150	\$25,000,000
Advanced Composites Inc.	35	\$2,500,000
Rocky Mountain Composites, Inc.	60	\$2,000,000
Contour Composites	20	\$1,300,000
Total	515	\$100,800,000
Components/Sub-Components	Employees	Revenues
L-3 Communications Corp.	3,000	\$950,000,000
IBT AeroTech	375	\$140,000,000
Parker Hannifin Corp. SLC Ops	750	\$135,000,000
Klune Industries, Inc.	175	\$75,000,000
Moog Aircraft-Salt Lake City Operations	325	\$60,000,000
Petersen	325	\$60,000,000
Space Dynamics Lab	300	\$54,000,000
Barnes Aerospace, Ogden Div.	180	\$54,000,000
Williams International	175	\$52,500,000
Triumph Gear Systems, Inc.	197	\$50,000,000
Wencor/Kitco	150	\$40,000,000
Metalcraft Technologies, Inc.	175	\$17,000,000
Ram Co.	133	\$12,000,000
Parvus Corp.	65	\$10,000,000
ACT Aerospace	52	\$5,600,000
Emerald Precision Casting Co	60	\$5,000,000
Procerus	15	\$1,500,000
RCS Rocket Motor Components, Inc.	13	\$1,500,000
Aircraft Power Systems	3	\$1,000,000
Aviation Materials Management, Inc.	3	\$640,000
Total	6,471	\$1,724,740,000
System Integrator/Prime	Employees	Revenues
ATK Space Systems	7,500	\$1,320,000,000
Boeing	750	\$290,000,000
Hill Air Force Base	11,500	\$250,000,000
Northrop Grumman	325	\$95,000,000
Lockheed Martin	175	\$52,000,000
Total	20,250	\$2,007,000,000
Operator	Employees	Revenues
SkyWest	3,300	\$1,200,000,000
Alpine Air Express	57	\$18,380,000
Total	3,357	\$1,218,380,000
MRO	Employees	Revenues
Hill Air Force Base	11,500	\$250,000,000
SAIC	165	\$22,000,000
Logistic Specialties, Inc.	150	\$8,000,000
Aerospace Engineering & Support, Inc.	70	\$5,200,000
Million Air	190	\$5,000,000
Intermountain Turbine Services	13	\$2,500,000
GMRE	10	\$2,000,000
Total	12,098	\$294,700,000
Grand Total	42,691	\$5,345,620,000



Strategic Insights



Utah's Aerospace and Defense industry reflects the influence of a multifaceted set of national and global factors each of which shape the forces that drive the viability and expansion of the industry.

The following describes the key factors affecting this cluster within Utah today and which are likely to influence the future expansion of the industry cluster. (See Illustration 11—Strategic Insights)

Aerospace and Defense Cluster Strategic Insights



Strategic Insights

Specific industry insights which are directly relevant to the acceleration of Utah's Aerospace and Defense Cluster.

Maintenance, Repair, and Overhaul

1. The requirements to extend the operating life of commercial, civil, and military aircraft fleets are driving the aerospace and defense industry value chain towards maintenance and platform sustainability.
2. New opportunities are expanding for the MRO of the F-22, F-35, F-16, and A-10 fleet.
3. Utah has a predominant aerospace strength best suited for the expanding MRO business where upgrades to aging aircraft require new composite structural materials, on-board IT systems and software, sensors, avionics, and electronics.
4. Software development and integration will be a key future capability in such areas as enterprise software, supply chain interaction, product management, product development, war fighter improvements, and data storage.

Unmanned Aircraft Systems

5. New opportunities are emerging to supply and service small companies manufacturing UASs.
6. New opportunities are expanding for testing and MRO of military UAS.
7. The growth in UASs is generating new technologies and trends in battlefield management that will be essential to future war-fighting.

Space Exploration

8. President Obama's recent proposal to cancel the Constellation program and the Ares rockets is very detrimental to the Cluster; however, recent successes by ATK, congressional support for the program, and efforts made within the state could save Constellation.
9. New opportunities lie in components of the space program that may be outsourced to private companies in such areas as building and testing rockets, developing compatible space capsules, and commercial-style space transportation services.
10. New opportunities lie in applying core space related capabilities such as satellites, sensors, and space monitoring to environmental and climate change research initiatives.

Aerospace/ Defense Cluster Acceleration Project





UAS

5. New opportunities are emerging to supply and service small companies manufacturing UAS's.

UAS developments have been growing. In this year's defense budget there is an increase of 18.4 percent in the overall budget for these systems (from \$4.53 billion in 2009 to \$5.4 billion in 2010).¹¹

While the UAS industry is maturing, it is establishing itself as a reliable piece of the war fighting suite—making UASs a stable element in the defense budget.

Frost & Sullivan expects that the production of subsystems (e.g., communications, sensors, smart components) will reach \$4.6 billion in revenues through 2013. There will also be significant funds spent on research, design, testing, and engineering (\$4.7 billion), UAS Services (\$2.1 billion), and UAS platforms (\$9.6 billion) over the same period of time.¹²

Utah firms already servicing this expanding market

such as Procerus and IMSar are well positioned to capitalize on this growth. General Atomics, the maker of the Predator and Reaper UAS is likely increasing its presence in the state. Other firms serving traditional markets may be able to leverage skills into the UAS market. For example, L-3 Communications technologies are a critical component for air to ground data transfer and controls.

6. New opportunities are expanding for testing and MRO of military UAS.

Two key announcements over the past year give Utah an interesting advantage in the UAS market segment. Hill Air Force base will be the MRO home for the Predator and Reaper vehicles. This workload will lead to between 200 and 700 new jobs. Hill will also be responsible for the airframe on the Predator, Reaper, and Global Hawk as well as the satellite, radio, and software functions.¹³

In May of 2009, Utah's congressional delegation announced the approval of the Rapid Integration and Acceptance Center at Dugway.

The Center will integrate systems and conduct testing on the U.S. Army's Hunter, Shadow, and Sky Warrior UASs. There are an estimated 200 new jobs over the next two years anticipated for the Center.¹⁴

With Air Force MRO at Hill and acceptance and testing at Dugway (both benefitting from access to the Utah Test and Training Range), Utah will have hundreds of UASs serviced here each year. The Falcon Hill development at Hill Air Force Base presents a unique opportunity to create a "center" for UAS related businesses. (See Illustration 14—Future UAS Opportunities)

7. The growth in UASs is generating new technologies and trends in battlefield management that will be essential to future war fighting.

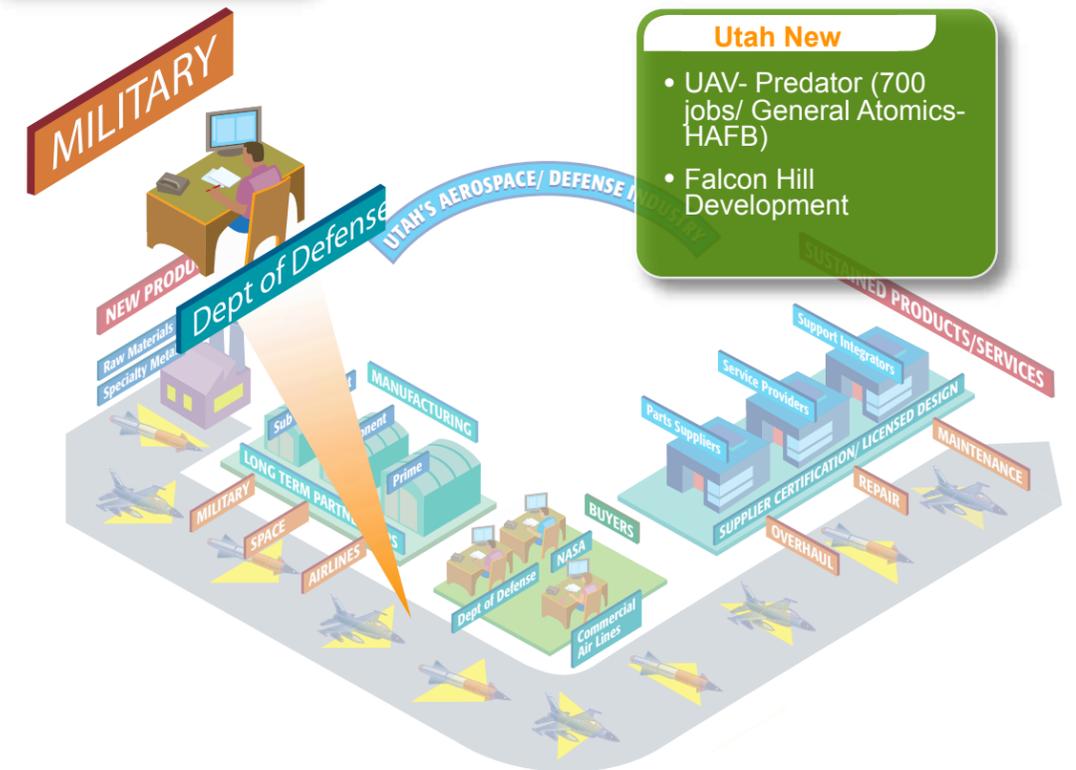
Today's armed forces, using a UAS flying overhead can detect an insurgent military force planting an improvised explosive device. With that information, today's armies can send in attack helicopters, mobilize ground forces, and launch an armed UAS or F-16. Such a scenario is the basis for network-centric warfare developed by the Department of Defense.¹⁵

This new form of battlefield management enabled by UAS deployment is changing the way war-fighting is carried out. As today's technologies advance with the growth of nano-UASs, unmanned ground vehicles, and connectivity among soldiers and civilian contractors, the complexities of battlefield management significantly increase.

Given the strength of L-3's presence in UAS communications, HAFB's competency in software development for cockpit awareness, and the Utah's growing strength in UASs, there may emerge new capabilities and workforce needs to support this future opportunity.



14 Future UAV Opportunities





8. President Obama's recent proposal to cancel the Constellation program and the Ares rockets is very detrimental to the Cluster; however, recent successes by ATK, congressional support for the program, and efforts made within the state could save Constellation.

With the recent announcement to cancel the Constellation program, NASA is truly in a time of transition. The current shuttle fleet consisting of Discovery, Atlantis, and Endeavour will be retired by the end of 2010.¹⁶ In 2004, President George W. Bush announced that the United States would once again return to the Moon. At that time, President Bush stated, "With the experience and knowledge gained on the moon, we will then be ready to take the next steps of space exploration—human missions to Mars and to worlds beyond."¹⁷ This goal soon became embodied in the Constellation program.¹⁸ An estimated \$9 billion has been committed to the

program.¹⁹ A key part of Constellation is the Ares I and Ares V rocket boosters, which are designed and manufactured by ATK.

With the change in administration, President Barack Obama created The Review of U.S. Human Space Flight Plans Committee (a.k.a. The Augustine Commission) to provide recommendations on the future of NASA. The commission focused on a number of alternatives for US space exploration, although nearly all recommended greater reliance on commercial space flight.²⁰

With these recommendations in hand, President Barack Obama and NASA Administrator Charles Bolden recommended that the Constellation program be cancelled.²¹ Instead of pursuing human space flight, the Administration is recommending a number of unmanned missions with the objective to "develop more innovative technologies, foster new industries, [and] increase our understanding of the earth."²²

However, the billions of dollars already spent to build this program combined with recent successful launches have increased desire from members of Congress to increase funding.²³ Furthermore, members of the House Democrats and Republicans have indicated "mistrust of the White House's decision-making process and a determination to come up with their own alternatives."²⁴ A senior official at the Government Accountability Office has said "past agency programs, 'which claimed to be following the commercial model did not succeed.'"²⁵ Prior to the recommended cancellation, NASA began planning additional tests for the Ares I-X rocket.²⁶ If congressional support and NASA inertia are not enough to overcome this latest decision, the cancellation of Constellation would have a very negative effect on human space flight,²⁷ ATK, and subsequently the Aerospace and Defense Cluster in Utah.

9. New opportunities lie in components of the space program that may be outsourced to private companies in such areas as building and

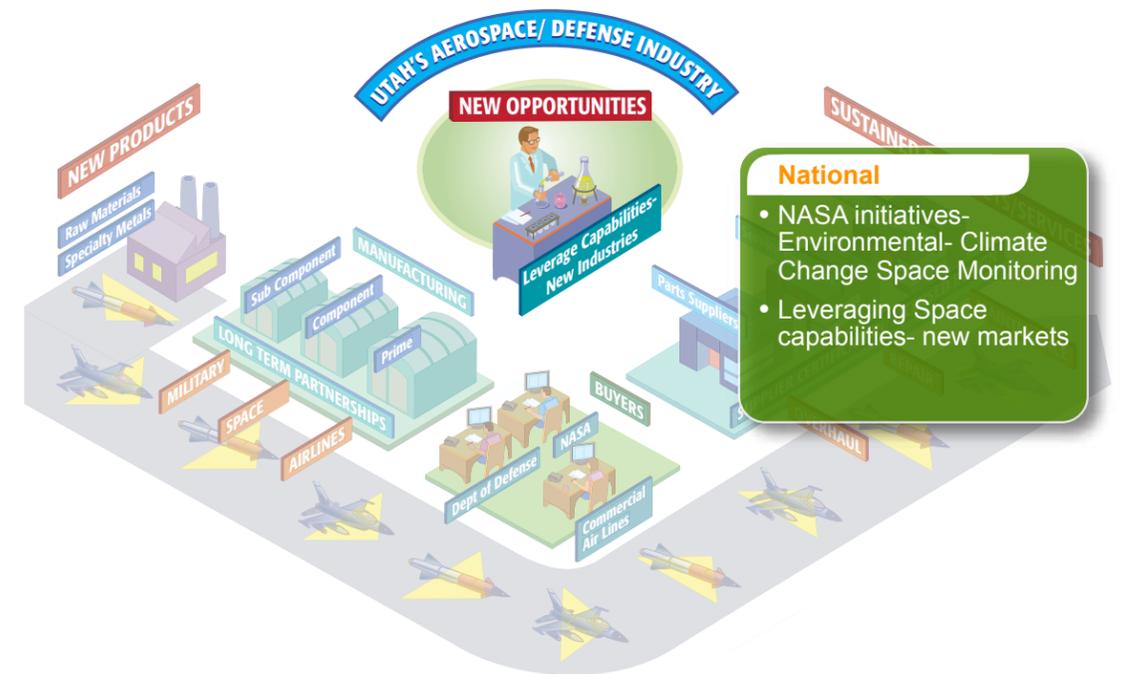
testing rockets, developing compatible space capsules, and commercial style space transportation services.

The proposed NASA budget recommends that \$6 billion be invested over the next five years "to spur the development of American commercial human spaceflight vehicles."²⁸ These funds will be allocated to competitive solicitations that support a range of higher and lower-programmatic risk systems and system components; e.g. human-rating of existing launch vehicles and development of new spacecraft that can ride on multiple launch vehicles.

There are already a handful of companies who are slated to provide such services to NASA through the C3PO (Commercial Crew and Cargo Program).²⁹ Firms included in this program include Space-X, Orbital, Planet Space, and SpaceDev.³⁰ (Virgin Galactic is another player that provides more of a space tourism function than a transportation of goods to space.)



15 Future NASA Opportunities



Some other areas of future growth in space transportation include smaller, easier to launch satellites.³¹ Another issue that is now being addressed by DARPA is how to deal with proliferation of space junk, or the millions of small particles in low-earth orbit.³² There will likely be a number of interoperability challenges with numerous firms providing space-hauling services.

These and other changes may be addressed with the talent base already existing from firms like ATK and the Space Dynamics Lab.

10. New opportunities lie in applying core space related capabilities such as satellites, sensors, and space monitoring to environmental and climate change research initiatives.

Though the State recognizes the value of continuing Constellation, the Aerospace and Defense Cluster must be prepared for whichever direction the space program goes. The proposed cancellation of Constellation signals potential opportunities for other areas of the space program. In the FY 2011 budget, the President recommended a new line item in the budget entitled “Space Technology” which includes:

“Next-generation technologies, to help improve the Nation’s leadership in key research areas, enable far-term capabilities, and spawn game-changing innovations to make NASA other government and commercial space activities more capable and affordable.”³³

To accomplish these objectives, NASA will increase spending by about \$500 million per year in the areas of “communications, sensors, robotics, materials, and propulsion.”³⁴ Though Utah has strengths in each of these areas, there is very little predictability in the future direction of NASA. While Utah possesses many competencies that lend themselves to addressing these markets, it will require some shifts in perspective.

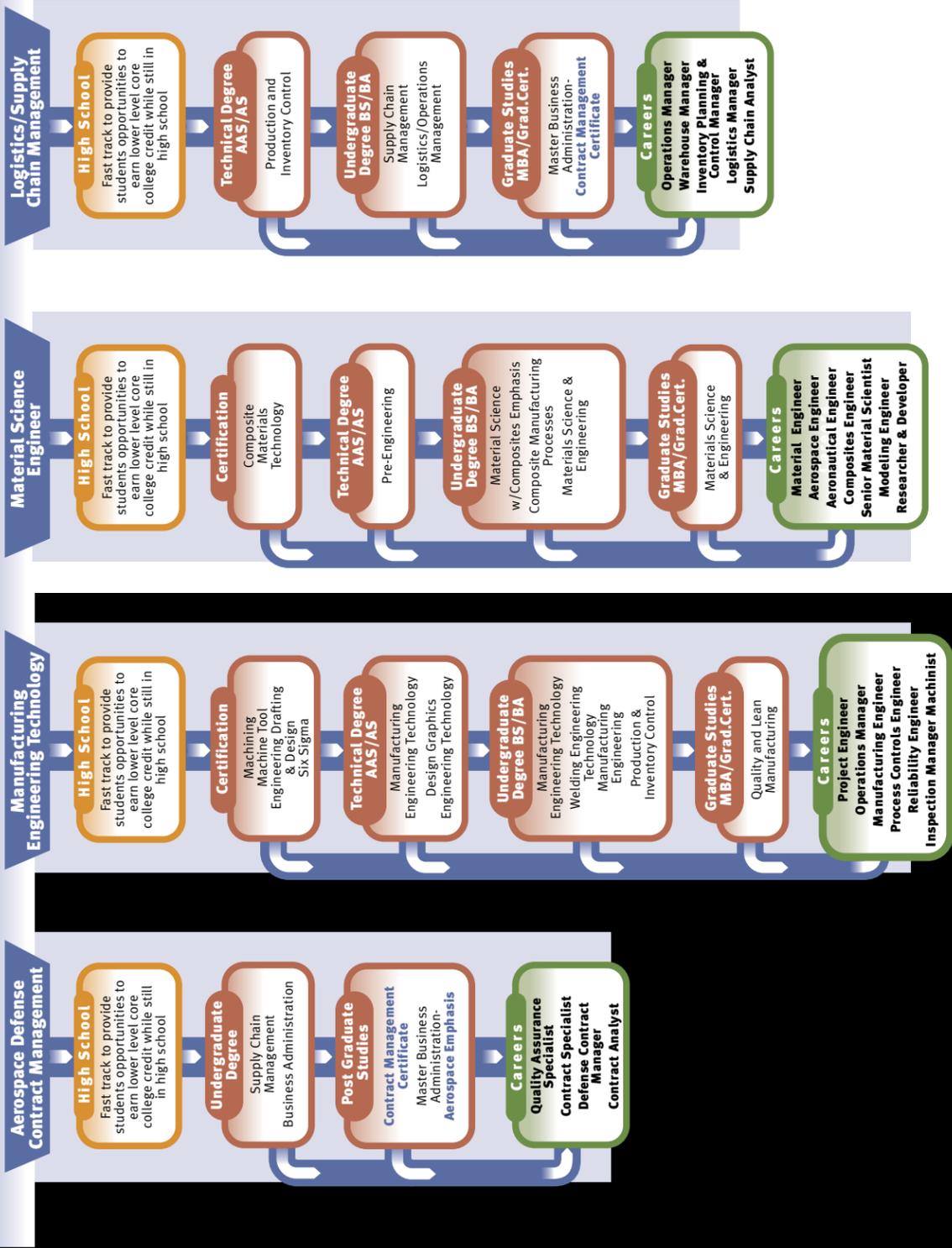
There is an ongoing emphasis on climate change science. The proposed budget recommends an additional \$382 million towards re-flying the Orbiting Carbon Observatory and accelerates development of new satellites that will “enhance observations of the climate and other Earth systems.”³⁵

Given general trends, Utah’s Aerospace Cluster may need to consider taking existing new competencies into new markets. (See Illustration 15—Future NASA Opportunities)

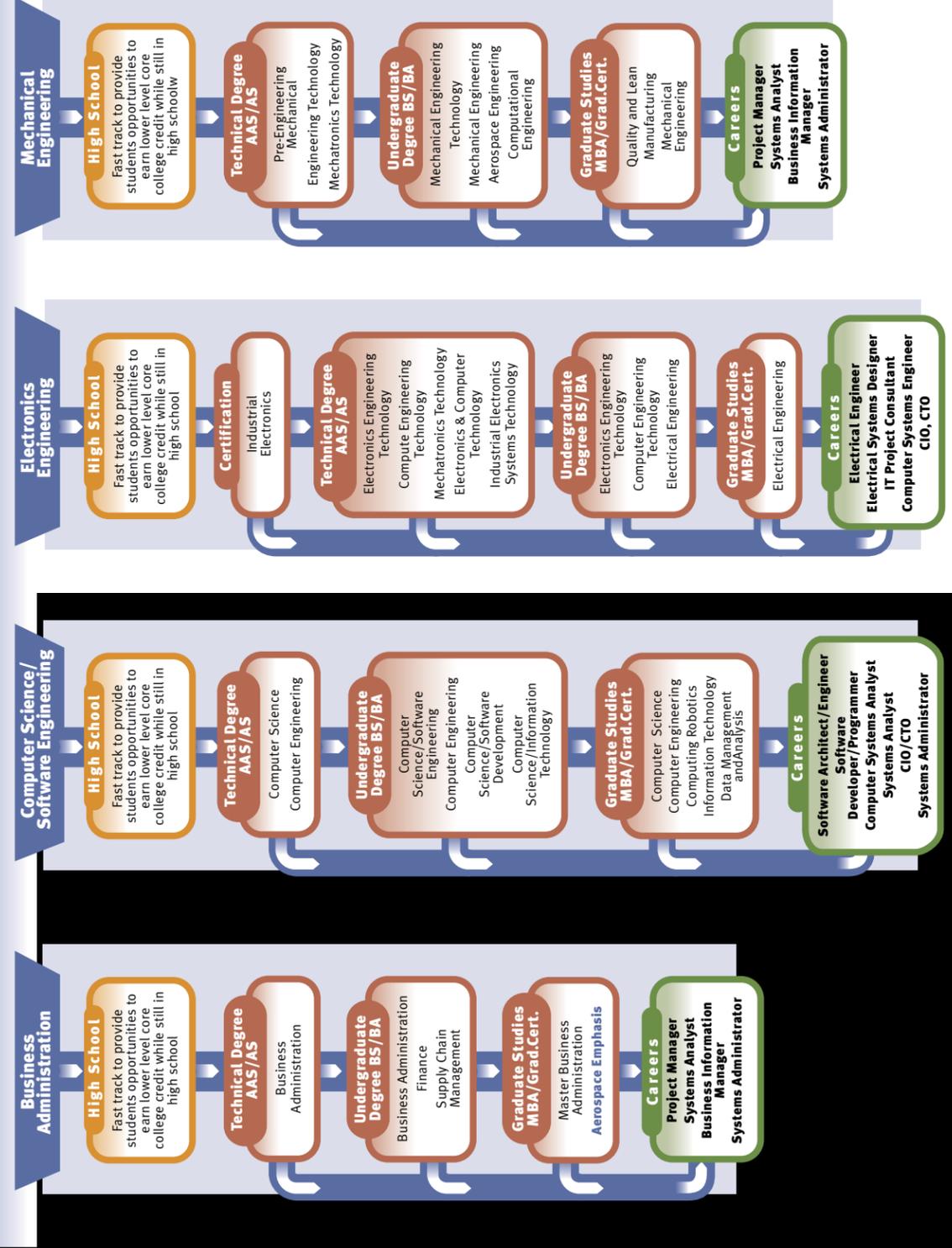
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CAREER PATHWAYS UTAH AEROSPACE / DEFENSE CLUSTER



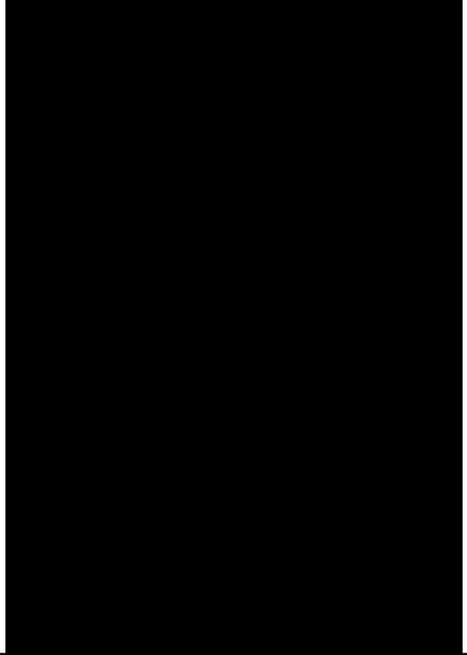
CAREER PATHWAYS UTAH AEROSPACE / DEFENSE CLUSTER



Aerospace and Defense Cluster Acceleration Strategy
Implementation Responsibilities

- - Prime Implementation Agent
- - Support Implementation Agent

Action Items	Industry	USHE	DWS	GOED	USTAR	Other
<i>Growth Opportunities</i>						
Sustain the Core						
Strategic Support for HAFB						
Collaborate with the Utah Defense Alliance to advocate for and promote the continuation and expansion of the HAFB mission.	●	○	○	○	○	
Secure Space Funding	●			○		
Secure a continuation of the NASA exploration mission.						
Drive for Growth						
UAS Topical Expertise						
Work with L3 to increase Utah's participation with the Rocky Mountain Chapter of the Association of Unmanned Vehicle Systems International (AUVSI). Explore additional symposiums, conferences and events that help establish Utah's emerging expertise in UAS platforms, systems and support.	●	○		○	○	
Explore the Future						
Obtain New Funding						
Obtain federal funding for environmental monitoring and climate change research that can be performed in Utah.		●			○	
<i>Key Supporting Strategies</i>						
Talent Development						
Aerospace and Defense Career Pathways						
Provide students with clearly identified Aerospace and Defense Career Pathways.	○	●	○			ATCs and Public Education
Meet Immediate Technical Hiring Needs	○	○	●			ATCs and Public Education
Meet the immediate workforce needs of HAFB to satisfy current contracts by encouraging second and third year students at Weber State University and other institutions to pursue a tailored physics/computer science major.						
Develop Stronger Industry Management Talent	○	●	○			
Implement an aerospace emphasis in MBA degrees with a focus on specific competencies required for leadership in the aerospace industry.						



Aerospace and Defense Cluster Acceleration Strategy
Implementation Responsibilities
Page 2

Action Items	Industry	USHE	DWS	GOED	USTAR	Other
Establish Training for Aerospace / Defense Program Manager						
Establish a new Aerospace/Defense Program Manager curriculum at Weber State University and other institutions that provide the multi-faceted skills required of today's Program Managers to lead teams, define and correlate requirements, and manage programs over their full life cycle.	○	●	○			
Increase Regional Engineering Education Capacity						
Grow regional engineering education capabilities to better serve the specific needs of the aerospace and defense industry. Specific educational emphases should include electronics engineering, software engineering, and composite structural engineering.	○	●	○			
Re-Train and Re-Engage Existing Work Force	○	○	●			ATCs
Implement effective outreach, retraining, and re-engaging initiatives that are targeted at the industry trained workforce recently laid-off.						
Market and Promote Job Opportunities	●		○			
Aggressively market and promote industry job opportunities.						
Business Management Training						
Provide management training programs that improve the skills of industry business leaders and managers to increase the quality and performance of their business enabling them to expand into new markets, and to effectively meet increasingly complex customer requirements.	○	●	○	○		
<i>Industry Leadership</i>						
Organize an Industry Association						
Organize an association for Utah's Aerospace and Defense Industry that will create a forum for dialogue and communication and will enable clear communication of needs and requirements by the industry to academic and public sector support entities.	●	○		○		
Advanced and Applied Research and Testing						
Aerospace Research Forum						
Formally create an industry forum where all Utah research related to the industry can be shared and research needs and interests communicated to that state's tier 1 research universities.	○	○			●	

Appendix

Action Items	Industry	USHE	DWS	GOED	USTAR	Other
<u>Aerospace Directed Research</u> Engage the CAP Committee and the various universities to undertake a more coordinated and emphasized research strategy that combines the input from the industry as well as academic institutions to specifically address the unique requirements of this cluster.	☉	☉			●	
<u>Industry Research Incentives</u> Incentivize Utah researchers in related fields.	●	☉			☉	
<u>Utilization of Unique Assets</u>						
<u>Falcon Hill and East Gate Development</u> Collaborate with the Military Installation Development Authority (MIDA) and the City of Layton to ensure optimal development and utilization of Falcon Hill and the East Gate development.	●			☉		
<u>Expand and Attract</u>						
<u>Industry Incentive Package</u> Create a business relocation incentive package tailored to meet the needs of targeted Aerospace companies considering locating in Utah.	☉			●		
<u>Targeted Campaign</u> Initiate a campaign to attract aerospace and defense related companies that fit into Utah's value chain with specific emphasis on MRO, and the emerging field of using UAS vehicles for military and commercial cargo hauling, and remote monitoring.	☉			●		Economic Development Corporation of Utah
<u>Vendor Data Base</u> Create a database to identify businesses in Utah's aerospace and defense supply chain that promotes interaction and new business opportunities.	●	☉	☉	☉		
<u>Expand Contracts</u> Continue to assist small and new manufacturers to obtain source approval to secure new contracts in the market and retain more HAFB workload in the state.	●	☉	☉	☉		



Utah System of Higher Education

60 South 400 West
Salt Lake City, UT 84101-1284

higheredutah.org

Grow Utah Ventures

450 Simmons Way Suite 500
Kaysville, Utah 84037

growutahventures.com

Governor's Office of Economic Dev.

State of Utah
324 South State Street, Suite 500
Salt Lake City, UT 84111

business.utah.gov

Department of Workforce Services

State of Utah
140 East 300 South
Salt Lake City, UT 84111

jobs.utah.gov