



CASE STUDY  
**NASA**

# NASA's Down-To-Earth Principles Deliver Positive Strategic Outcomes

Not every organization is preparing for future trips to Mars or searching for planets well beyond our solar system. But while the **National Aeronautics and Space Administration (NASA)** pursues these and additional otherworldly ambitions, its approach to strategy delivery offers real-life lessons for all industries.

Today NASA faces considerable challenges to implement its strategy and achieve its mission. These include tight budgets, increasing competition from venture-capital-funded startups and the all-important safety needs surrounding human spaceflight. To address these challenges and continue to innovate, the government agency relies on several guiding principles.

## Embrace Smart Simplicity

The first of these principles is to stay focused on what really matters and keep things as simple as possible. This can be challenging given that 90% of NASA's projects are managed via a complex "supply chain of thousands of organizations" and "international collaborators" around the world, according to Edward Hoffman, academic director of the Master of Science in Information and Knowledge Strategy program at Columbia University and NASA's former Chief Knowledge Officer. For this reason, NASA relies on the science community to help simplify strategy design and implementation.

One way NASA accomplishes this is by conducting a decadal survey that asks respondents to identify and prioritize the agency's strategic initiatives. Experts from academia, think tanks and other government agencies look out into the future and recommend key research areas. Directives may range from forming valuable international partnerships to conducting large-size missions on Earth surface deformation and change.



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*Photo:* Mirror Assembly for the James Webb Space Telescope – Nov, 2016. *Credit:* NASA / *Source:* Wikipedia.org

From there, NASA reviews and prioritizes projects into categories. These include: early stage programs, which research emerging technologies; technology maturation programs, which test solutions in a simulated space environment; and technology demonstration programs, which incorporate new technologies into an actual mission.

Once a project begins, NASA applies a “rigorous” approach to measuring performance using “minimum success criteria,” says Stephen Jurczyk, associate administrator of NASA's Space Technology Mission Directorate, which manages and executes the government agency's space technology programs.

These key performance metrics, including technical performance, reliability and lifetime requirements, are designed to be simple and easily understood across the organization. An example of a lifetime requirement may be that a craft must operate continuously for one year in space. Or from a performance standpoint, a new technology must enhance system performance by 40%. The result is real-time transparency into strategy execution. This “smart simplicity” helps enable NASA to quickly get at the core of an opportunity or emerging threat.



# Dedicate And Mobilize The Right Resources Via A Powerful Pipeline

Successfully executing any high-priority strategic initiative takes the right resources. That's why NASA maintains a steady pipeline of talent that not only satisfies current demand for skills but also addresses workforce requirements years in advance of a program.

A number of strategies help NASA build this critical talent pipeline. For one, NASA has established a program management office at each of its centers, where senior executives use sophisticated human capital management programs, such as data analytics, to take inventory of the agency's workforce capabilities. In the event of a skills shortage, NASA uses this workforce inventory to create the necessary certification, training and career development programs to increase the effectiveness of the agency's talent pool. And in Washington, D.C., NASA's executive project management office (PMO) and chief engineer are able to monitor and support the program and to conduct periodic studies of the agency's overall skills strengths and weaknesses.







For example, Hoffman cites a period when a NASA PMO “identified that we didn’t have a future pool of systems engineers” to oversee increasingly complex missions. In response, the agency identified and selected nearly 50 high-potential employees from across the organization and enrolled them in an intensive one-year program that provides hands-on training to enhance systems engineering capabilities.

Another strategy NASA actively uses to develop the right resources is knowledge sharing. The NASA Academy of Program/Project & Engineering Leadership (APPEL) and

its Knowledge Services website is a powerful online resource that supports the agency’s technical workforce with the knowledge and training required to deliver on NASA missions. Visitors can access career development tools and materials, as well as share the different types of knowledge needed to tackle the most challenging programs head-on. Courses and curriculum span a broad range of subjects, while the site serves as a singular resource for technical knowledge.

*Photo:* An overall view of the space station flight control room in the Mission Control Center at NASA's Johnson Space Center a – Aug, 2009. *Credit:* NASA / *Source:* Wikipedia.org



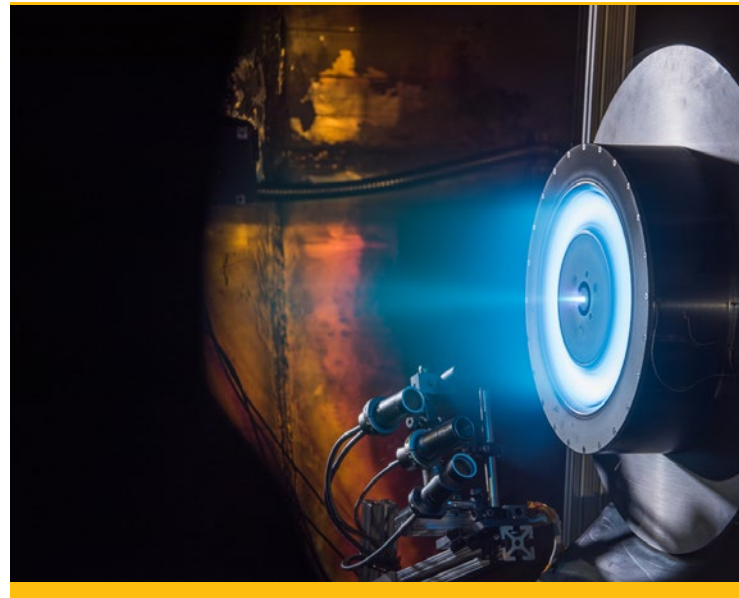
## Embrace Missteps As Learning Experiences

Despite rigorous project and talent management, there is no “cast iron” guarantee of a successful strategy implementation. For example, NASA was working on an electric propulsion technology that ionizes material and then uses electrical fields to generate thrust. Jurczyk recalls having “all kinds of problems” with the system, from creating a propellant feed system to converting iodine from a solid into a gas. “The concept was fine, but when we tried to actually build a prototype of the system, we just couldn’t get it to work,” says Jurczyk. After a year and a half of work, he says, NASA pulled the plug on the project.

However, rather than shy away from failures like the electric propulsion technology project, NASA empowers its employees to experiment and learn in an environment where it’s safe to fail fast. For starters, employees are encouraged to discuss challenges openly throughout knowledge forums—multi-day events that bring together experts from NASA centers and members of industry and academia to discuss the factors most likely to lead to success, and how workers can learn from failure.

NASA also encourages its senior leaders to share stories about past failures and field questions from employees on what went wrong and why. “NASA can be a place where it’s intimidating to talk about a problem or a failure,” says Hoffman. “It’s a difficult business—we have to be comfortable talking about mistakes, mishaps and failures.”

While few organizations are working on electric propulsion systems, they’re likely facing the same challenges: tight budgets, increased competition, digital disruption and maintaining employee satisfaction. Fortunately, as NASA demonstrates, with the right principles guiding strategy implementation, the sky’s the limit. ■



*Photo:* A prototype 13-kilowatt Hall thruster is tested at NASA's Glenn Research Center in Cleveland.  
*Credit:* NASA / *Source:* NASA.gov



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