

Proceedings of the Innovation & Successful Partnerships Summit Houston, Texas

Putting Together the Puzzle: Findings and Implementation Recommendations

Executive Summary

Texas economic development strategy recognizes that global competition is increasingly based on knowledge-based talent, and the ability to commercialize new technologies into high growth global industries. One recognized Texas asset for both talent and technology innovation is the National Aeronautics and Space Administration Johnson Space Center in Houston.

NASA and its contractors have developed, tested and transferred over 75,000 scientific solutions to the commercial world for more than 40 years. Today, the Johnson Space Center is specifically undergoing a transition that could provide industries with a unique opportunity to explore those solutions and learn about the workforce that made this possible.

The mission of the Johnson Space Center is changing following the completion of the 29 year old space shuttle program and termination of NASA's back-to-the-moon Constellation Program. This major change may eliminate or at least put at risk more than 6,000 jobs in the Houston region. While some positions may be transferred to new programs, Texas leaders want to ensure that neither the core group of engineers nor other talented specialists are lost during the transitions. Texas must take steps to discover resources and promote opportunities that will minimize the economic impact of the cancellation of the Constellation Program and maximize the unique technical skills of the at risk workforce.

Under the leadership of the Johnson Space Center, the Greater Houston Partnership, and the Texas Workforce Commission, a strategy was developed to meet the challenges of Johnson Space Center's

changing mission and workforce issues as well as to provide opportunities for partnering with non-aerospace organizations. Other partners included the Office of the Governor, the Gulf Coast Workforce Board and the Bay Area Houston Economic Partnership.

As a part of the implementation of this strategy, the Innovations & Successful Partnership Summit was held September 2, 2010 at Rice University in Houston, Texas. The Summit provided a forum for senior level industry executives and the Johnson Space Center team to convene and discuss strategic initiatives. Conversations took place on how viable partnerships could be formed through licensing, collaborating, joint research projects, and applying 21st Century technology innovation to gain a global competitive advantage for Texas.

Experts from the Johnson Space Center provided a presentation on the organizational capabilities and talent available to industry through licensing and shared research. Other presentations included industry and entrepreneurial opportunities, including a new vision for technology transfer. A portion of the day included facilitated industry-specific small group discussions to share insights, perspectives, and needs from business, industry, and Johnson Space Center representatives.

This report presents the common findings and recommendations gleaned from conversations among representatives of industry, Johnson Space Center and its contractor partners, policy makers and educators from across Texas. Specifically, it focuses on Johnson Space Center's changing mission, identifies current opportunities and challenges to enhance the process and partnerships for both the Johnson Space Center and industry partners, and provides recommendations from the core findings of the Summit. The report frames the critical issues derived from the Summit as well as proposes a road map to guide Johnson Space Center and industry towards a future of successful partnerships.

I. Johnson Space Center's Changing Mission

NASA will retire the 29-year old space shuttle program and look to a new direction. The president signed the National Aeronautics and Space Administration Act of 2010. This authorization lays out a new plan for NASA by investing in its programs and planning for new ones. It extends the life of International Space Station while developing a commercial space

transportation industry. The President restructured the Constellation program to sustain capability for long-duration presence in low-Earth orbit. This new plan focuses NASA's exploration efforts beyond low earth orbit, and does not support the previous plan to return to the moon. The decision represents a major change in strategy for the space agency, which had already poured \$9 billion into a new rocket, the Ares 1, and a new crew capsule, Orion. Both projects were five years into development and several years from completion, and have now been eliminated by the administration's 2011 budget. The budget includes \$2.5 billion over the next two years to close-out Constellation.

For the NASA Johnson Space Center (JSC) in Houston, the most significant change is the outright restructuring of the \$108 billion Constellation Program. That change came atop the planned end to the shuttle program later this year. About 3,300 civil servants work on the two programs, and those jobs will continue. However, there are as many as 6,000 contractor positions in the Houston area associated with the shuttle and the Constellation Program that are being eliminated or are at-risk. The authorization bill requires a study within one year of enactment of the agency's infrastructure and workforce. The study will examine NASA's structure, organization and institutional assets. Prime contractors on the Ares rocket program include ATK Launch Systems, Pratt & Whitney Rocketdyne and The Boeing Company. Lockheed Martin is the lead contractor on the Orion capsule.

Under previous plans, many of the jobs that would be eliminated with the end of the shuttle program would have been transferred to the Constellation Program. Even if some of the shuttle and Constellation jobs are transferred to the new Flagship Technology Demonstrations program in Houston, JSC managers worry about losing a core group of rocket engineers during this transition. NASA believes that the new approach is more sustainable, developing basic technologies — new propulsion methods, life-support systems and other components needed to send humans far from home for years at a time. Admittedly it will take NASA time to develop and bid new contracts. As shuttle and Constellation contractors lose their jobs, immediate employment might not be a reality; the gap could be 12 months or longer.

II. Johnson Space Center

Johnson Space Center (JSC) has its origins in legislation shepherded to enactment in 1958 by then-U.S. Senator Lyndon Johnson. After President John F. Kennedy made the goal in 1961 to put a man on the Moon by the end of the decade, the Space Task Group was formed with Langley Research Center engineers to lead the Apollo Project. The group would need test facilities and research laboratories suitable to mount an expedition to the moon. In July 1961, NASA Administrator, James E. Webb, headed the site selection team. Requirements for the new site included the availability of water transport and an all-weather airport, proximity to a major telecommunications network, availability of established industrial workers and contractor support, an available supply of water, a mild climate permitting year-round outdoor work and a culturally attractive community.

Houston was initially included because of the proximity to the 4,700-acre United States Army San Jacinto Ordnance Depot located on the Houston Ship Channel, and to regional universities, including Rice University, the University of Texas, and Texas A&M University. The selection of Houston for the site was announced in September 1961. The land for the new facility was donated by Rice University and was situated in an undeveloped area 25 miles southeast of Houston near Galveston Bay. Construction of the center began in April 1962, and the facility was officially opened for business in September 1963. When opened, the 1,620-acre facility was originally designated the Manned Spacecraft Center and was to be the primary center for U.S. space missions involving astronauts.

JSC's Mission Control Center has been the operational center of every American human space mission since Gemini IV. The control center manages all activity on board the spacecraft and directs all space shuttle missions. Mission Control Center was constructed in 1962. By 1965, JSC was fully operational and has been responsible for coordinating and monitoring every crewed NASA mission since the Gemini Project. Today, this facility monitors the International Space Station, scientific experiments, testing new concepts for operation in low earth orbit and the health of the astronauts around the clock 24/7, 365 days a year. In September 2008, JSC celebrated its 50th year of leading America into space.

JSC handles most of the planning and training of the U.S. astronaut corps and houses training facilities such as Ellington Field, the Sonny Carter Training Facility and the Neutral Buoyancy Laboratory. The Sonny Carter Training Facility provides pre-flight training in becoming familiar with crew activities and with the dynamics of body motion under weightless conditions. The Neutral Buoyancy Laboratory provides a controlled neutral buoyancy environment, a very large pool containing about 6.2 million gallons of water, where astronauts train to practice extra-vehicular activity tasks while attempting to simulate zero-g conditions.

JSC is also responsible for operations at the White Sands Test Facility (WSTF) in New Mexico. The WSTF is a rocket engine test facility and a resource for testing and evaluating potentially hazardous materials, space flight components, and rocket propulsion systems. WSTF services are available to NASA, the Department of Defense, other federal agencies, universities and commercial industry. As the official JSC Propulsion Systems Development Facility, WSTF participates in propulsion systems testing, with test expertise in hypergolic propellant handling and training, and it is the Shuttle Fleet Leader for testing orbital maneuvering and reaction control subsystems. The engineers, chemists, and scientists in WSTF laboratories conduct testing of hazardous materials and propellants, air quality, aerospace hardware and ground support equipment, and all materials used in space flight.

JSC also leads NASA's flight-related scientific and medical research programs. Technologies developed for spaceflight are now in use in many areas of medicine, energy, transportation, agriculture, communications and electronics.

The Astromaterials Research and Exploration Science (ARES) office performs the physical science research at JSC. ARES directs and manages all functions and activities of the ARES scientists that perform basic research in earth, planetary, and space sciences. ARES scientists and engineers provide support to the human and robotic spaceflight programs. The responsibilities of ARES also include interaction with the Office of Safety and Mission Assurance and the Human Space Flight Programs.

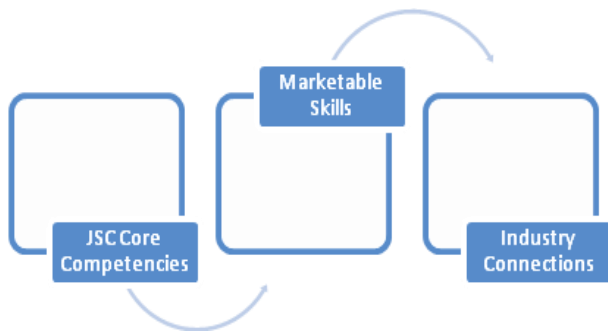
JSC was granted a five-year, \$120-million extension of its agreement with the National Space Biomedical Research Institute at Baylor College of Medicine to study the health risks related to long-duration space flight. The extension will allow a continuation of biomedical research in support of a long-term human presence in space started by the institute and NASA's Human Research Program through 2012.

III. Texas' Vision for Economic Development

Texas has developed an economic development strategy that focuses on fostering industries and technologies where the state has the greatest growth potential. In today's globally integrated economy, Governor Rick Perry has said that "knowledge and capital are rapidly being deployed to parts of the world where the right combination of talent, technology, business climate, infrastructure and markets converge." Although Texas is an acknowledged leader in many

The Texas Workforce Commission is the state government agency charged with overseeing and providing workforce development services to employers and job seekers of Texas. TWC is part of a local/state network that includes statewide efforts coupled with planning and service provision at a regional level by 28 workforce boards.

areas of economic growth, momentum alone will not ensure a prosperous future. Economic success is no longer just competing against neighboring states, but is a competition among nations. This competition is increasingly based on knowledge-based talent, and the ability to commercialize new technologies into these high growth global industries.



JSC and its partners are looking to match Johnson Space Center Core Competencies to Marketing Skills, and link the Marketable Skills to different Industries

The pace of global competition, however, has left both states and companies struggling to keep up. As markets move faster, strategic planning and program implementation have increasingly focused on how regional assets drive economic performance. Competitive advantage,

whatever its source, ultimately can be attributed to the exploitation of a valuable resource that enables a region to perform activities better or more cheaply than its competitors. This is true at the state level, where the valuable resource may reside in its universities or its natural resources (or the research-based interface of both), and equally true at the corporate level, where innovation and technology can drive new goods and services into a global marketplace. This “resource-based view” links a region’s internal capabilities (what its employers do well in converting resources to goods) to the external environment (what the market demands and what competitors offer). The ability of regional industries to network into centers of innovation and creativity can offer low-risk opportunities to adapt to changing market demands and commercialize new products or services with a time-to-market advantage.

Since workforce is a key component to developing and maintaining a competitive advantage, Texas views skilled employees as a local resource.

The Johnson Space Center’s (JSC) highly skilled talent pool serves Texas as a regional resource and provides an economic competitive advantage over global competition spanning multiple industries. Clustering high skilled workers together not only develops a pool of talent for the future, but breeds innovation and the creation of new enterprises. Building an economic environment that will allow this talent pool to remain in the region is necessary to developing a pipeline that will meet Texas’ future workforce needs. The Gulf Coast Workforce Board has board staff and a Workforce Solutions team that offers strategic planning and assistance to the JSC leadership team, employees of JSC and contracting companies to provide opportunities to stay in the region, whether for re-employment with another organization or taking advantage of entrepreneurial opportunities to start a new endeavor.

The workforce system is finding new ways to identify innovative methods to serve out-placement employees. One example of this innovative approach is a new integrated Workforce Solutions website that compiles a standard set of employee information from JSC and its contractors, so that JSC will have the same information available as other employers in the region and across the state. Another recently launched website is safeguarded by a “member only” process for current and future employers and provides more detailed information on

employees. This process allows potential employers direct access to available employees and their skill sets. Also, the U.S. Department of Labor recently announced a \$5.3 million grant to assist about 600 workers affected by layoffs from multiple employers impacted by NASA's retirement of the Space Shuttle program. Awarded to the Texas Workforce Commission, this grant will be operated by the Gulf Coast Workforce Board. The grant will provide affected workers with access to dislocated worker services, which may include skills assessment, basic skills training, individual career counseling and occupational skills training.

Social media outlets are allowing a Workforce Solutions team to find synergies between businesses, job postings, and jobseekers from the aerospace industry. Multiple social networking mediums, like Twitter, were used to attract over 250 job seekers and 80 businesses to participate in a virtual job fair. Social media provides JSC an inexpensive method to inform new partners about core competencies and collaboration opportunities. JSC can also use social media to develop a new community of interest, to discuss current research opportunities, and to efficiently center outreach efforts.

SOCIAL MEDIA IN ACTION
The Aerospace Transition Center created a LinkedIn group that provides real-time information about new job opportunities and people looking for work, and the group also serves as a virtual discussion board

IV. Innovation and Successful Partnerships Summit

On June 7, 2010, staff from the Texas Workforce Commission (TWC) and Workforce Solutions Gulf Coast (WSGC) met with leadership at the Johnson Space Center (JSC). The topic of the



meeting was to discuss the budget cuts at JSC and to propose a meeting between JSC, its contractors and a group of employers from around the state to discuss technology transfer, talent transfer, and possible joint initiatives between the aerospace industry and other employers. The concept was presented to the JSC Leadership Team, which

supported the concept and proposed a meeting date of September 2, 2010. The event was led by the Greater Houston Partnership, the JSC Team and TWC in collaboration with the Office of the Governor, WSGC, the Bay Area Houston Economic Partnership and Rice University.

The meeting would provide participants the opportunity to discuss strategic initiatives from an industry perspective and how viable partnerships could be formed through licensing, collaborating, joint research projects, or applying 21st century technology and innovation to gain a global competitive advantage and premier position for Texas. Specific goals for the newly named Innovation & Successful Partnerships Summit (Summit) were established in collaboration with the JSC Leadership Team. Goals included:

- Engaging major industries for technology interchange with JSC;
- Building the technical capabilities and reputation of Houston and Texas;
- Enabling NASA's Missions toward Human Space Exploration;
 - Maintaining key competencies;
 - Enhancing, establishing and/or developing technology competencies;
 - Leveraging other resources;
- Strategically positioning JSC for future opportunities
 - Enabling JSC to better navigate through peaks and valleys of funding and Workforce;
 - Gaining efficiencies in institutional infrastructure (e.g., green);
- Inspiring technology advancement in academia and creating a workforce pool of the future; and
- Assisting NASA as a catalyst to establish an industry market for low earth orbit space exploration.

The Summit was held on September 2, 2010 at the BioScience Research Collaborative on the Rice University campus in Houston, Texas. Industry executives came to hear about the unique skills, technologies and partnering opportunities at JSC, as well as the research and commercialization opportunities that exist for Texas businesses.



Experts from JSC provided a capabilities presentation on the resources and assets already available and the potential for developing new and evolving partnerships to meet potential partner needs. Other presentations included industry and entrepreneurial opportunities, a new vision for technology



transfer, and an overview of how technology, innovation and partnerships can help meet the current and future industry needs of Texas. A portion of the day included facilitated industry specific small round table discussions to share insights,

perspectives, and needs from the business, industry and JSC representatives participating in the Summit.

These discussions were led by facilitators who had been selected for their wealth of industry



understanding, professional credentials and objective perspective. Each facilitator was assigned to the round table suiting his/her industry knowledge. Three “small group” round table discussions were held for the following industries: Life Science & Healthcare; Petroleum Exploration & Processing/ Power Generation & Renewable Energy; and,

Transportation, Logistics and Maritime Industries/ Advanced Technologies & Process Industries.

V. Common Findings

A. Multiple areas of interest were identified by participants in the Summit round table discussion groups that may offer Johnson Space Center broad opportunities for technology transfer, applied research and commercialization. (See Text Box)

- Overlap and duplication exist between Johnson Space Center (JSC) and other industries' activities.
- Relationships should be established to cultivate new synergies between JSC and industries within areas of interest.

B. Private sector employers and potential industry partners do not understand the organizational structure and workforce core competencies for the Johnson Space Center and its contractors.

- Contractors have focused on responding to NASA Request for Proposals and have not marketed to the private sector.
- Private companies that are not currently NASA contractors do not have information about the capabilities and core competencies of Johnson Space Center employees, contractors, and other partners.

Areas of Interest

Solar Panel Design for Improved Efficiency

Weather – lightning detection and forecasting

R&D on Nuclear Power

Vibration Monitoring on Wind Turbines and Towers

Wind Performance Mapping

Earth mapping for Energy Installations

Energy Storage – High Capacity Lithium Ion Batteries

Energy Storage – Fuel Cells

Risk Analysis

Complex Systems Design and Control

Energy Transmission and Nanotechnology

Water Desalination and Recycling

Corrosion

Remote Sensing and Monitoring

Composite Materials

Ultrasonic Technology for Pipeline Monitoring

Testing Facilities – Aerodynamics

Systems Engineering

Radar Interference

Laser Monitoring of Emissions in Non-Attainment Zones

Structural Design and Analysis

Laser Measurement of Latent Oil in Gulf of Mexico

Facilities and Methods for Operational Testing of Wind Turbine Gear Boxes

Training Systems and Methods Analysis Tools (root cause analysis, FMEA, etc)

Environmental, Safety and Health Technical Assistance and Planning

65 Human Systems Risks – gaps in knowledge and technology

ISS use and data feeds

Commercialize (even co-brand) to use NASA credibility across disciplines

Regular SBIR funding for Human and Health Performance

C. The private sector has not engaged with the Johnson Space Center and its contractors to develop a roadmap to successful partnerships.

- Companies want a consistent process of technology transfer that is common across all of Johnson Space Center (JSC) and its contractors. In the private sector, technology transfer can be accomplished through licensing agreements, commercialization agreements, joint ventures, public/private partnerships, and possibly other ways. Currently in the JSC organization, each of these technology transfer opportunities may require its own unique, but modernized process.
- Private-sector companies and research institutions have simplified and streamlined the technology-transfer process in recent years and are available to assist JSC in making these same changes.

D. The “Pull” oriented technology outreach by Johnson Space Center has some recent success...

- NASA has expended considerable effort in benchmarked industries with successful alliances that are seeking common interests with the space community.
- There are tremendous success stories of commercialization and new product spin-off from NASA to the private sector.
- Industry understands and appreciates the marketplace value of having NASA and the Johnson Space Center Team as partners. However, industry is often hesitant to invest in what it sees as a difficult and protracted process for technology transfer. Smaller companies are likewise hesitant to invest scarce resources in what they see as an environment that has a high risk of shifting priorities in the NASA community.

E. ... though the “Push” technology outreach is less functional.

- Johnson Space Center (JSC) and its contractors are open to working in a “push” function when solutions are found internally that have external value; however, the JSC “push” function is generally thought to be too slow and NASA’s mission does not focus on revenue, but rather on responding to specific needs within the space program.
- The JSC Team has developed dual usage solutions around its Human Systems Risks portfolio that could be offered to commercial markets. Technical briefs on these

solutions are available; however, the feedback from the marketplace is that processes, technical data and timelines for acquiring and licensing technologies from JSC, its team, and the NASA community at large are too cumbersome and time-consuming to mitigate the risk of adopting and commercializing new technologies.

- Models of parallel funding for innovation exist at other national labs and should be researched for JSC to streamline its process for partnering and commercializing technology while maintaining its current high degree of fiduciary responsibility.

F. Each Round Table Discussion group requested the name and contact information for a “single point of contact” within the Johnson Space Center family of organizations.

- “Who should I call about...?” was a question often asked by industry participants in each Round Table Discussion at the Summit.
- It is unreasonable to propose that a single person can be so networked within the Johnson Space Center (JSC) Team as to know all of the (a) technology development (b) facility availability and (c) contractor competencies, along with (d) understanding the various partner industries and their needs, and (e) how to partner with / contract with / outsource to / license to or from, etc.
- The business case presented by a combination of extraordinary opportunities and bureaucratic processes may be intuitive to one party, but may be prohibitively confusing to another. There must be a “front door” to begin conversations and collaboration.
- JSC, its contractors, and potential partners from the private sector should be focused on collaborative efforts. The technology that underlies the connection should be apparent and intuitive.



G. The internal culture of the Johnson Space Center and its contractor partners presents significant challenges.

- The culture of the Johnson Space Center (JSC) is highly mission-driven. Priorities at JSC align with congressional priorities and appropriations, and sustained success is measured not in revenues or spin-off's, but in sustained funding and mission successes. These metrics are shared across the NASA community and its contractors.
- NASA's Research & Development budgets are pre-committed; therefore, innovation is not always synchronized with the timing of federal funding cycles.
- There has not been a history of interaction with industry "outside the fence," although where interactions have occurred, there have been amazing successes and spin-offs.
- While many major companies are aware of some of the work going on at JSC, they have not been actively recruiting talent or technology from JSC and its contractors.

V. Recommendations

The following recommendations were developed from the Innovation & Successful Partnerships Summit's core findings and round table discussion groups. The recommendations frame the critical issues derived from the Summit as well as propose a road map to guide Johnson Space Center and industry towards a future of successful partnerships.

Recommendation: Provide easily accessible information on the organizational structure of the Johnson Space Center and workforce core competencies from the Johnson Space Center.

The Johnson Space Center (JSC) and its contractors conduct business by working under federal funding guidelines. Up until now, NASA has had little incentive to partner with private industry, and private-sector contractors were successful at responding to JSC's Requests for Proposals (RFP). During the Summit round table discussions, one contracting company's CEO went as far as to say that his company doesn't know how to market because all they have ever done is respond to RFPs – a strong example of how JSC and contracting companies do not communicate their capabilities to the private sector. Private sector companies, on the other hand, do not understand the capabilities and core competencies of JSC employees, contractors, and other partners. There are many opportunities for companies and industries to lease JSC facilities,

transfer technology, commercialize technology, and conduct joint research. An important step in exploring these opportunities is for JSC to communicate what tools and technologies they have that might bring value to private sector companies.

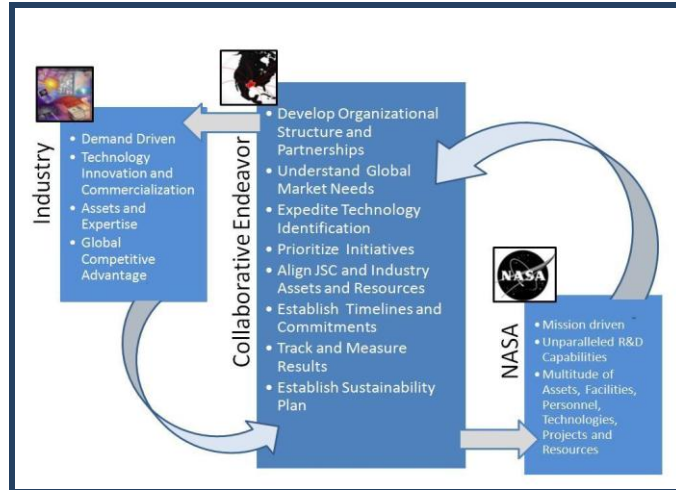
It is also important for JSC and contractors to communicate the skill-sets of employees that are scheduled for outplacement since businesses in the Houston area, across Texas, and even nationwide may be looking for employees with high-level skills identical to persons that are to be released. Transferring JSC employees to private sector companies will be even more difficult if companies don't understand the core competencies of the talent pool.

JSC and affected contractors need to interact with private companies and organizations to demonstrate their capabilities and resources (facilities, personnel, etc.), to find new partners and establish new funding sources, and provide outreach to new partners. NASA contractors need to invest in communicating how their assets translate to value in the private sector. Workforce professionals are currently using a customized web-based skills matching system to identify potential employment opportunities for contractor employees slated for outplacement. The occupations of JSC employees and its contractors are broken down into detailed work activities (DWAs), and then matched across different industries to expand employee opportunities. Communicating the skill-sets and core competencies of people that are scheduled to be released needs to be a top priority for JSC, and a similar process could be developed to "cross-walk" technology transfer and joint research opportunities.

Recommendation: Implement an organization to act as the "single point of contact" for the Johnson Space Center Team.

The Johnson Space Center (JSC) Team's "single point of contact" might best be filled by a new "Outside the Fence" organization. This organization would be outward facing, but with internal knowledge, access and the authority to pursue, develop and exploit relationships with private sector partners. The organization would have deep knowledge of JSC and contractor research needs (the "pull") and market potential (the "push"), as well as knowing processes for due diligence and acquiring or commercializing technologies and facilities. Ideally, the organization would be made up of both JSC leaders and members of the larger JSC Team, and would report to

the JSC Director. The organization’s success would be measured on its achievement of developing a “community of practice” within the JSC Team and linking it to multiple industries through joint internal and external efforts of technology transfer (both to and from JSC and NASA), and such related projects as executives in residence, networked entrepreneurship training and incubation, and process improvement in industry-facing licensing and communications.



This new organization could also serve as the interface between incubation of commercial solutions and the private sector. This office/organization would act as intermediary for the research/scientist and entrepreneurial/commercialization communities that often may not speak in the same terms. This is where industry will communicate with JSC and its contractors, facilitating both the “push” and “pull” of technology.

The new organization should promote itself heavily to industry by offering a seamless process to collaborate and partner with JSC. The new organization should be a “one stop shop” for all industries. Best practices should be developed for the organization to market the JSC talent pool to other industry business partners.

- The “outside the fence” group should organize and centralize an outreach plan so that companies looking to partner with the NASA community have a single place to go.
- This new organization should be charged with designing and vetting a new system for technology transfers and partnerships.

There are policies and programs in place to incent a “pull” of needed technologies and research into the JSC portfolio with ongoing partners including ongoing conversations through Rice University and a series of workshops held in partnership with the Human and Health Performance Center. JSC has been proactively working the “pull” function in Space Life Sciences by having open innovation platforms where limited prizes are provided for discrete technology solutions.

JSC should build on these established partnerships with local economic development entities, including the Bay Area Houston Economic Partnership, the Houston Galveston Area Council, the Houston Technology Center and the Greater Houston Partnership, to promote its needs. Outreach can be done through facilitated networking, including the use of social media. JSC also has mentoring / protégé programs, such as the NASA Scientist in Residence Program that can be expanded and promoted. Outreach programs might include business plan competitions at both undergraduate and graduate levels and technology innovation competitions, etc. The JSC Team could partner with such organizations as the ExxonMobil Foundation, Vestas Research and Development and the Office of the Governor to raise the number and profile of such events, and to pull in more participants. By raising awareness of the available research that can be shared with, jointly pursued, or transferred to Texas universities, JSC can provide statewide resources of knowledge for collaboration.

Recommendation: Widely distribute identified Human System Risks.

An important step for the Johnson Space Center in pulling in outside technologies was the identification of the 65 Human System Risks by the Space Life Sciences group. JSC should make these identified gaps in knowledge and technology widely available in order to attract partners and develop solutions that mitigate identified risks. Organizations around the world, including groups like the responders to the trapped Chilean miners, see practical use in helping to solve challenges to human systems.

Recommendation: Small Business Innovation Research should include regular funding for Human Health and Performance.

The Johnson Space Center (JSC) and private sector representatives agreed that including Human Health and Performance (HHP) as a topic in every cycle of the Small Business Innovation Research (SBIR) funding program is imperative to developing successful opportunities for small businesses to meet federal research and development needs. Currently, the annually awarded SBIR funds are based on agency selected topics which do not always include an HHP focus. Sporadic funding cycles, including funding for HHP projects, leaves gaps in the forward momentum of projects and discourages small business engagement in the innovation system. Some projects cease operations entirely during an unfunded interval. JSC and small businesses should commit to encourage a stringent HHP focus in SBIR funding opportunities to help fill these gaps and develop synergies in the research and development field.

Recommendation: Standardize and streamline the technology transfer process across the Johnson Space Center.

Private sector companies are looking for opportunities to invest in technology transfer and to benefit from commercializing technology-based innovations. These companies want a standard process of technology transfer across the Johnson Space Center (JSC). Businesses are looking to JSC for licensing agreements, commercialization agreements, joint ventures, public/private partnerships, and possibly other opportunities; each of these pursuits should have a streamlined and modernized process. Companies need “low-risk projects” to invest in technology transfer or new partnerships. In the current economic environment, leaner staffs make it difficult to invest time and money on projects that have a high risk of not developing due to a cumbersome process. While some JSC divisions have decentralized their transfer processes, streamlining the larger organization’s processes will allow companies to find synergies with JSC resources across divisions. A simplified process will encourage more private companies to work with JSC.

Recommendation: Industry needs to commit time and resources to develop effective communication and meaningful partnerships with the Johnson Space Center.

Industry leaders have demonstrated their commitment to the economic development of Texas by their participation in the Governor’s Competitive Council, the Industry Cluster Initiative, and a multitude of industry trade associations, chambers, and other public sector projects. Business leaders recognize that the Johnson Space Center (JSC) and its contractors offer virtually

unlimited potential for companies to develop partnerships and leverage resources. The challenge is to devise a more efficient and productive process that requires a concerted effort from all the potential partners.

Industry leaders continue to express a willingness to develop robust partnerships and help design a process that would expedite the identification and vetting of viable joint projects. The Innovation & Successful Partnerships Summit (Summit) offered an introduction of JSC resources to some companies, a possible refocusing of effort for others and a chance for JSC and industry to interact about the next best steps for all.

By more clearly defining the technologies and sectors they are pursuing, company leaders, trade associations and knowledgeable experts could help focus efforts, accelerate the process for organizational change and technology transfer, and finally, could help improve unit performance and results. The technology areas of interest identified at the Summit offer a starting point for the discussion. However, handing over a partial list of opportunities or competencies without meaningful and ongoing interaction will fail to produce successful results.

Industry-focused working groups have been used effectively in designing and managing public private partnerships. If such a construct were to be adopted by JSC and its partners, interested private sector companies could contribute their in-house experts as members of these working groups to collaborate with JSC experts in identifying the most likely technologies to benefit their company and or industry. These groups would be organized by industry sector to review and advise on both near term and longer term opportunities.

By using the resources and reputation of JSC along with the business savvy and market intelligence of industry leaders, opportunities could quickly be turned into measureable results and greater success for all involved.

Recommendation: Implement a similar Innovation & Successful Partnerships Summit for research universities in Texas.

Among the goals of the Innovation & Successful Partnerships Summit (Summit), Johnson Space Center (JSC) and the other organizers sought to inspire technology advancement in academia. Given the preliminary successes of the first Summit, a similar event between the JSC Team and major research universities in Texas should be held to discuss technology transfer, research availability and transfer, and possible joint initiatives.

Leading-edge research requires resources, and JSC offers exceptional facilities and equipment. More important are the exceptional human resources— the consolidation of minds and talent from JSC and Texas' research universities. Collaboration allows partners to share resources, to identify and work on more challenging problems, and to manage any associated project risks. Together, JSC and Texas research universities can discuss focusing their combined expertise and resources.

The collaboration of JSC and Texas research universities can be a highly successful formula. By raising awareness of the available research and needs that can be met, jointly pursued, or transferred to research universities in Texas, JSC will provide statewide resources of knowledge for collaboration. Top research universities in Texas have simplified and streamlined the technology-transfer process in recent years, and JSC could learn from their efforts. Advantages of this level of collaboration include the growth of competitively funded research programs, the involvement of other public and private entities in research activities, and the leveraging of resources to maximize the investment return for both JSC and the State of Texas.

Prior to the proposed event / Summit:

- A central website should be developed for potential attendees to review the range of JSC capabilities and research;
- Organizers should meet to define the purpose and scope of the Summit, including the primary messages to be conveyed, the goals to be achieved, and any expected follow up activities after the event (i.e., agreement on the best methods for post-Summit information exchange, forward dialogue with Summit partners and attendees, etc);

- JSC should hold internal pre-Summit meetings with the extended JSC Team to ensure all expectations and messages are consistent, and to assign JSC leaders to participate by Summit focus areas;
- The roles and responsibilities of each partner or sponsor should be assigned and designated to allow for seamless Summit planning; and
- Potential attendees should be identified by the partners for prospective synergies, and to note key areas of concern.

The organizers of the Summit should allow for a two-way flow of information from JSC and the research universities. Adequate time should be allotted for networking. The tone of the Summit should allow attendees to feel free to share ideas and collaborate.

VII. Appendix

For more information on the Johnson Space Center and the Innovation & Successful Partnerships Summit visit <http://www.nasa.gov/offices/ipp/centers/jsc/summit/index.html>.

Acknowledgements

The Innovation and Successful Partnerships Summit was led by the Greater Houston Partnership, the Johnson Space Center Team and the Texas Workforce Commission in collaboration with the Office of the Governor, Workforce Solutions Gulf Coast, the Bay Area Houston Economic Partnership and Rice University.

Special thanks to the BioScience Research Collaborative at Rice University, the National Corrosion Center, the Ocean Energy Institute, Meso Coat, PetroLuxus, and Planet Resource Recovery, Inc. for their support of the Summit.

Special Acknowledgements

Dr. Wade Adams, Rice University
Elaine Barber, Greater Houston Partnership
David Braun, Bay Area Houston Economic Partnership
Michael Coats, Director, Johnson Space Center
Reagan Davis, Greater Houston Partnership
Carlos Garcia, Rice University
Yolanda Marshall, Johnson Space Center
Bob Mitchell, Bay Area Houston Economic Partnership
Jeff Moseley, Greater Houston Partnership
Tom Pauken, Chairman, Texas Workforce Commission
Emil Peña, Executive Director, National Corrosion Center
Doug Peterson, Johnson Space Center
Wendi Schoffstall, Rice University
Barry T. Smitherman, Chairman, Public Utility Commission of Texas
Nancy Tootle, Gulf Coast Workforce Board