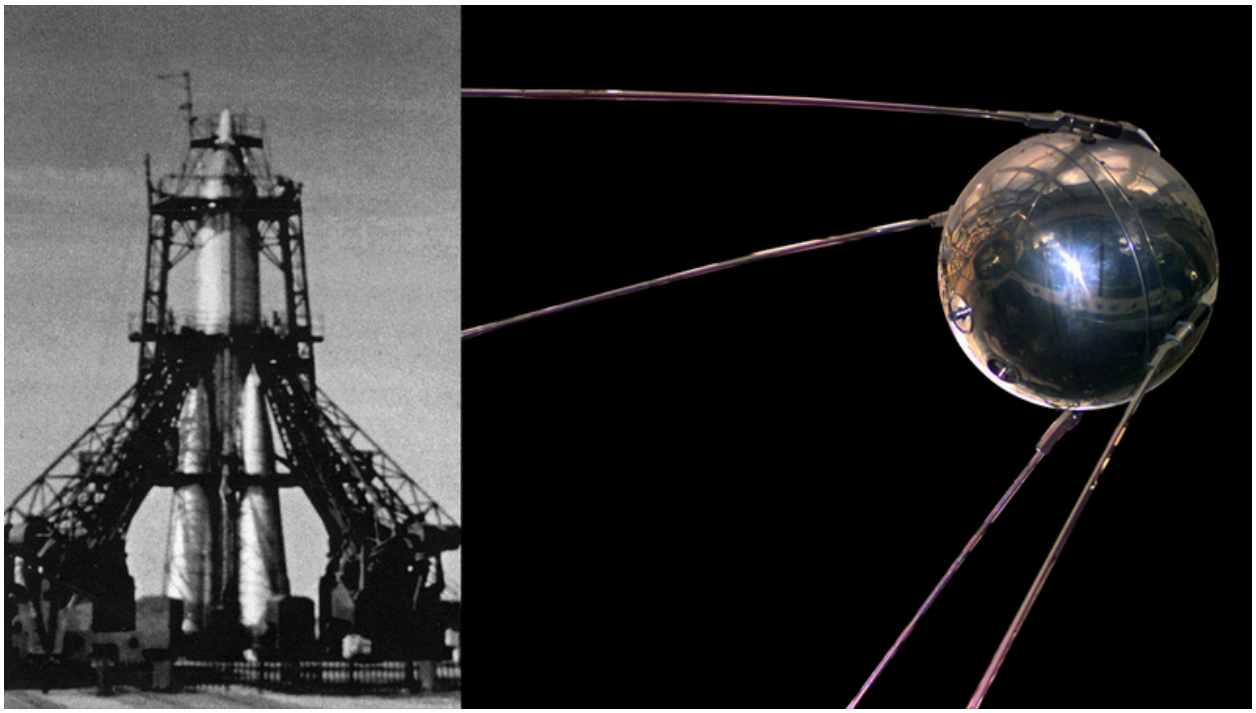
universe

JPL

May 2024

Featured Stories



Left: Sputnik 2 in its launcher at Tyura-Tam, 1957. Right: A replica of PS-1 /Sputnik 1 at the National Air and Space Museum in Washington, DC.

The Soviet Missile Program, Part II: The R7 and the Space Race

By Erik Conway

In part I of this story, I followed Sergey Korolev, the chief architect of the Soviet Union's ballistic missile program, from his education through his experience during Stalin's Great Purge to the first Soviet launch of their copy of the German A-4 missile. By this time, Korolev was the chief designer of Special Design Bureau 1 (or OKB-1) of Scientific-Research Institute 88, responsible for developing both short and long-range ballistic missiles, including intercontinental ballistic missiles (ICBM).

By far the most important of the numerous missiles developed in OKB-1 during the 1950s was the R-7. Intended to be the U.S.S.R.'s primary ICBM, it evolved into the Vostok and Soyuz launch vehicles. The R-7 allowed the Soviet Union to initiate the famous "space race," but it was Korolev that drove the U.S.S.R. to

be first to orbit the Earth, and by winning this space race that most Americans didn't know existed, he triggered a political crisis that made NASA's formation possible. It also gave JPL a very different future.

R-7 Origins

The R-7's origin can be traced back to some work performed by Mikhail Tikhonravov — designer of the USSR's first successful liquid rocket, who had somehow escaped Stalin's purges without running afoul of the secret police. His idea had been to design vehicles around clusters of missiles, some of which would serve as boosters for others. Instead of stacking the missile "packets" vertically, they were bound horizontally. In the R-7 design, four clusters of boosters were, quite literally, strapped to a central core stage.

This was a variation of Konstantin Tsiolkovsky's staged rocket idea from earlier in the century. Tsiolkovsky had died in 1935, two years after Tikhonravov had flown the USSR's first rocket. It's likely Tikhonravov knew of Tsiolkovsky's ideas. The U.S. Atlas ballistic missile, developed at the same time as the R-7, also used this "parallel staged" design.

Korolev worked out the specific requirements for what would become the R-7 ICBM with his superiors during late 1953 and early 1954. The first Soviet hydrogen bomb test had been in August 1953, and Korolev's engineers were working towards an ICBM payload weight of 3 tons (metric). But a mistaken calculation of the weight of a second-generation bomb by physicist Andrey Sakharov — later a famous dissident within the USSR — led to a payload requirement being imposed for twice that mass. The basic layout of the rocket had already been decided on — four strap-on boosters on a central core — and changing it would delay the effort.

The additional lift capacity came from fundamentally reworking the engines. Valentin Glushko, the engine designer and sometimes rival who Korolev had worked with on and off since the early 1930s, had been working on a kerosene and liquid oxygen fuel engine with a single combustion chamber. Try as he might, he couldn't get its thrust nearly high enough to meet the new requirement. Another engineer, Aleksey Isayev, had shown that a multi-chambered version of the same engine could achieve much higher thrust with lower combustion chamber pressures. Glushko switched to a four-chambered design that essentially doubled the thrust.

On May 20, 1954, the USSR's Council of Ministers approved the R-7's development.

Artificial Satellites

Korolev and Tikhonravov were space enthusiasts, both members of the rocket research group GIRD during the 1930s. The previous decade had seen a burst of active interest in the potential of space activities for advancing the Soviet state. Even Pravda, the official state newspaper, had run positive articles explaining rockets and "interplanetary communications," the common term for space travel. They were familiar with the work of theorist Konstantin Tsiolkovsky. Like von Braun in Germany, Tsiolkovsky had written of travelling to Mars. So they believed in the value of satellites.

By the time the R-7's development was formally approved, Tikhonravov's advanced design group had started investigating satellite-related questions, including re-entry, instrumentation, and orientation. They drafted a series of memoranda between 1952 and early 1954 that addressed these basic issues.

Though Tikhonravov didn't work in Korolev's OKB-1 during this early period, the two coordinated their work so that Tikhonravov's satellites could ride on Korolev's R-7, should it be successful. And both Tikhonravov and Korolev lobbied their superiors and other key officials that held resources they needed for a satellite effort: the Army, for example, had to be willing to turn over an R-7 for a launch effort. They received lukewarm support from those various officials in 1954 — they weren't told "no," but weren't encouraged either.

The military wanted missiles. They didn't yet perceive the value of satellites.

External events helped Korolev immensely. In October 1954, at a meeting of the Special Committee for the International Geophysical Year in Rome, the Soviet delegation sat silently while the U.S. made its proposal to launch a scientific satellite. The Soviet Academy of Sciences established its own commission to study a satellite effort later that year, though its existence wasn't announced until mid-April 1955. It was kept relatively firewalled from the military program, but was the direct participant in the IGY effort. So it was the commission's chairman, academician Leonid Sedov, who provided the Soviet response to the U.S.'s announcement on July 29, 1955 of its IGY satellite intentions. "In my opinion, it will be possible to launch an artificial Earth satellite within the next two years. The realization of the Soviet project can be expected in the near future," he said at a press conference later that day.

But there was not yet a Soviet satellite project. Korolev used the U.S. announcement as a tool to gain approval of one. He wrote to his superiors asking them to advance a satellite proposal to their superiors, and they agreed. In early August, he was instructed to submit a plan for a satellite program. He delivered it in November.

On Jan. 30, 1956, he gained formal approval from the U.S.S.R.'s Council of Ministers for an "unoriented artificial satellite."

One more key approval arrived a month later, directly from First Secretary of the Communist Party Nikita Khrushchev, who had succeeded Stalin after Stalin's death in 1953. Khrushchev and other senior officials visited OKB-1 on Feb. 27, to commend the bureau on the successful first test of the R-5M intermediate range ICBM with a live nuclear warhead earlier in the month. At the end of the tour, Khrushchev saw a full-scale model of the massive R-7 for the first time. After explaining the missile's capabilities, Korolev took the opportunity to pitch a satellite directly to Khrushchev.

"If the main task doesn't suffer, do it," Khrushchev had answered. As long as the satellite effort didn't interfere with getting the R-7 into service as a weapon, it was acceptable.

First to Orbit — and Heard at JPL

On Sept. 30, 1956, JPL and the Army Ballistic Missile Agency had launched the first Jupiter C of the Re-entry Test Vehicle series, proving the ability to return payloads from space. Korolev knew about the flight, but he interpreted as a failed attempt to launch a satellite. "In September 1956, the U.S.A. attempted to launch a three-stage missile with a satellite from Patrick Base [sic] in the state of Florida which was kept secret," he wrote in a letter to his superiors. He couldn't know JPL had been explicitly barred from making an orbital attempt by the Eisenhower administration.

At the same time Korolev was wrestling with a thrust problem. The R-7's engines weren't generating enough thrust to launch the 1,000 kg satellite planned for it, though they did meet the basic military needs. And Korolev was personally committed to being the first to orbit a satellite, hoping for a launch

between April and July 1957. Tikhronravov suggested the solution: instead of delaying the launch to resolve the thrust issue, build a much smaller satellite that could reach orbit with what they had.

In January 1957, Korolev asked for permission to launch a much smaller, less ambitious, satellite of 30-50 kg mass, between April and June of that year. In mid-February, he received approval, with an important constraint. The R-7 had to have one or two fully successful test flights before the launch attempt.

The flight test range at Kasputin Yar was not nearly large enough for the R-7, and the Soviet leadership had chosen a new test range in Kazakhstan, near the tiny town of Tyura-Tam, in February 1955. The first R-7 launch took place May 15, 1957. One of the booster clusters detached early, destroying the vehicle. Several attempts to launch a second R-7 in June were aborted. A third R-7 launched on July 12 failed when the rocket spun in flight, throwing off all four of the strap-on boosters.

Korolev had missed his chance to orbit a satellite before the start of the IGY.

On Aug. 21, Korolev finally got a perfect flight out of his R-7. The missile deposited its dummy warhead 6,500 km away, over the Kamchatka region. A second flight on Sept. 7 was also successful.

The two-launch requirement met, Korolev gained permission for an Oct. 6 orbital attempt. But then he changed his mind, advancing the date to Oct. 4. American delegates to an IGY meeting in Washington intended to present a paper titled “Satellite over the Planet” on that date, and apparently he thought it was meant to coincide with an unannounced U.S. satellite launch. He might be beaten into space if he didn’t move his launch date!

The Oct. 4, 1957 launch attempt went off successfully, with some hitches: not all of the engines ignited when they were supposed to, but all eventually did. A turbine failure caused engine shutdown one second early, so the satellite reached a slightly lower orbit than intended. These flaws didn’t matter. Satellite PS-1 — the name Sputnik, meaning “satellite” or “fellow traveler” was applied after the Soviet news agency announced the success on Oct. 5 — went into orbit, and its transmitters operated properly so that everyone with an amateur radio setup could hear it.

A SUN., OCT. 6, 1957 Los Angeles Times 2★

Russia Scores Tremendous Propaganda Beat Over U.S.

Russians Say This Is Orbit of Their 'Moon'

NORTH POLE
NORTH AMERICA
U.S.S.R.
EUROPE
North Atlantic Ocean
U.S. Air Base
AFRICA
Pacific Ocean
Equator
SOUTH AMERICA
South Atlantic Ocean
SOUTH POLE
Projected Orbit For U.S. Satellite

HOW SATELLITE SPINS—Black line indicates orbit of Soviet earth satellite, which Russians say is north to south at an angle of 65 deg. to the equator. Dotted line indicates projected orbit of the still-unfinished U.S. satellite.

Satellite Enhances Prestige

BY JOHN M. HIGHTOWER

WASHINGTON, Oct. 5 (AP) — Russia scored a smashing propaganda and psychological victory over the United States with its successful launching of history's first earth satellite.

Coming within a few weeks after Russia's announcement of firing an intercontinental missile, the new achievement should go far toward convincing people all over the world that Russia has emerged as a first-class military power in the age of missiles and atomic weapons, and that it is seriously challenging the leadership of the United States.

Whether this is literally true in the sense that the Soviets have large numbers of the most modern weapons in combat readiness may be debated. But the point is that the Soviets have been waging a campaign to convince people in other nations—as in Western Europe and the Middle East—that it is true.

Enhance Prestige

To the extent that they

TRACKING SATELLITE—Keith B. Bradshaw, left, and Robert Legg, members of San Gabriel Valley Radio Club's satellite tracking committee, as they recorded Russian satellite's passing over Southland yesterday morning. Beeps transmitted by Soviet "baby moon" were recorded for later decoding.

CONGRESS QUIZ ASKED OVER RUSSIAN BEAT

WASHINGTON, Oct. 5 (AP) — A demand was heard today for a Congressional investigation of why Red Russia beat the United States into the realm of space with an earth satellite.

It was voiced by Sen. Symington (D) Mo., longtime critic of Eisenhower administration policy in the military and scientific fields.

The Soviet feat also stirred the hot embers of

Endless Globe Circling Possible, Scientists Say

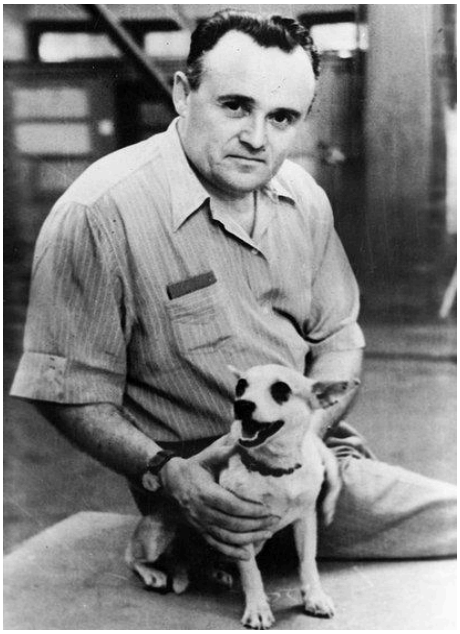
Continued from First Page

nical panel on tracking and computing satellites, emphasized, however, that much greater power and guidance ability would have to be developed before such a step

From the Los Angeles Times, Oct. 6, 1957.

JPL Director William Pickering was at a meeting in Washington, D.C. when the launch was announced. It was a Friday, and Pickering called back to the Laboratory to get a tracking effort going. By that evening, Sputnik's signals were heard at JPL and were being recorded by JPL's amateur radio club, which had a station in Temple City. Precision tracking took until the following Tuesday, from a hastily-erected station in Earthquake Valley.

Sputnik 2

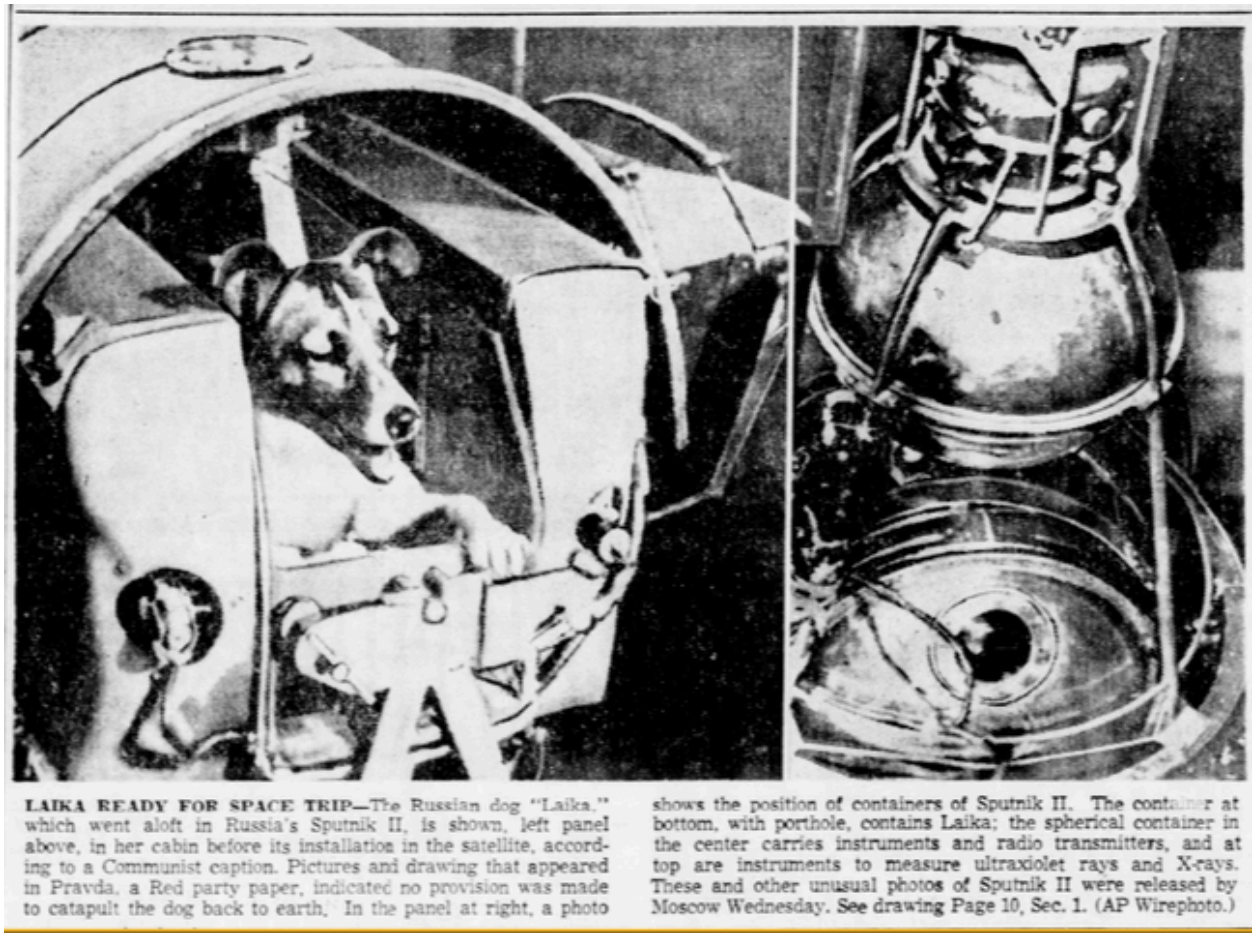


Neither Soviet nor American leaders yet understood the propaganda coup Korolev had scored. Korolev went home to Moscow on Oct. 5, and sent his leadership on vacation. This was a mistake. Khrushchev called Korolev at home to hear the story of the launch from Korolev directly, and during the call had asked him if it would be possible to launch another satellite in time for the anniversary of the Great Socialist Revolution to be held on Nov. 7. Korolev said he could, and that he would launch a dog. The formal order to do it came on Oct. 12.

What would be known as Sputnik 2 (and also "Muttnik") was possible because back in 1949, Korolev already had enough stature, and enthusiasm for space-related enterprises, to get a small space medicine program going in the Soviet Union's Institute of Aviation Medicine. Throughout the 1950s, that program had launched both instrumentation and animals into the upper atmosphere to understand the space environment, the impact of the rocket's accelerations and vibrations on the animals, and how to counter them to sustain life. Dogs had been a feature of the program (the U.S. had used monkeys in its own space medicine work). So the technology to put a dog in space existed, though not the technology to bring it back.

The basis for the attempt was a highly modified capsule intended for "biological" launches on the R-2 missile. It would hold the dog, its feeding system, life support, and camera systems. It was effectively melded with the PS-1 structure, which held the radios. The new vehicle weighed more than 500 kg, an order of magnitude higher than its predecessor. Unlike Sputnik 1, Sputnik 2 would remain attached to the booster so that the booster telemetry system would be available to send the dog's data back to Earth.

The R-7 booster was shipped to Tyura-Tam on Oct. 18, and on Oct. 31, the chosen dog, Layka, was put in the capsule and attached to the rocket. She was launched into orbit early the morning of November 3rd, Moscow time, becoming the first Earthling to orbit the planet. Layka was expected to live about a week and then be euthanized prior to oxygen deprivation, but in fact lived only a few hours and died of heat stress when the makeshift capsule's thermal control failed. The Soviet leadership kept that under wraps for decades, though, maintaining a story that she had lived for four days.



LAIKA READY FOR SPACE TRIP—The Russian dog "Laika," which went aloft in Russia's Sputnik II, is shown, left panel above, in her cabin before its installation in the satellite, according to a Communist caption. Pictures and drawing that appeared in Pravda, a Red party paper, indicated no provision was made to catapult the dog back to earth. In the panel at right, a photo shows the position of containers of Sputnik II. The container at bottom, with porthole, contains Laika; the spherical container in the center carries instruments and radio transmitters, and at top are instruments to measure ultraviolet rays and X-rays. These and other unusual photos of Sputnik II were released by Moscow Wednesday. See drawing Page 10, Sec. 1. (AP Wirephoto.)

Left: Layka in her pressure capsule. Right: The sphere holding Sputnik 2's radios. Above it is a package of scientific instruments. AP Wirephoto that appeared in the Lubbock Morning Avalanche, November 14, 1957.

Layka's image was plastered all over the U.S. press during her short life. Yet what mattered to U.S. officials wasn't the dog but the total mass that the R-7 had shoved into orbit with her: 6.5 tons. While they knew the U.S. could have orbited a small payload by November 1957 — and would shortly do that — they also knew nothing the U.S. had could match that feat.

That inferiority to the Communist enemy would echo in the U.S. for most of the next decade. One result would be NASA's creation the following year. But in the next column, I'll look at the U.S.'s first attempt at meeting the Soviet challenge: Project Vanguard.

For further reading:

Asif Siddiqi, Challenge to Apollo: The Soviet Union and the Space Race, 1945 -1974 (NASA SP-2000-4408, 2000).

Asif Siddiqi, The Rockets' Glare: Spaceflight and the Soviet Imagination, 1857-1957 (Cambridge University Press, 2010).

Roger Launius, John M. Logsdon, Robert W. Smith, eds., Reconsidering Sputnik: Forty Years since the Soviet Satellite (Routledge, 2000).

Margaret Nice, Alexander Mrad, Jessica Millenbach, Alisha Esqueda, and Michelle Smith.

Administrative Professionals Keep the Lab Running

In honor of Administrative Professionals Day on April 24 — which the Lab celebrated with Admin-a-grams, pizza, and a group photo — we spoke to five JPLers about what drives them in their career paths, how the affinity group GUILD (Group for Unity, Inclusion and Learning Development) has supported them, and what it takes to play a crucial role in supporting teams across the Lab.

Below, get to know Alisha Esqueda, Jessica Millenbach, Alexander Mrad, Margaret Nice, and Michelle Smith.

Answers have been edited for length and clarity.

JESSICA MILLENBACH
Business Analyst for the Autonomous Systems Division Office

How would you describe your overall professional purpose at JPL and what drives you in your career?

If I had to describe my purpose at JPL in just one sentence, I would say that I proactively identify challenges that lie ahead for my organization and then develop solutions to help carry us through. Those solutions run the gamut from building financial and workforce dashboards and analyzing data to hunting for lost assets, mentoring others, and beyond.

The thing that drives me most in my career is the desire to make tangible contributions to the incredible work being done at JPL. As a businessperson working for a non-profit organization, it can be challenging

to see how my contributions matter and have an impact on the success of a project, so I strive to find new and innovative ways to add as much value as possible. I enjoy the challenge.

What are the most rewarding and most challenging aspects of your job?

The most rewarding part of my job comes when I've developed a solution that my leadership can leverage to resolve an issue, answer a hard question, or make a more informed decision. Knowing that I did something or made something that helped others do their best for the institution brings me a lot of joy.

The most challenging aspect of my job is building trust and rapport with the technical people I work with in order to convince them that my business colleagues and I can partner with them to achieve the lab's objectives. I have seen a lot of progress on this front in my ten years at JPL, and I'm excited to see the trend continue in the future.

How has GUILD supported you and your professional development at JPL?

GUILD has provided so many wonderful opportunities to connect with other business professionals at JPL, and that is something I am truly grateful for. I found that I became disconnected with the business community during the mandatory work from home era of COVID, but GUILD's events and programs have helped me reconnect and make lasting relationships with my peers.

What's the most important trait to maintaining strong interpersonal relationships with colleagues and managers at JPL?

I think the most important thing one can do to build and maintain strong interpersonal relationships is to actively listen. There are no shortage of strong voices at JPL, but when everyone is talking, not enough people are listening to one another. I find that quietly, but actively, listening to my colleagues and managers allows me to develop a keen understanding of the challenges they're facing but also to demonstrate that I care about their perspective, which both allows me to develop solutions to their problems and build rapport and strengthens relationships in a very effective way.

MICHELLE SMITH
Administrative Liaison

How would you describe your overall professional purpose at JPL and what drives you in your career?

My purpose and drive are to obtain JPL knowledge so I can best support my team. I am the kind of person who does not want to catch up on something but stay a step ahead. I am always here to support others. Always looking for a solution to help a situation, and in the process, I have met some amazing knowledgeable individuals, and I have learned a great deal from them. Working at JPL keeps me engaged and excited about the work I do.

How has GUILD supported you and your professional development at JPL?

I attended a business event back in 2009. Once the meeting was over I was asked if I was interested in creating a group for the Staff Assistants. I worked and "SANG", Staff Assistant Networking Group, was

created. I was the co-chair and a few years later I took on the lead role. I realized that Staff Assistants in different organizations all had a little different variety of work that they did. So, why not bring one person from each section into the SANG group? “Let’s not limit who we can help, but find a way to help everyone.” I also wanted to give everyone the opportunity to lead and shake their fears. “Take the lead and see where it leads you.” I was a part of this group for over 10 years before I was moved to the liaison position I am in now. The group is now known as” GUILD.” The group has grown into something amazing for all business teams on Lab. That was what the committee was started for, to help others achieve their best.

In your opinion, what makes being an administrative professional at JPL unique?

What is unique about a business admin is their constant support to the organization. Working with some brilliant minds, with tight schedules and budgets, which is challenging meeting deadlines, but rewarding at the same time. It offers us a chance to be part of something truly extraordinary in space exploration.

ALEXANDER MRAD
Administrator in the Earth Science Section

How would you describe your overall professional purpose at JPL and what drives you in your career?

To provide outstanding business support to the Section while maintaining consistency between the other sections and Division. My career is driven by growth and enhancement of skills to achieve greater customer satisfaction. That, along with building a strong relationship with my colleagues, are the building blocks to a successful career to pave the way for the next steps.

What are the most rewarding and most challenging aspects of your job?

My work being contributed to a scientist’s research has been the most rewarding part of my current position. Seeing a proposal budget plan that I’ve created morph into field work in Greenland is the highlight of my job. The biggest challenge is trying to understand all the science verbiage in all these proposals and what all these graphs mean (laughs).

What makes being an administrative professional at JPL unique?

An administrator is provided the opportunity to collaborate with departments across the entire Lab. The role is very ad-hoc heavy, which allows an admin to network with personnel in all types of positions. One minute it’s financials and budget plans, the next it’s facilities and floor plans. It’s unique because the responsibilities are diverse and could change from one day to another. I’m always learning something new by researching, networking, and exploring the many different job classifications and functions on Lab.

MARGARET NICE
Executive Assistant to the Director & Director's Office Support Group Manager

What are the most rewarding and most challenging aspects of your job?

The most rewarding aspects of my job are often coupled with the most challenging. I usually groan inwardly when faced with setting up an impossible meeting, a complicated event, or a list of tasks that'll take a full day. Being trusted with that work, and being able to accomplish those challenges, is incredibly rewarding.

What's the most important trait to maintaining strong interpersonal relationships with colleagues and managers at JPL?

For me, transparency and communication are key for strong interpersonal relationships. If I'm not comfortable with a comment, task, etc., being able to tag someone to discuss it has always felt better than whispering and enduring. I've had great managers in my time at JPL, which has allowed me to feel truly supported so that I can do my job effectively.

How has GUILD supported you and your professional development at JPL?

One thing I've really enjoyed is the informal "new employee buddy networking" that Tara Nelson implemented. People are paired with new business/administrative employees for their first few months at JPL. I've especially loved those meetings, not just because I've met lovely people, but it's also offered me the opportunity to offer support for new JPLers in this seemingly foreign country called JPL. I still remember being new, and it was the kindness and helpfulness of veteran administrative professionals that got me through it.

ALISHA ESQUEDA
Section Staff Assistant, Optics Section

How would you describe your overall professional purpose at JPL and what drives you in your career?

I've cherished the connections I've built assisting the technical staff of mostly engineers and scientists for almost five years. I'm grateful to be part of a team that not only supports my professional goals, but also encourages my decision to pursue graduate studies at Pepperdine University Graziadio Business School. I believe continual learning, adaptability, and a willingness to embrace process improvements are essential for success in my role.

What's the most important trait to maintaining strong interpersonal relationships with colleagues and managers at JPL?

Establishing strong relationships with both your teams and the individuals you directly support is key. Going the extra mile and paying attention to details not only demonstrates commitment but also a sense of appreciation for your colleagues. I had the pleasure of supporting the former section manager of Optics for almost five years, who recently retired after 45 years of service at JPL. I learned that even

simple acts like engaging in friendly conversations while walking down the hall, attending the Section Community Speaker Events, and attending Lab tours can significantly enhance the overall work experience and allow me to immerse myself in JPL's mission.

I've been fortunate to cultivate meaningful connections with colleagues within Division 38. They've not only enriched my professional journey but have also contributed to a more fulfilling work environment. Also, I decided to join the JPL softball team three years ago and it has allowed me to bond with peers outside of my division, which I have really enjoyed.

As you look back on your career, what advice would you give an early career admin professional about the job?

Investing time in getting to know the individuals you work closely with is invaluable. By understanding their unique needs and challenges, you can better support them, which leads to improved collaboration. I've discovered that by prioritizing the well-being and requirements of my colleagues, I've been able to fulfill my responsibilities more effectively.

Also, I learned that no matter your career path at JPL, it is important to give back to the institution by mentoring others and sharing knowledge.

Icy Worlds Closer to Home

By Vincent Robbins

It was September 2016 and Warren Holmes had hockey on his mind.

After his dad passed away that year, Holmes was drawn to the ice as a way to process the loss and honor his memory. His father, who played college hockey in the 1960s in Canada, remained an avid fan throughout his life. He took Holmes to his first Chicago Blackhawks game when he was eight years old and held season tickets to the LA Kings since the pre-Wayne Gretzky days.

But the idea of picking up hockey intimidated him — he was 47 years old and had never played.

“I was telling the story to [my colleague] Mathieu Fradet and he said, ‘We're about the same size. Why don't you try my gear on?’” Holmes recalled.

It was just the nudge he needed. Donning the borrowed gear, Holmes skated into a beginners' hockey class at Pasadena Ice Rink, kicking off a late-blooming love for the game that his father had enjoyed so much. Though he hit the ice looking for solace, he found something else he didn’t expect: a community of JPLers.

On Lab and On the Ice

Holmes, a product delivery manager, met Systems Engineering Group Supervisor Amy Trangsrud and User Interface Designer Scott Davidoff in that introductory class, and they decided to form a team with other students. Holmes then learned by word of mouth that they weren’t the only hockey enthusiasts on Lab: some JPLers were already on local teams, some were idle but had played in college or other competitive levels, and over the years there had even been a few other JPL teams in the Pasadena league — two of which were called, naturally, the Rovers.

The fledgling squad grew through colleagues from departments across Lab: Software System Engineer Eric Oij, Exoplanet Scientist Rob Zellem, Enterprise Applications Software Engineer Azeem Khaja, Spacecraft Navigator Cliff Helfrich, and Mechatronics Engineer Andrew Berg to name a few.

Founding Lagrange Points teammates Amy Trangsrud and Warren Holmes on the ice.

“What's fun to me is that there are people that work at JPL that I never would have met any other way,” Holmes said. “Most of the people I never see at work, I only see them at the rink.”

But one teammate, McKenna Kunes, eventually joined who wasn’t such a distant colleague.

“We were conversing by email regularly for weeks…and then at some point, both of us realized at the same time, ‘Oh, you must be that person at the rink.’ I didn't even know she was a JPLer — she was just Mckenna [from hockey].’”

As the new team came together, they needed a name. Although it wasn’t (and still isn’t) an exclusively JPL team, with several JPLers involved and Holmes at the helm as team captain, it was inevitable that their name would be space-themed.

In astronomical lingo, Lagrange points are positions in space where the balance of gravitational and centripetal forces between two large celestial bodies allow objects to stay in position. These points are often used by spacecraft as locations from which to perform observations.

“I do not know why I thought that would be a good name for a hockey team,” Trangsrud said. “Nothing is too nerdy for the Lagrange Points locker room.”

Flying in Formation

The Lagrange Points joined the Copper Division at Pasadena Ice Rink, competing with other local teams of varying talent. Some players, like Holmes, picked up hockey late, while others played in their younger days and were shaking off the rust. Over the first few years, the Lagrange Points players’ skills progressed, team chemistry coalesced, and they had custom orange jerseys emblazoned with LP made, giving them the appearance of a semi-pro squad on the ice.

Software System Engineer Eric Oij, the teams leading scorer this season, takes a shot on goal.

Holmes said he began to feel more comfortable in his skates.

“The thing about hockey is that the learning curve is steep but it's also very long,” Holmes said. “Even the best players can pick up skills as they keep playing.”

The temptation, of course, is to assume the team of NASA employees plays “smart” — on-the-ice IQ translating to strategic advantages over their opponents. Trangsrud laughed at how a recent segment on KCAL News that highlighted the Lagrange Points cheesily indulged this predetermined news hook (referring to the players generally as “rocket scientists” — hardly accurate). But she did draw a different comparison as to how the culture of JPL might translate to the game.

“Good hockey is like formation flying,” Trangsrud said. “One of the things that makes JPL succeed in space is our ability to collaborate and coordinate our efforts as teams taking on complex challenges. That mindset translates really well to hockey.”

That team chemistry has taken the Lagrange Points to five playoff appearances and three Copper League championship finals. In a remarkable déjà vu on the ice, the 2019 and the 2022 championships played out exactly the same, against the same foe: the Crown City Royals. A 2-to-2 tie in regulation and no scoring in a 3 vs. 3 overtime led to a sudden-death shootout. Both times, Lagrange Points came up short.

Just a few weeks ago, the squad had yet another shot at the title: against — you guessed it — the Royals (who, at this point, seem to be taking on the role of the imposing, malevolent Team Iceland antagonists from “D2: The Mighty Ducks.”) Once again, Lagrange Points couldn’t pull out the victory, suffering a 3-2 defeat in regulation. But, despite the near misses, making it to the title game three times in a seven-team league is no small feat.

The Lagrange Points pose for a photo on the ice after their third championship appearance.

“The team has ups and downs but I think has gotten better over the last few years, and we continue to grow stronger as a group of friends,” Trangsrud said. “I hope one day we'll win the cup.”

As for Holmes, he said the time spent on the ice since his father’s death has helped keep his memory close to his heart.

“It just made me remember him,” Holmes said. “It helped deal with his passing.”

Events

WalkUnitedLA 2024

Saturday, May 18
7 a.m. to 2 p.m.
SoFi Stadium 1001 Stadium Dr.
Inglewood, CA 90301
Register here.

What's happening: Join WalkUnitedLA, a family-friendly walk/run organized by United Way of Greater Los Angeles and the Los Angeles Rams, taking place on Saturday, May 11 at the SoFi Stadium in Inglewood, CA.

Why this matters: JPL is partnering with community allies, businesses, and thousands of enthusiastic walkers and runners to help break the cycles of poverty and foster communities of opportunity. Together, JPL is raising funds and awareness to combat homelessness, promote affordable housing, support BIPOC community college students in their journey to graduation, and ensure economic mobility for families across L.A. County.

Go deeper: Visit WalkUnitedLA to learn more about its impact.

Questions? Please reach out to UWGive@jpl.nasa.gov.

Von Karman Lecture Series — Shake & Bake: How Spacecraft Are Tested to Handle the Harsh Environment of Space

Thursday, May 16
5 to 6 p.m.

Watch live on YouTube

The main idea: Brad Kinter and Michel William will teach us more about the equipment, the people behind environmental testing, and how they literally “shake and bake” spacecraft.

Background: Have you ever wondered how spacecraft are designed to handle the punishing conditions of launch and the extreme variations of space?

From rocket vibrations, to the temperatures and pressures of space and other planets, the Environmental Test Lab at JPL is responsible for simulating these conditions and verifying, through a series of rigorous tests, that spacecraft will be able to fulfill their missions.

Speakers:

- Brad Kinter, group supervisor, Environmental Thermal Testing

- Pete Landry, systems integration and test engineer, Environmental Dynamics Test & Instrumentation Group

Host: Marc Razze, Office of Communications and Education

Co-host: Laurance Fauconnet, Solar System Public Engagement Specialist

---

JPL Family News

Retirees

The following JPL employees recently announced their retirements:

40+ Years:

Mark S. Gatti, Section 3300, 43 years
Donna C. Bonorris, Section 4000, 42 years
Alan S. Mazer, Section 386M, 41 years
Brian Okerlund, Section 3550, 41 years

30+ Years:

Anthony Freeman, Section 4000, 37 years

20+ Years:
Stacy L. Connaughton, 29 years
Robert Denise, Section 389D, 28 years
William Pateracki, Section 2833, 28 years
Magdalene Q. Chang, Section 2503, 25 years
Shawn N. Malik, Section 512A, 23 years
Jim Shea, Section 2205, 21 years
Bonnie Brodsky, Section 2800, 21 years

10+ Years:
Richard W. Van Why, Section 1700, 19 years
Mark A. Campos, Section 357C, 13 years

Letters

I want to thank the Lab and my wonderful colleagues for the beautiful plant I received upon the passing of my mother, Carolyn Ann Wilklow. It was a calla lily, which my mom especially loved, so it was extra special. I appreciate all the support, love, and patience that I have been afforded during this very difficult time. My mom was so proud that I have been a part of the JPL family for nearly 25 years. With warmest regards, Colette (Wilklow) Lohr

I would like to thank JPL for the beautiful flowering Kalanchoe plant that was sent in memory of my brother who recently lost his battle with leukemia. I would also like to thank my colleagues for their kind words. –Dean Johnson

Passings

Passings must be submitted through Human Resources, which coordinates with the family of the deceased.

Elizabeth Kay-Im died on April 3, 2024, at the age of 57. Kay-Im worked at JPL for 34 years, most recently in Directorate 300. She was the division manager for Directorate 300 and Division 390. During her time at JPL, she received the People Leadership Award and the NASA Exceptional Achievement Medal. Kay-Im is survived by her husband Eastwood Im, daughter Alexandria, and son Aaron.

In lieu of flowers and gifts, the family kindly requests contributions to the following causes in memory of Elizabeth Kay-Im.

- City of Hope https://www.cityofhope.org/giving/give-honor-or-memory
- Sarcoma Foundation of America https://www.curesarcoma.org/donate-today/
- Whittier College https://www.whittier.edu/giving/givenow

Narendra Jimi Patel passed away on February 11, 2024, at the age of 73. Jimi worked at JPL for over 30 years before retiring in 2021, and he played a significant role in supercomputing on lab. Living in London, England in the 1980s, he was attracted to JPL by the construction of a new Cray X-MP supercomputer at JPL, which was a novel and ambitious undertaking at the time.

The team that he worked with evolved over the years, from the "Supercomputing and Visualization Group" to simply "High Performance Computing", or HPC. Jimi became a mainstay on the team, helping procure and maintain computing resources that supported Entry, Descent, and Landing (EDL) for the Mars Pathfinder, MER, Phoenix, MSL, and InSight missions. HPC grew significantly under his leadership to support not only JPL missions, but also the many science divisions on lab who need to run increasingly complex simulations and computations.

Jimi is survived by his wife Rani, children Rishi and Sangeeta, and grandchildren Leela and Dhyaan.

-This obituary was written and submitted by Edward Villanueva.

Dr. Fred T. Krogh passed away on March 14, in his home, at age 86, after several years of fighting cancer. Fred worked at JPL for more than thirty years in the Computational Mathematics group. The group developed, maintained, and consulted about a library of mathematical software, and did research which Fred loved. He loved it so much that he continued to work on mathematical research when he retired.

A minor planet was given the name "5927 Krogh" in Fred's honor for his work on the "accurate,flexible and fast numerical integration algorithm used to track and navigate NASA interplanetary spacecraft since the 1970s. His work is at the core of JPL planetary, asteroid and comet orbit solutions and ephemerides."

https://ssd.jpl.nasa.gov/tools/sbdb_lookup.html#/?sstr=2005927&view=OPD

He is survived by his wife Anne-Marie, his children, grand-children and many friends.

-This obituary was written and submitted by Anne-Marie Vaudescal.

Personnel Appointments

Star Tracks is a monthly series highlighting recent personnel appointments on Lab.

Michael E. Lisano: Deputy Section Manager of 3120 Project Systems Engineering & Formulation on April 8.

Jim McGuire: Section Manager of 3830 Optics on April 8.

Elena F. Rafferty: Manager of 2507 Astronomy & Physics Business Operations Office on April 8.

Emily C. Brageot: Group Supervisor of 397D Science Planning on April 22.

Ross Williamson: Group Supervisor of 386D Electronics Technology on April 22.

David R. Ardila: Deputy Manager of 7300 Exoplanet Exploration Program on April 29.