



Briefing for the Colorado Congressional Delegation

Summer/Fall 2011



WHO WE ARE

The Colorado Space Coalition (CSC) is a partnership among members of the private sector, the state of Colorado, the Denver Metro Chamber of Commerce/Metro Denver Economic Development Corporation, several economic development agencies, the Colorado Space Business Roundtable, higher education institutions, and other stakeholders. The Coalition is led by Lieutenant Governor Joseph (Joe) Garcia, Major General Andy Love, USAF (Ret.), and Thomas Marsh, Retired Executive Vice President, Lockheed Martin Space Systems Company.

The goal of the Colorado Space Coalition is to build on our diverse company base to maintain and enhance Colorado's position as a center of excellence for space, and expand our recognition as the best place for aerospace companies to locate and thrive.

The CSC spans the entire state and represents diverse backgrounds, but united goals. We meet regularly to assess opportunities for Colorado's growth and to promote our space assets nationally and internationally. The Colorado Space Coalition values the Congressional Delegation's interest in and commitment to making Colorado a center of excellence for space.

WHY SPACE MATTERS TO COLORADO

Economic Impact: Colorado ranks first in the nation for private aerospace employment concentration, with more than 163,000 direct and indirect space-related jobs, a \$2.8 billion annual payroll, and billions of dollars in annual revenue. Further, Colorado's aerospace workforce compensation has the highest percentage increase over local average salary: the average annual salary for a Colorado aerospace worker is \$108,930, as compared to \$46,820 average annual salary for private sector workers in the state – a 133 percent positive differential. Employment in aerospace rose 6.5 percent between 2005–2010.

Center of Excellence: Colorado excels in the development of launch vehicles, spacecraft, satellites, optical instruments, and sensors. Our state is also a strong competitor in the areas of ground control, navigation and detection, remote sensing, and geospatial data collection and analysis. Colorado is a major space operations hub, with control centers for the Global Positioning System (GPS) constellation and numerous other national security satellite systems located at Peterson, Schriever, and Buckley Air Force Bases. Crucial operations infrastructure for the nation's two largest satellite television providers is also located in Colorado.

World-class Research: Colorado is a leader in space-related research, hosting numerous laboratories that produce outstanding space science supported by federal funding and our state's private space companies. The University of Colorado is the nation's second-largest public university recipient of the National Aeronautics and Space Administration's (NASA) research dollars, and the Colorado School of Mines also has a major research role with NASA. The National Oceanic and Atmospheric Administration (NOAA) in Boulder plays a critical role in Earth observation, weather/climate monitoring, and space weather prediction.

Hub for the Commercialization of Space: NASA has located its first public-private partnership for manufacturing in Colorado through a partnership with the Colorado Association for Manufacturing and Technology (CAMT) and the state of Colorado. The partnership will accelerate the commercialization of new space and cleantech technologies. NASA notes that Colorado is an internationally recognized cleantech center, and one of the nation's largest aerospace manufacturing hubs with access to research institutions and federal laboratories conducting aerospace research.

U.S. Center for Military Space: Colorado's diverse mix of Department of Defense (DoD) military bases and space-related commands fosters important synergies with private aerospace companies and supports the growth of Colorado's business base. Our companies' work with the DoD and NASA supports critical national security and civilian infrastructure

functions. Colorado is also home to the U.S. Air Force Academy, which houses an astronautics program that conducts research, develops and flies satellites.

Large and Diverse Industry Base: Colorado's eight major aerospace contractors directly or indirectly support many of the state's 400 companies that work with the aerospace industry. Key industry strengths include: launch vehicles, spacecraft, sensor manufacturing, optical instruments, satellite development and manufacturing, ground control, navigation and detection instruments, mission support, research and development, and remote sensing and geospatial data collection and analysis.

Magnet for Entrepreneurism: Colorado provides a fertile environment for smaller aerospace startups that offer after-market services and low cost, off-the-shelf products. Significant customers of aerospace startups are often major aerospace contractors, NASA or the DoD. Unique to aerospace, the relationship between the startup company and the customer is often manifested in favorable financial terms and ongoing coaching during product development. Aerospace startups play a large role in developing new applications of aerospace technologies that are increasingly reaching profitability in large mass market products and services.

Leading Technology: Colorado also features an abundance of high-tech companies that are developing viable, cutting-edge technologies to support aerospace. These technologies are critical components for the nation's scientific, defense, and commercial space missions. For example, Sierra Nevada Corporation is one of four companies currently receiving NASA funding to develop the next generation spacecraft and business model for the delivery of personnel to and from low-earth orbit. These developments will ultimately promote greater employment stability.

A National Asset: Colorado's military, civil and commercial aerospace activity provides critical support to national security programs and the communications infrastructure necessary for economic prosperity. Colorado leads global climate monitoring and weather warning systems, and is a leader in developing technologies for the nation's future space exploration program. The men and women working in Colorado's space industry today are essential for the U.S. to maintain its global leadership in space in the years to come.

National Space Symposium: Colorado is home to the Space Foundation, an internationally known and respected nonprofit organization that supports space activities, space professionals and education. The Space Foundation conducts the annual National Space Symposium, an event that attracts more than 8,000 space-focused government and industry representatives from around the world, generates \$25 million annually within Colorado, and reinforces our state's reputation as a leading location for aerospace companies to do business.

EXECUTIVE SUMMARY

SUMMER/FALL 2011 CONGRESSIONAL REQUESTS

Continued federal investment in Colorado's academic, military, and commercial space infrastructure is vital to maintaining and expanding our state as a center of excellence for space. The Colorado Space Coalition recommends the following support for action, authorization, and appropriations for Fiscal Year 2012 and beyond:

Support NASA's new exploration strategy

The CSC recommends supporting NASA's exploration strategy, which begins to focus on manned exploration of the solar system while relying on commercial approaches including multiple efforts that involve Colorado companies to staff and supply the International Space Station. New approaches to continued operation of the International Space Station will provide enduring opportunities for Colorado to support scientific research on the now-completed orbital outpost. Support of this low-earth orbit strategy will free up resources to develop and sustain manned and unmanned scientific exploration beyond Earth's influence, many of those led by innovations of Colorado industry.

Support NASA funding

The CSC recommends support for NASA's FY2012 budget, which holds spending at FY2010 levels. A resolution to the federal budget and certainty in funding for NASA can help Colorado companies operational planning. Specific NASA programs important to Colorado's aerospace industry include the Orion multi-purpose crew vehicle (Orion MPCV), NASA's focus on commercial spaceflight capabilities, space exploration technologies, and earth science programs. Continued operation of the International Space Station through at least 2020 is also significant to Colorado's aerospace companies, university researchers, and science students.

Support strategies to develop a 21st century aerospace workforce

The CSC recommends promoting and supporting P-20 education programs and initiatives that increase the engagement, retention, and success levels of students in science, technology, engineering and math (STEM) education, as well as support of federal grant requests benefitting the Space Foundation Discovery Institute, and continued funding support of the Colorado STEM Network. The CSC also recommends support for workforce program funding and grant opportunities benefitting displaced technical workers in Colorado.

Promote and advance Colorado aerospace through participation in Congressional caucuses and committees

The CSC recommends seeking opportunities to participate in the following caucuses and committees: the Senate Aerospace Caucus, the Senate Committee on Commerce, Science & Transportation Subcommittee on Science and Space, the Senate Select Committee on Intelligence, the House Permanent Select Committee on Intelligence, and the House Committee on Science and Technology.

Reduce unnecessary licensing and export restrictions

The CSC recommends supporting and encouraging the continuance of administrative changes to International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR) to increase U.S. security and competitiveness. Recommendations include supporting the President's Export Control Reform Directive, working with the U.S. Department of State to pursue a statutory exemption for exports of space related items to U.S. allies, and removing space-related products and components that are widely available on the open international market from the U.S. Munitions List. Additionally, the CSC recommends reducing restrictions on the commercial potential of the geospatial industry and working with the U.S. Department of Commerce to promote export sales of U.S. space components, products, and services.

Support Colorado's military and civilian space resources and programs

The CSC requests support to protect Colorado's military assets, as well as funding for Colorado's federal facilities and programs, and promotion of policy and investment that strengthen Colorado's commercial space and cyberspace growth. Recommendations also include supporting a competitive sourcing process with regard to the DoD's in-sourcing initiative, advocating for greater industry competition on projects traditionally undertaken by NASA centers, and supporting continued funding of the DoD's Small Business Innovation and Research and Small Business Technology Transfer program budgets.

The CSC also requests support for programs in which Colorado companies play a major role and demonstrate capacity for future growth opportunities, such as: the Global Positioning System III and Operational Control Segment programs, the Ground Based Missile Defense (GMD) program, Space Situational Awareness (SSA) programs, NASA's science missions, and Operationally Responsive Space (ORS) programs.

The Colorado Space Coalition's partners – representing Colorado's business, space, and higher education leadership – are committed to assisting the members of Colorado's Congressional Delegation in achieving these goals. We seek to build on the successes currently in place and to work collaboratively to ensure Colorado continues to grow as a center of excellence for space.

2011/2012 Congressional Legislative Strategies to Support Aerospace

The nation's aerospace industry is currently facing its biggest shake-up since President Kennedy's space program. Colorado's space industry, with its diverse mix of aerospace companies, education and research institutions is poised to play an even larger role as a result of NASA's shift in focus toward development of U.S. commercial spaceflight capabilities, robotic precursor missions, climate change research and observations spacecraft, and research and development on heavy-lift and propulsion technologies.

We must respond to these competitive opportunities and challenges by continuing commercial growth, improving efficiencies, and advancing small business and education opportunities, while also enhancing the ability of Colorado-based programs and technologies to compete here in the United States and around the world.

Continued investment in Colorado's commercial, military, and academic space infrastructure is vital to maintaining our state as a center of excellence for space. The Colorado Space Coalition recommends the Colorado delegation work together to support the expansion of Colorado's aerospace industry and jobs through the following strategies for action, authorization, and appropriations for fiscal year 2012 and beyond:

Support NASA funding and the National Space Policy

Recommendations:

- Support commercial crew development including funding for the Orion Multipurpose Crew Vehicle (MPCV) program to develop a Crew Rescue Vehicle for the International Space Station (Lockheed Martin), the Dreamchaser as a smaller replacement for the space shuttle (Sierra Nevada, ULA), and ULA's Atlas V rocket as a potential launch vehicle for manned spacecraft.
- Oppose legislative language that reduces funding or cancels the James Webb Space Telescope (JWST) program. JWST is NASA's follow on observatory to the Hubble Space Telescope. Ball Aerospace and Raytheon Company have prominent roles in this program in Colorado.
- Encourage and support a strong and successful space exploration program that is critical to our nation's security and requires a robust and inspirational plan.
- Encourage NASA to involve the wider science community in planning, developing, and implementing future missions with balanced programs within the existing fiscal constraints.

- Support the national space policy's objective calling for increased and innovative collaboration with industry and international partners for space activities of mutual benefit.

Background

NASA is a major funder of space-related programs for Colorado companies and research institutions. Further, higher education participation in NASA programs is critical to developing the future workforce for the aerospace industry and providing hands-on opportunities for university students and cost-effective scientific research.

NASA's revised space exploration plan and proposed 2012 budget present both challenges and opportunities for Colorado. Lockheed Martin's Orion MPCV is funded through the end of the fiscal year and any program activity is important to Lockheed's Colorado operations. Orion activity represents an annual direct, indirect, and induced economic impact of around \$300 million in Colorado and 1000 direct jobs.

Colorado companies and research institutions are well-positioned for future growth as a result of NASA's increased investment in commercial spaceflight, space exploration technologies, and earth science programs. Both Sierra Nevada Corporation and the United Launch Alliance are recipients of NASA's commercial crew development effort to carry astronauts to and from low Earth orbit. A Commercial Spaceflight Federation Survey suggests 800 direct jobs will be created in Colorado as a result of a full commercial crew flight program with a Colorado-built spacecraft.

Increased NASA investment in developing space exploration technologies will also benefit Colorado initiatives such as eSpace: the Center for Space Entrepreneurship and the 8th Continent Project that support development of Colorado companies working on innovative solutions to unique space exploration challenges. Colorado universities are already engaged in leading NASA space exploration research projects and are well-placed to take advantage of future projects as a result of NASA's increased investment in this area.

NASA's proposed increased investment in Earth science programs will present opportunities for Colorado research institutions. NOAA and the University Corporation for Atmospheric Research (UCAR) are both dedicated to exploring and monitoring the Earth's atmosphere. The Cooperative Institute for Research in Environmental Sciences (CIRES) is a joint institute of NOAA and the University of Colorado at Boulder, whose activity includes earth science and observation and space weather projects. Colorado State University is home to the Cooperative Institute for Research in the Atmosphere (CIRA), which provides global and regional climate research, satellite observations, and air quality measurements.

Strong investment by NASA and NOAA in space research and climate change is important to the nation and Colorado. An example is the Laboratory for Atmospheric and Space

Physics (LASP) at the University of Colorado. LASP is a leader in atmospheric and space research focusing on planetary science, solar terrestrial physics, atmospheric sciences and space physics. LASP is currently involved in nine missions already in space and eight others under development.

Independent access to space is critical to both national security and maintaining the U.S.'s global leadership role in space activities. Colorado and the rest of the country require a clearly articulated and detailed strategic plan to explain NASA's future space exploration goals and how the 2012 budget priorities will help achieve them. To ensure capacity and support for future space exploration opportunities, the plan must recognize and address the need for a robust and reliable supply chain and industrial base.

Collaboration with industry and international partners can help deliver results of benefit to all of our partners at lower cost. The CSC endorses this goal in the national space policy. An example of this potential is the National Oceanic and Atmospheric Administration's COSMIC-2 program, which would deliver U.S.-developed forecasting instruments to a satellite constellation funded and deployed by Taiwan. This program would give the U.S. access to time critical forecasting information for less than a third of the cost of deploying a constellation outside of the COSMIC-2 partnership.

Support strategies to develop a 21st century aerospace workforce

Recommendations:

- Promote and support P-20 education programs and initiatives that increase engagement, retention, and success levels of Colorado students in science, technology, engineering and math (STEM) education.
- Support continued funding of the Colorado STEM Network.
- Support federal grant requests benefitting the Space Foundation Discovery Institute.
- Support workforce program funding and grant opportunities benefitting displaced technical workers in Colorado.

Background

Aerospace companies in Colorado and nationwide are deeply concerned about the skills shortages facing the industrial base and the need to replenish the workforce with engineers in the very near future. To keep Colorado competitive and innovative, our P-20 students require a rigorous STEM education, if they are to have the opportunity for a career in aerospace or other high-tech industries.

The public and private sectors must work together on educational efforts that address workforce shortages and maintain and replenish engineers and scientists needed to keep Colorado competitive. From 2007 through 2009, the Metro Denver Workforce Innovation in

Regional Economic Development (WIRED) initiative awarded more than \$2 million to six programs that address aerospace workforce needs. The Space Foundation Discovery Institute is housed on the campus of the Jack Swigert Aerospace Academy in Colorado Springs, and provides space- and aerospace-themed professional development, training and support for teachers and students from around the world and serves as the base location for the Space Foundation's education programs. Other regional programs include the Challenger Learning Center of Colorado Springs, the Space Foundation's National Teacher Liaison, STARS Student and Space Across the Curriculum programs, as well as the Denver Museum of Nature and Science and university-related programs.

Colorado's private aerospace companies provide significant support in this effort by engaging and supporting our students through their many education outreach programs. We also must collaborate with related industries—such as life sciences, information technology and telecommunications—to maintain our high-tech, high-quality workforce.

State-level education initiatives and policies play a critical role in supporting the STEM education programs necessary to produce the diverse and robust pipeline of future engineers and scientists necessary to drive the aerospace economy. The Colorado STEM Network (CSN) is a statewide coalition of businesses, government, education, and community groups to improve STEM education for all students by identifying local challenges and assets around the alignment of P-20 outputs and expectations, and supporting development and implementation of policy at the local level.

Promote and advance Colorado aerospace through participation in Congressional caucuses and committees

Recommendation:

- Seek opportunities to join and actively participate in the following caucuses and committees: the Senate Aerospace Caucus, the Senate Committee on Commerce, Science & Transportation Subcommittee on Science and Space, the Senate Select Committee on Intelligence, and the House Committee on Science and Technology.

Background

Participation in these forums helps promote and advance support for aerospace and gain visibility for Colorado's leadership in this industry.

The U.S. Senate formed an Aerospace Caucus in late 2009 to provide critical oversight of United States Government Aerospace acquisition programs, ensure a competitive industrial base, and promote education and workforce development programs that prepare American students for careers in aerospace. Senator Michael Bennet is currently one of 24 members.

The Senate Committee on Commerce, Science & Transportation Subcommittee on Science and Space has responsibility for science, engineering, and technology research and

development and policy; calibration and measurement standards; and civilian aeronautical and space science and policy. The Subcommittee conducts oversight on the National Science Foundation, the National Aeronautics and Space Administration, the National Institute of Standards and Technology, and the Office of Science and Technology Policy.

The Senate Select Committee on Intelligence and the House Select Committee on Intelligence oversee and make continuing studies of the intelligence activities and programs of the United States Government, submit to their respective chambers appropriate proposals for legislation, and report to the Senate and to the House respectively concerning such intelligence activities and programs. Senator Udall is currently one of the 15 voting members on the Senate Select Committee on Intelligence.

The House Committee on Science and Technology's jurisdiction includes all nondefense federal scientific research and development (R&D) at a number of federal agencies, including: NASA, the Department of Energy, the National Science Foundation, the Federal Aviation Administration, the National Oceanic and Atmospheric Administration, and the National Institute of Standards and Technology. Senator Mark Udall formerly served as the ranking member of the Space and Aeronautics Subcommittee of the House Science and Technology Committee.

Reduce unnecessary licensing and export restrictions

Recommendations:

- Support and encourage the continuance of administrative changes to International Traffic in Arms Regulations (ITAR) and Export Administration Regulations (EAR) to increase U.S. security and competitiveness, including the January 2008 Directive regarding export controls reform and the President's Export Control Reform Initiative.
- Remove noncritical areas where ITAR control is not necessary in order to focus security protections without creating barriers to commerce and development.
- Support administrative and legislative changes that reduce restrictions on the commercial potential of the geospatial industry sector, such as Section 826 of HR 2410, and the fiscal years 2010 and 2011 Foreign Relations Authorization Act, which authorizes removal of satellites and related components from the United States Munitions List.
- Work with the U.S. Department of State to pursue a statutory exemption for exports of space related items to U.S. allies, such as North Atlantic Treaty Organization (NATO) countries.
- Work with the U.S. Department of Commerce to promote export sales of U.S. space components, products, and services.

Background

Export controls create unintended consequences due to the broad and vague nature of the ITAR and EAR regulations and the lengthy processing time. For example, international interest in purchasing U.S.-produced space components suffers due to the unpredictable licensing process, which hampers U.S. competitiveness. In turn, it forces international governments and companies to purchase or develop foreign-produced technology, thereby reducing U.S. security, rather than enhancing it. Further, U.S. universities are unable to attract top graduate students from around the world to work on research that is covered by ITAR restrictions, limiting their ability to develop the next generation of technology. Similarly, current policy also prevents the United States from retaining the talent of such science and engineering professionals.

The President's Export Control Reform Initiative recommends four key reforms: a single export-control list, a single licensing agency, a single enforcement-coordination agency, and a single information-technology system. Components of this will require Congressional approval, and we urge your support for these reform activities. For example, to open global markets for U.S. space companies, the review of Category XV should be continued, and space-related products and components that are widely available on the open international market should be removed from the U.S. Munitions List.

Support Colorado's military and civilian space resources and programs

Recommendations:

- Protect and expand Colorado's military assets.
- Support and encourage funding for Colorado's federal facilities and programs.
- Support 2012 funding and infrastructure for Colorado space launch activities and promote policy that strengthens Colorado's commercial space growth.
- Advocate for a level playing field for contractors with regard to the DoD's in-sourcing initiative, including support for a critical analysis of this issue, and a legal challenge system, analogous to the competitive sourcing process described in OMB Circular A-76.
- Advocate for greater opportunity for industry to compete on projects traditionally undertaken by NASA centers.
- Support continued funding of the DoD's Small Business Innovation and Research (SBIR) and Small Business Technology Transfer (STTR) program budgets.
- Support Colorado efforts to attract federal centers of excellence. Advocate for increased investment in Research Development Test and Evaluation (RDT&E) to develop the proven technology and future systems critical to national security and global technology leadership.

- Continue support of funding for the Space-based Infrared System, the Global Positioning System III, and OCX Programs.
- Support robust funding for national satellite infrastructure programs, including the civilian weather satellite system, Joint Polar Satellite System (JPSS.)
- Provide backing for Colorado's remote sensing industry. The CSC urges the coalition to fully support the EnhancedView contract and to oppose any attempts to delay or decrease the contract terms.
- Continue support of funding for the Ground Based Missile Defense (GMD) Program, including an aging and obsolescence program.
- Advocate for current and future funding for Space Situational Awareness (SSA) Air Force opportunities and programs of record.
- Support development of the Operationally Responsive Space (ORS) concepts and programs.
- Support and encourage cyberspace growth in Colorado.

Background

- Colorado is home to a diverse mix of DoD military installations that make it a key strategic location for the space industry. Three Air Force bases in Colorado have space-related activities: Buckley, Peterson, and Schriever. In addition, Colorado hosts four military commands: Air Force Space Command, U.S. Army Space and Missile Command/U.S. Army Forces Strategic Command, North American Aerospace Defense Command, and U.S. Northern Command. Continued support is also requested to maintain the Fort Carson Military Construction program, which totals \$3.1 billion through FY 2015 to ensure adequate facilities are in place to support Fort Carson's growth. Fort Carson is a key United States Army Power Projection installation located south of Colorado Springs and is the second-largest employer in Colorado with more than 25,000 active duty military.
- Colorado's federal laboratories and programs conduct cutting-edge research, are large employers for Colorado's space industry, and ensure a competitive domestic industrial base. NOAA and the University Corporation for Atmospheric Research (UCAR) are dedicated to exploring and monitoring the Earth's atmosphere. The Cooperative Institute for Research in the Atmosphere (CIRA) is a partnership between NOAA and Colorado State University that provides global and regional climate research, satellite observations, and air quality measurements. In 2009, CIRA was granted a five-year extension to continue research in weather- and aviation-related satellite technology. The Laboratory for Atmospheric and Space Physics (LASP) at CU-Boulder serves as one the nation's premier laboratories for designing, building, and controlling spacecraft and scientific instruments. LASP is also a proven training ground for future space scientists and engineers.

- Colorado’s space launch activity is led by United Launch Alliance (ULA), which provides space launch services for the U.S. government with its Evolved Expendable Launch Vehicles (EELV)—the Delta IV and Atlas V. ULA currently employs 1,700 people in Colorado. Support is requested for permanent commercial space launch indemnification, which helps protect U.S. commercial launch services providers against catastrophic third-party liability claims resulting from FAA–licensed launch activities. Congressional approval is required for any payment. Indemnification ensures U.S. launch companies remain competitive in a growing global launch market. Congress recently extended government indemnification of launches for three years, but permanent indemnification would provide much greater business continuity and competitiveness.
- Strategies to strengthen Colorado’s continued growth in the commercial space arena include:
 - Promoting inter–agency collaboration to fully utilize the capacity of launch services, improving both program cost–efficiency and access for private space companies to non–restricted commercial opportunities.
 - Encouraging NASA to decrease the cost of non–manned missions by developing more flexible risk standards and procedures than those for manned missions.
 - Monitoring and championing funding of programs that use commercial space capabilities and services to the maximum extent practical to address the requirements of the U.S. Government. This will enable a dynamic, domestic commercial space sector as well as assure a sustainable, long–term presence of vital space–related military, federal and civilian assets in Colorado.
- As a result of the DoD’s in–sourcing initiative, outlined in 2009, the DoD plans to reduce the number of support service contractors, replacing them during the next five years with 39,000 new full–time government employees, 20,000 of whom would be acquisition professionals. This initiative has strategic value in building skills and capacity within the DoD, but there is a need to ensure that it does not turn into a goal–driven, cost–reduction exercise, and that routine commercial activities undertaken by contractors (that do not fall within the target skill areas identified as critical) remain with the contractors. Additionally, when making cost assessments for these positions, the DoD needs to include full lifecycle cost accounting, rather than compare fully burdened contract costs versus government labor costs borne by the federal infrastructure.
- Colorado companies have the capacity and expertise to undertake many of the projects traditionally developed by government organizations such as NASA centers. Extending opportunities for industry to bid on such projects supports the growth of aerospace companies and strengthens the space industrial base.

- SBIR and STTR grants are an important source of high-tech seed funding that allow small aerospace companies to pursue research ideas and collaborate with research institutions. They are particularly valuable since the recent downturn in direct NASA funding for similar innovation and research work. Colorado is currently the second largest recipient of SBIR grants.
- We support the ongoing creation of federal centers of excellence, like the FAA Commercial Space Transportation Center hosted at the University of Colorado. The center is a partnership between a number of schools including CU-Boulder and the FAA, and is focused on launch operations and vehicle systems that will enable safe and efficient commercial human space flight and space commerce.
- Increased investment in Research Development Test and Evaluation (RDT&E) programs is required for developing the proven technology and future systems that are critical to both national security and global technology leadership. Support is requested for retention of both RDT&E and acquisition funding components within the DoD budget.
- Lockheed Martin is working on two programs that are critical to national defense and upon which thousands of Colorado jobs depend. Both programs appear at risk for cancellation or slow down due to budget constraints. The Space-Based Infrared System (SBIRS) addresses warfighter needs in the areas of missile warning, missile defense, and battlespace characterization. Global Position Satellite III (GPS III) upgrades military and civilian capabilities to accommodate advances in technology and new demands, particularly for national security purposes.
- Raytheon received an \$886 million contract from the U.S. Air Force to develop a new element of the Global Positioning System Operation Control Segment (GPS OCX) to improve the accuracy of information from GPS satellites. The company will add 300 jobs by the end of 2011. Other Colorado-based partners on this project include ITT Corp., Boeing Co., Infinity Systems Engineering, and Braxton Technologies.
- The civilian weather satellite system (JPSS) is important for the United States as our country suffers more severe weather events than any other nation on Earth. Polar-orbiting weather satellites collect data that generates advance forecasts and weather models. They save lives and protect commerce. Without continued sustainment and funding of weather satellite development on a 5-year replenishment cycle, gaps in satellite weather data are possible, putting communities and citizens in danger and contributing to additional losses of human life and property from natural disasters. Ball Aerospace is responsible for the satellite and space segment integration. Raytheon Company is developing the ground and data processing segments.

- Colorado is the hub for the nation's commercial remote sensing industry. DigitalGlobe, GeoEye and Ball Aerospace are significant participants in this market. In 2010, the National Geospatial-Intelligence Agency (NGA) awarded both DigitalGlobe and GeoEye multi-billion dollar contracts—the Enhanced View contract—to these companies to initiate development of additional satellites and for the delivery of imagery for defense and intelligence purposes.
- The Ground Based Missile Defense Program is the only deployed, operational U.S. missile defense against long-range missile threats in mid-course flight providing continuous operations and sustainment. NORTHCOM exercises command and control over the missile defense capability and Colorado National Guard troops manage the execution of the missile defense mission. The program does not currently have an aging and obsolescence program to ensure operational viability through 2030. Boeing is currently the prime contractor, with 400 local employees working on the program. The \$600 million contract is currently up for renewal, with several Colorado companies competing and the winner expected to be announced in early 2011.
- Space Situational Awareness (SSA) refers to the ability to detect, track, and monitor the movement and motives of objects (both manmade and natural) in Earth's orbit and is critical to protecting our nation's vital space assets. Colorado's support of SSA programs spans both small and large companies in addition to government civilian and military personnel.
 - JSpOC Mission Systems (JMS) – The JMS program will deliver new capabilities to the JSpOC in support of the Air Force's SSA mission. The program office will reside at Peterson Air Force Base in Colorado Springs. JMS is a current program of record and will be executed over the next 10+ years.
 - Space & Missiles Center/Space Superiority (SMC/SY) SSA Initiatives – The SMC center at Los Angeles Air Force Base is working on several SSA initiatives.
 - A Space Foundation partnership with the Maui Economic Development Board supports the Air Force Maui Optical Station – the most important space situational awareness installation in the world.
 - NOAA's Space Weather Prediction Center in Boulder is the nation's official source for space weather alerts and warnings. The Center partners with Air Force Space Command on SSA, and provides SSA for the civilian sector by being the flagship regional warning center for the International Space Environment Service.
- In 2007, Congress established the Operationally Responsive Space (ORS) Office to evaluate new methods of satisfying Joint Force Commanders' space needs. ORS has made significant strides in developing enabling technologies and concepts to drive

timelines down and deliver space-related information to the military. In June 2011, ORS launched the first spacecraft designed to respond to an urgent need of a Joint Force Commander. ORS-1 is successfully demonstrating our ability to give warfighters an effective but rapidly deployable capability at a fraction of the schedule and cost of a traditional major acquisition program. Continued support for the resources and authorities of ORS will create opportunities for Colorado's satellite industry, as well as establish the program as a key contributing element of assured U.S. space power.

- The importance of cyberspace is rapidly growing in nearly all aspects of national life. Our nation's cyberspace is under continuous threat. Although U.S. military defense is a critical area, financial markets, information systems, and many other aspects of civilian infrastructure all require a secure cyberspace. Air Force Space Command (AFSC), headquartered at Peterson Air Force Base, is responsible for the Air Force's cyberspace mission, which brings opportunity for growth and new business for Colorado companies to support cyberspace operations. A Space Foundation initiative, the Cyber 1.0 conference, promises to do for Cyberspace what the National Space Symposium has done for space - with significant economic benefit accruing to the state of Colorado. There is also great value for Colorado in growing cyber-related curriculum in our education institutions.

CONCLUSION

The purpose of this Colorado Congressional Briefing is to present opportunities that the Colorado Space Coalition identifies as key issues in the aerospace industry and to recommend possible actions by members of the Congressional Delegation to assist the state in reaching its goal of further growing Colorado as a center of excellence for space.

This document is a step toward providing a long-term, coordinated, and unified approach to action, authorization, and appropriations. The Colorado Space Coalition is committed to a partnership with the Colorado Congressional Delegation in this effort.

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