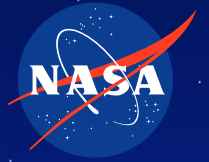


Deloitte.



Houston, we've had a breakthrough!

Reimagining the JSC-of-the-future using
Deloitte's Breakthrough Manifesto to engage
the spaceflight community and usher in the
next 60 years of human spaceflight



Summary

Based on more than a decade of research and work with clients, Deloitte published *“The Breakthrough Manifesto”*¹ in 2023 which captures 10 principles and 50 methods that can spark transformative innovation. Deloitte and NASA have collaborated to apply these principles and methods to re-envision the future of human space exploration and industry collaboration for the benefit of all.

Introduction

We are in a new golden age of space—and the market is booming, with predictions valuing the space economy at \$1T by 2030.² This era is a result of significant industry disruption over just the last decade. Innovation across government, industry, and academia alike has driven a vast increase in space capabilities and speed to market while unlocking new markets from in-space manufacturing to tourism. These disruptions and innovations have transformed the space market—garnering new interest, funding, players, and markets—while causing ripple effects in business models, talent alignment, budget priorities, and more. It is a time of momentous challenge and opportunity.



NASA Johnson Space Center (JSC) resolves to meet the moment and usher in the future of human spaceflight for the next 60 years by becoming the hub for human space exploration. Anchored in its rich human spaceflight heritage, JSC is positioning itself to be the preferred go-to-market human spaceflight partner. To achieve this, they have established their blueprint—**Dare, Unite, Explore (DUE)**—comprised of 5 strategic pillars. JSC will 1) lead globally; 2) explore new destinations now; 3) revolutionize the human experience in space; 4) create game changers; and 5) propel the space economy.

JSC's primary goal is to enable their partners to unlock the full potential of their organizations to advance human spaceflight. JSC

will serve as the hub of collaborative innovation and incubation, contributing to its partners its differentiated expertise and key infrastructure. This paper tells the story of a collaboration between JSC and Deloitte to envision and shape the future by applying Deloitte's Breakthrough Manifesto to the unique opportunities of this time. The lessons learned along the way can help any organization or industry seeking transformative breakthroughs.

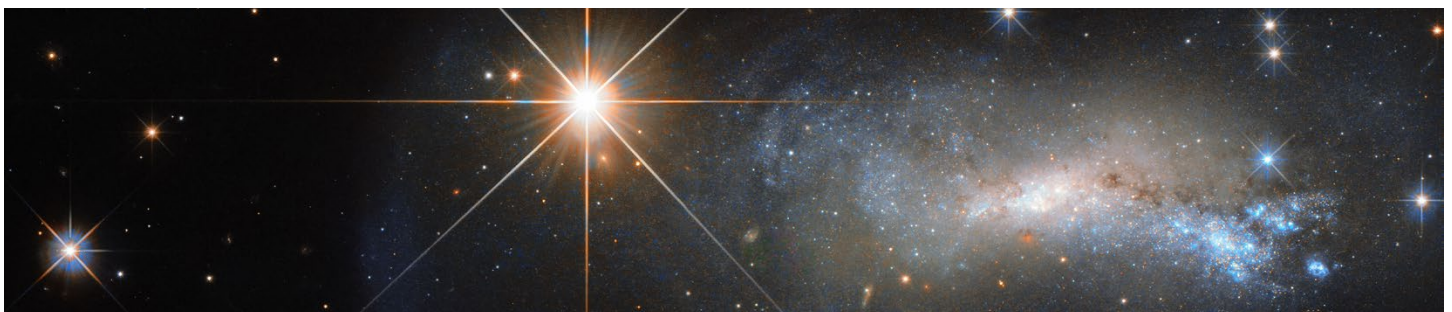
A breakthrough vision for NASA's role in space exploration

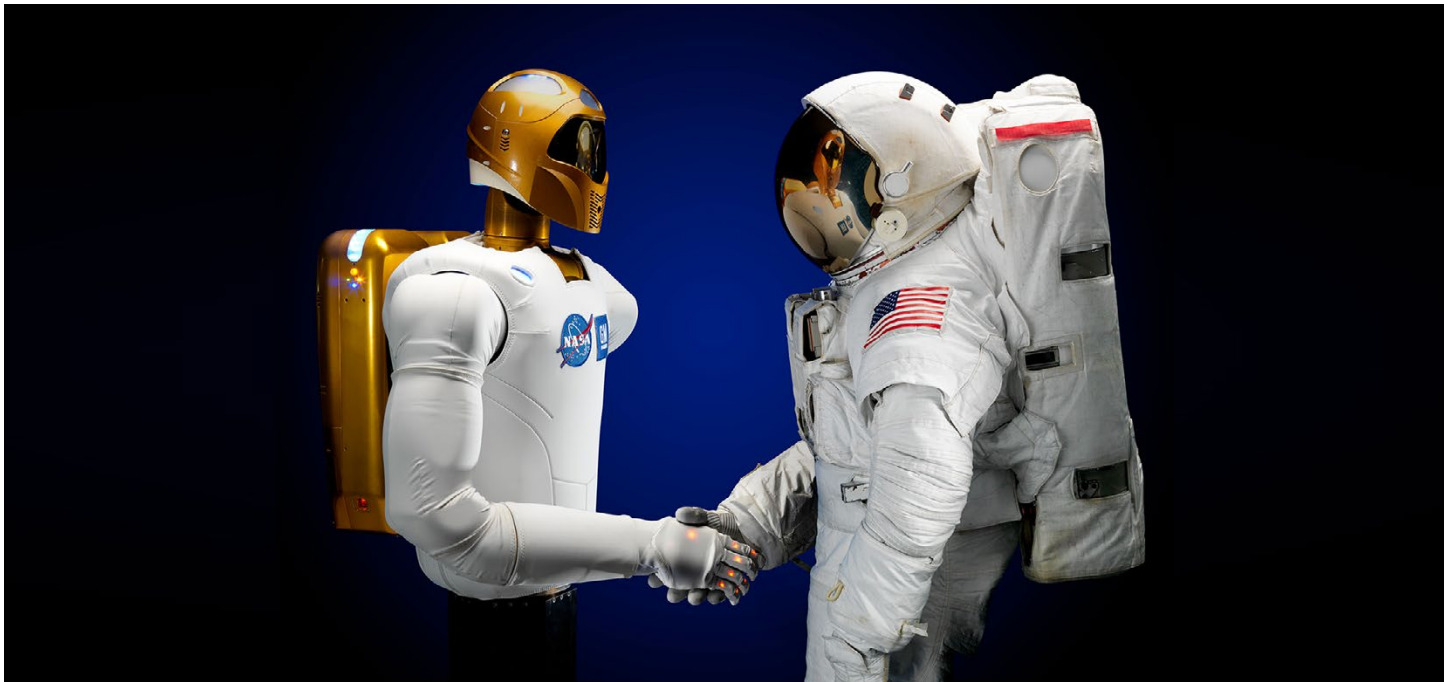
The space industry has evolved immensely in recent years, shifting across size, scope, funding, and—most noticeably—how business is done. Governments no longer control the ecosystem or orbital access, and the industry is driven more by commercial innovation, investor energy, and market dynamics than by large government procurements and development projects.

JSC sees an opportunity to transform along with the industry. To realize its aspiration of leading in human spaceflight for the *next* 60 years, as they have for the *last* 60 years, they will foster a collaborative ecosystem that leverages the leading resources, capabilities, and talent the nation has to offer.

"Giant Leaps Start Here"—that is JSC's motto and their next giant leap starts now. Building on their rich heritage, JSC is aligning its strategy and operating model to become the preferred go-to-market partner; accelerating partner technology and mission goals by offering use of center assets and expertise; by incubating and then transferring technology to partners; and by enabling greater use of the nation's existing spaceflight infrastructure such as test, training, health, and operations facilities.

Realizing any audacious vision poses considerable challenges and JSC's ambitions are no different. They are focused on transforming how they work and communicate, putting innovative partnership at the center of all they do. To bring their bold vision to life, JSC enlisted Deloitte, the Deloitte Greenhouse™, and the Breakthrough Manifesto to explore the best ways to transform with the market, encourage and enhance stakeholder collaboration opportunities, and cement itself at the center as the hub of this newly transformed human spaceflight economy and ecosystem.





The Breakthrough Manifesto

The Deloitte Greenhouse developed the Breakthrough Manifesto after more than a decade of work with individuals, teams, and organizations seeking transformative change. It codifies 10 principles underpinning all the Deloitte Greenhouse does to help organizations tackle their thorniest challenges and overcome their most intractable barriers. Derived from research and practice, and pressure-tested with some of the world's largest and most successful companies, Deloitte has found that these principles, when applied with intention and regularity, can greatly enhance the likelihood of getting to breakthrough.

Deloitte thinks of breakthrough in terms of its two central aspects, inherent in the name:

- **BREAK**—obliterating barriers and obstacles that stand between you and the place you're trying to get to on the other side.
- **THROUGH**—not just leaving things broken, but rather creating momentum to successfully transition between the *from* and the *to*.

Despite its importance and impact, the process of getting to breakthrough isn't standard fare for most individuals and teams. It requires a certain type of mindset and thinking that spurs engaging with the world differently.

To achieve breakthrough, one must first realize that there is a problem or opportunity relative to the current state, as JSC realized with their role in the human spaceflight ecosystem. Then, one must figure out what's getting in the way and how to overcome it and build the impetus and drive to achieve the desired change. JSC collaborated with Deloitte to do just that.

The 10 Breakthrough Manifesto principles

1. **Silence your cynic:** Suspend disbelief and assume everything's possible. No great breakthrough was born of a naysayer.
2. **Strip away everything:** Set aside everything you think you know. Assumptions, beliefs, and dogma are the enemy.
3. **Live with the problem:** Avoid rushing to the solution. Better things come to those who explore before acting.
4. **Check your edge:** Ask yourself, "is this truly unexpected?" Surprise is the mother of inspiration.
5. **Enlist a motley crew:** Go beyond the usual suspects. Sparks fly when thinkers, domains, and outside disciplines collide.
6. **Get real:** Shed the glossy veneer and bring your authentic, gnarly, bruised, human self. Magic happens when we're personal, connected, and real.
7. **Make a mess:** Stop perfecting and just start making, doing, and trying. A prototype is worth a thousand discussions.
8. **Don't play nice:** Call out the elephants. The sooner you get truth on the table, the faster you get results.
9. **Dial up the drama:** Create a full-sensory theatrical experience. Emotional narrative journeys are how humans have made meaning since forever.
10. **Make change:** Shatter the plan. Evolve. Make a dent. Nothing matters unless it matters.

Searching for Breakthrough in the Deloitte Greenhouse

JSC collaborated with Deloitte to reshape their thinking, identify barriers to progress, and unlock the organization of the future. Through the lens of the Breakthrough Manifesto, we worked together to open the aperture on how to look at the challenges facing JSC and expand the possibilities for what the future can really be. Aligning on priority focus areas, we collaborated throughout five different workshops across complementary technical areas. We brought together relevant stakeholders in these disciplines, sharing ideas, rolling up our sleeves, generating roadmaps, and prioritizing actions for collaboration and change. Our ambitions of transformative innovation were further fed by meeting in Deloitte's 14,000 square foot next gen Greenhouse in downtown Houston. This game-changing experiential space is designed to illustrate the art of the possible and to inspire, accelerate innovation, and advance co-created solutions through immersive environments and leading-edge experiences.

Each workshop highlighted a different problem space, exploring its unique challenges, initial plans, working hypotheses, and market perspectives, all anchored in shared future aspirations and big dreams—in the short term, the long term, and beyond. Over the course of these five workshops, JSC cumulatively engaged 40+ unique organizations and 100+ unique stakeholders across government, industry, and academia to focus on the following challenges:

- **Digital transformation:** JSC wants to be digital first, and digital transformation is both a priority and a challenge. For JSC, the crux of transformation is not just the technology, but the ability to access, share, manipulate, and secure data. Furthermore, JSC recognizes that the human, change management aspects of transformation may be the hardest, but potentially the most impactful part.
- **Capabilities mapping:** JSC is well recognized as the home of the astronauts and Mission Control, but is lesser known for its myriad of capabilities, services, and facilities. Over the course of one year, JSC identified more than 375 unique capabilities at the center. Framing these in a way that JSC's partners can understand and will want to use to accelerate the space market is crucial for future collaboration. Translating the NASA vernacular and organization into a business and industry lexicon is key to stimulating interest and excitement.
- **The JSC Front Door:** Serving as a single source of access to JSC, the Front Door must communicate a diverse set of information from capabilities, services, missions, contracts, and more. We explored the best way to frame this Front Door so JSC can meet their partners where they are across capabilities, priorities, infrastructure needs, the ways to work with JSC, and—maybe most importantly—who to contact and how (<https://www.nasa.gov/johnson/frontdoor/>).

Over the course of these five workshops, JSC cumulatively engaged 40+ unique organizations and 100+ unique stakeholders across government, industry, and academia.

- **Texas state and regional space strategy:** The economic engine and space hub that is Texas cannot rest on its laurels. Alabama, Florida, and other states are aligning state level strategies to capture market share, differentiate their slice of the space market, and entice the talent that can enable them to capitalize on this new space boom. How does Texas align such a large state around a common goal, leverage the best of what exists, and strategically invest to attract both missing pieces of its market and accelerate existing aspects of the market? With JSC as the torch bearer, Texas and Houston can build a holistic economic development plan and foster stakeholder buy in to go forward together as a state and remain the hub for human spaceflight.
- **Cross organization collaboration and share investment:** With the space ecosystem and stakeholder base expanding rapidly, there are better and more efficient ways to work across multiple organizations on shared projects and investment. This included identifying barriers across contract mechanisms, data sharing, infrastructure, research, common missions, and shared investment, with the biggest goal being finding ways to maximize finite resources to achieve shared success in space for all involved.



The Breakthrough Manifesto in action

While we engaged all 10 Breakthrough Manifesto principles throughout the workshops, we highlight three of the principles as examples of how they were applied to JSC's challenges.



Strip away everything—Set aside everything you think you know. Assumptions, beliefs and dogma are the enemy.

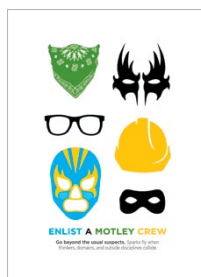
The principle at a glance: When you need a breakthrough, what you think you know can blind you to new possibilities. Instead of leaning into your expertise, beliefs, or orthodoxies, *strip away everything*—set aside

what you think you know, question your assumptions, and adopt a beginner's mindset. Interrogating that which you take for granted can free you from constraints and old patterns of thinking. Rather than assuming you already know the answer, getting curious and asking more questions can open avenues for fresh, unconventional solutions that redefine your reality and landscape.

JSC implementation—The JSC Front Door: At the heart of JSC's challenge is finding the best ways to engage space ecosystem stakeholders and organizations for greater collaboration, to codify partnerships, and to advance and innovate together. JSC believes they are not currently perceived as they want to be and that attempts at collaboration were not quick nor easy. To reframe their approaches, outreach, perceptions, and process, JSC adopted the *strip away everything* principle, starting from scratch and without pre-conceived notions, to examine the problem from the

perspective of their target collaboration partners. The result of this exploration is the JSC Front Door.

Through multiple interviews with ecosystem stakeholders, JSC gathered insight about specific stakeholder personas on their current challenges, needs, and areas where they'd want to collaborate. In short, JSC flipped their approach on its head to meet the market and adapt to their terminology, gaps, and needs. When discussing capabilities, they now do so in a lexicon familiar to industry rather than aligned to JSC organizational structure. Literally *stripping away everything*, JSC completely redefined their capabilities descriptions and rebuilt their website. This included webpage structure, intake portal, and functionality to operate as a true front door to answer any question a stakeholder could have, serve as the one-stop-shop for all things JSC, and—most importantly—connect stakeholders directly to JSC personnel.



Enlist a motley crew—Go beyond the usual suspects. Sparks fly when thinkers, domains, and outside disciplines collide.

The principle at a glance: To increase creativity, *enlist a motley crew*. In other words, seek varied perspectives on a problem, maybe even from outside your own team or discipline.

It can feel good to work with those who see the world as you do, but diversity can foster creative conflict while expanding the ideas that are brought to the table. People with diverse ways of thinking may look at a problem differently, as well as the possible ways of solving it. They will likely examine an issue from multiple sides, pay attention to more sources of information, and make different connections, all of which can increase the possibility of breakthrough.



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JSC implementation—The Business Development and Technology Integration Office: NASA is known as an organization of engineers, and given the mission, engineers are critical, but they're not all that's needed to create JSC's future. It takes a talented, visionary, and diverse team, crosscutting business elements including strategists, futurists, general counsel, and accountants, as well as specialists in business, human resources, finance, and government relations. JSC's Business Development and Technology Integration Office was built with staff from six different organizations and is comprised of a wide cross-section of talent beyond NASA's core engineering competencies. Inherent in its name, this office, known as AA2, controls partnerships, agreements, strategy, technology integration, and more. To operate across such a diverse ecosystem with varied discipline sets, JSC has enlisted a very special, talented, and highly effective *motley crew*.

Moreover, JSC reframed talent sourcing by adopting industry language (such as "business development") and hired talent skilled in these fields, which was a new approach for government agencies. *Enlisting this motley crew*, beyond just engineers, has led to innovative strategies, new capabilities, and compelling visions for what JSC can be. This team has become the test case for innovative strategic industry engagement that is being emulated at other centers and adopted at Headquarters.



Make change—Shatter the plan. Evolve. Make a dent. Nothing matters unless it matters.

The principle at a glance: Although it's often said that humans are creatures of habit, we are also creatures of change; it is constantly happening around and to us. But to *make change* is to actively drive transformation rather than merely trying to adapt to it. To intentionally

practice pushing oneself past beloved ideas to exploring possible diverging pathways. To make an active commitment to depart from the status quo and shape the environment, setting trends rather than following them. Getting to breakthrough means focusing on change that is significant, meaningful, and moving beyond the imagining of new ideas to bringing them to life, crafting the future as a result of that effort.

JSC implementation—Exploration Park: JSC recognized that for impactful change, their transformation had to be more than just strategy, websites, contracts, and data sharing. To truly cement JSC as the hub of human spaceflight requires a physical change, co-locating partners to form a coalition and fenceless community. While perceived barriers had previously kept them stuck in the discussion phase, JSC got bold and shattered the obstacles in their way, culminating in the creation of a new physical hub of activity, known as Exploration Park.

Exploration Park, just outside the front gates of JSC, will co-locate industry leaders and academic institutions with the expertise and assets of the Center, creating a Houston spaceflight coalition and



hub, all emanating from the JSC campus. The first anchor tenant, the Texas A&M Space Institute, has been awarded \$200M by the State of Texas to build an industry leading facility, including a 2.5-acre Moon landscape and a 2.5-acre Mars landscape, as well as collaboration and conference space.³ More importantly, they will bring in some of the brightest up and coming minds in Texas and the country. Several additional organizations, both domestic and international, are examining Exploration Park, signing MOUs, drawing up leases, and aligning their future strategies accordingly.

Through the course of these Greenhouse workshops, JSC has created several new pathways to showcase its capabilities and missions, change the perception of the center, and to collaborate as the leading go-to-market partner. These include:

- Establishing the Associate Director for Vision and Strategy role and the Business Development and Technology Integration Office (AA2) office.
- Defining and mapping the more than 375 JSC capabilities for partner insight and use.
- Creating the JSC Front Door as a one-stop shop for all information regarding what JSC does, the pathways to work together, and a place to contact the center.
- Creating a socialization campaign aligned to partner personas across government, industry, and academia.
- Creating a strategic collaboration plan and time-phased roadmap with other government space fairing agencies.
- Uniting the State of Texas around shared ambitions for the space economy in the state and serving as advisors to the Texas Space Commission.
- Creating Exploration Park with the Texas A&M Space Research Institute as the anchor tenant.

Lessons learned

After five sessions of deep exploration through the lens of the Breakthrough Manifesto, several key takeaways emerged. These lessons will guide JSC as they collaborate with their partners to shape the future.

Know your partners and adapt to them

One key to enhanced collaboration is knowing your partners—how they communicate, their needs and gaps, and their appetite to collaborate. With a new, deeper understanding, JSC is working to meet partners where they are, rather than the other way around, tailoring communications and flexing and adapting to their needs. Adopting a JSC-as-a-Service approach allows partners to choose the collaboration model, assets, and even price point that work best for them and their stakeholders. JSC will stay nimble as partners' needs shift, budgets are challenged, or new perspectives and expertise are needed to succeed. As a result, JSC can maximize the use of its assets, infrastructure, expertise, and workforce, further solidifying their role as a human spaceflight hub.

Engage stakeholders strategically

Transformative collaboration isn't for the faint of heart. It requires engaging the right stakeholders and, more importantly, *keeping* them engaged. One key stakeholder who disengages can mean missing key insights or failure to gain consensus on strategy or decisions. JSC has realized the power of gathering in the same physical space, at the right cadence, when it matters most—to bring in major decision makers, build confidence, foster excitement, or re-ignite



progress. NASA's strong brand, too, has the power to engage. Working with NASA is what dreams are made of—for both children and adults. JSC will leverage diverse pathways—YouTube, Podcasts, digital, traditional media, influencer partnerships, and even the old fashion roadshow—to capture interest and engagement in order to share this new vision, ignite ecosystem excitement, and foster collaboration across all interested parties both old and new.

Involve empowered participation

Who is engaged is as important as how they are engaged. The ideal stakeholder is an empowered one who has 1) skin in the game and a vested interest in the outcome; 2) authority to make commitments and decisions on behalf of their organization; 3) recognized positions of knowledge, respect, and authority in their organization's hierarchy; and 4) command of both the technical and business implications.

Measuring impact

With transformation comes the need to measure progress and impact. JSC will do so by identifying some quick wins and by employing both quantitative and qualitative measures of success.

Quick wins: The best way to instill confidence in these transformations is to demonstrate how, in just a few short months, these changes have returned immediate and noticeable impacts. For JSC, some examples of quick wins to be documented include *cross-government organization engagement* as indicated by the collaboration points across organizations, projects, and investments, and *increase in JSC engagement* tracked via Front Door website metrics.

Quantitative measures: To the degree things can be quantified, they should be. It is an art to select the right quantitative measures across the right categories, ideally with no more than 4-8 per category. JSC will focus on measuring:

- *Agreements:* number of total agreements and average time to close, JSC branches engaged, capabilities utilized.

- *Outreach:* number and types of unique organizations and outreach events.

- *Shared ambition:* number of shared projects and investments, as well as dollars and time saved.

Qualitative measures: When quantitative measures can't tell the full story, qualitative measures can provide a more vivid illustration of impact. JSC will explore:

- *Partner feedback* focused on the impacts of change, areas that still need tweaks, and general favorability to working with JSC as a partner.
- *Internal JSC feedback* on how well these partnerships are working, and how this paradigm shift is influencing the morale, passion, and purpose of the JSC employee base.
- *Excitement in the market* as evidenced by indicators of general sentiment and reactions at conferences in the media, and online.

Digital first, data always

In today's market, data is king, and JSC has petabytes of it. But to best put this data to use requires a shift in mentality—digital first, data always. Whether understanding aerothermal orbital reentry environments or processing hours of space station imagery and video, JSC can get the most from its data by transforming its approach, with a focus on cutting edge technology, better processing techniques, accelerated analysis methods, and a shift away from owning large, end-to-end hardware programs.

In addition, JSC will focus on streamlining and enhancing the sharing of its open-source data with as many industry and academic stakeholders as possible. With partners as force multipliers, these massive high-fidelity data sets can unlock new insights, develop fresh approaches, and potentially produce transformative discoveries.

Incubate to accelerate

JSC is well positioned to serve as an incubator and accelerator for the nation. Technology research and development has been a cornerstone of the JSC mission since its inception and its expertise and facilities continue to make it an ideal place for early-stage research and development. Beyond these early stages, however, other industry leaders are often better positioned to bring developments to market and scale them. JSC recognizes that they can have the greatest impact on national and industry priorities by playing a collaborative and supportive role, incubating developments to be transferred to partners for the next phase.

Call to action

Organizations need breakthrough now more than ever. Around the world, foundational beliefs and behaviors are shifting rapidly and simultaneously across societal, political, and economic arenas. Rapid advances in technology are driving entirely new worlds of opportunity with the potential for great benefit but also great harm. The Breakthrough Manifesto is a powerful tool for government and industry alike to help reframe challenges, identify creative solutions, and imagine and shape the future. In the case of JSC, collaboration with the Deloitte Greenhouse and application of the Breakthrough Manifesto led to transformative changes that will cement JSC as the center of human spaceflight for the next 60 years and beyond.

Space is a hard and dangerous business. The reinvigorated market and influx of new capital has brought immense energy, and with it, expectation—the sky is no longer the limit. To truly advance human space exploration, new and innovative partnerships are critical. Over the course of this workshop, several attendees coined the phrase “collab-itation” (combining the words collaborate and competition) to illustrate that the community can collaborate on shared ambitions while still competing, essentially reinforcing the “rising tides raise all ships” mantra. Finding ways to leverage the best our country has to offer is a key to achieving human spaceflight ambitions. To realize the market potential, truly unlock Space, and explore the final frontier, JSC and its partners believe they should do so together.



Image credit: NASA

Endnotes

- 1 <https://www2.deloitte.com/us/en/pages/operations/solutions/deloitte-greenhouse-experience-manifesto.html>
- 2 Bank of America: <https://www.luminary-labs.com/insight/the-invisible-1-trillion-economy/>; McKinsey: <https://www.mckinsey.com/featured-insights/sustainable-inclusive-growth/charts/a-giant-leap-for-the-space-industry>
- 3 <https://communityimpact.com/houston/bay-area/government/2024/02/15/texas-am-university-signs-lease-with-nasa-for-200m-space-institute/>

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