VOL

Library Transformation Update
by Perri Fox

FALL 2022

# NASA LIBRARIES

## MAKING SPACE FOR WOMEN

Coming from different backgrounds, education, training, and life experiences, the women of the Johnson Space Center have forged careers in a field once reserved almost exclusively for men—and still often represented that way in popular culture. In her new book "Making Space for Women," *Jennifer M. Ross-Nazzal* challenges this perception and opens STEM fields to new generations of women by bringing forth 21 interviews conducted for the JSC Oral History Project.

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### AGENCY LIBRARY PORTAL SYSTEM

*Charles Beebe* provides a glimpse behind the curtain of NASA's future suite of essential digital library tools

### TALK OF THE TOWN

*Claudia Jones* on Administrator Bill Nelson's recent visit to the NASA Headquarters Library

### A CENTURY OF SERVICE

*Jason A. Jacobs* reports on the NASA Langley Technical Library's historic past and new era of modernization

### RESEARCH TIPS

*Dorothy Notarnicola* offers guidance on finding and ordering Standards

+

Q&A with Armstrong Research Library's *Kaylynn Ung*

*Karl Bender* on Tom Corbett, the X-15, and Beyond

"Computers & Networks" Crossword by *Paula Laurita*

VOL. 2, NO. 1

FALL 2022

# NASA LIBRARIES

TRANSFORMATION

# PREAMBLE

*A Message from NASA's Library Transformation Manager.*

**BY PERRI FOX**

Welcome to the third edition of the *NASA Libraries* newsletter, which comes to you as NASA libraries navigate a transition to a new, enterprise model. The libraries now sit within the Office of Communications (OCOMM) History and Information Services Division (H&ISD).

I'm very excited about the future and our opportunity to work with History, Archives, FOIA, and Public Inquiries. History will be managed by themes (Human Spaceflight, Fundamental Research, Science, and Aeronautics) rather than by center. The enterprise Archives program will manage and prioritize archival support across the Agency. Co-locating these agency functions into one organization gives us the ability to leverage our commonalities and make the best use of our limited resources.

As part of the library transformation, physical libraries are being evaluated to determine which will continue to operate in a brick-and-mortar setting, and how all libraries will integrate into enterprise support roles based on existing expertise. We're developing guidance to inform "keep, discard, digitize" decisions for the physical collections. We continue to try and wrap our arms around subscriptions, and recently received approval and funding from Mission Support Directorate (MSD) to conduct a deep dive into this area. We will work with the Science and Engineering communities to gather "top-down" subscription requirements as feedback for Mission Directorates and Centers, with a recommendation presented to the Mission Support Program Management Council (MSP-MC) by December 2022. In addition to all of this, the libraries will also address governance, metrics, workforce development, and communication of the new operating model.

I'm very excited about the Agency Library Portal System (ALPS)! The new system provides a single NASA library web portal that removes access barriers to subscribed and NASA-held resources. ALPS will be a game changer for our community, and you can learn more about it in Charles Beebe's introductory article, "ALPS: Climb to New Heights of Information Access with NASA's Forthcoming Agency Library Portal System" on page 9.

I was pleased to meet many of NASA's librarians in person recently at a face-to-face event for the NASA Libraries Network, hosted at GSFC in Greenbelt, Maryland. It was an informative two-and-a-half days! One of my personal favorite speakers was NASA Associate Chief Scientist Louis Barbier, who noted that "NASA needs libraries!". He supports libraries in focusing on open science, supporting entrepreneurship, and innovating shared platforms for "radical collaborations".

The future NASA library must evolve from information collection and management to hubs of work and collaboration spaces. It should provide remote, equal access to resources, and serve as a custodian of NASA's historical material and special collections. Barbier's inspiring words will help to guide NASA libraries through their transformation to an enterprise model. His vision, together with the librarians' contagious passion, will drive the momentum for library modernization and improved services.

Sincerely,

Perri Fox

Perri Fox
Transformation Manager
NASA Libraries

# NASA LIBRARIES

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Library Request System
**requests.ndc.nasa.gov**

Ask-A-Librarian
**nasa-gsfc.libanswers.com**

Contact Us
**NASA-DL-Library-Consortia**

NASA LIBRARY NETWORK

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**Karl Bender** *("Fame in the Stars," p. 18)* is a former AFRC Librarian, now working on the STI side. Karl enjoys listening to music and museum hopping across the U.S.

**Kate Dunlap** *("NASA Libraries Strike Deal with Wiley," p. 26)* is the Senior Librarian and Library Technical Representative at Glenn Research Center. She's currently embarking on a virtual run through the Appalachian Trail.

**Perri Fox** *(Preamble, p. 2)* is the Library Transformation Program Manager and Deputy Director for the History & Information Services Division. She enjoys boating, traveling, cooking, and needlepoint and adores her 3 daughters and dogs.

**Jason A. Jacobs** *("A Century of Service," p. 21)* has been a Librarian at Langley Research Center since August 1994. He is a North Carolina native and enjoys exploring the historical sites and parks of Virginia.

**Claudia Jones** *(Talk of the Town, p. 5)* is the Lead Librarian at NASA Headquarters. She found her calling while advocating for a prison inmate who said she'd make a good librarian.

**Paula Laurita** *(The Crossword, p. 28)* is the former Librarian at MSFC. She's an enophile, foodie, and nerd who loves travel and short walks on the beach.

**Jenny Mottar** *(Front Cover)* is the Art Director for NASA Science at Headquarters. In her free time she enjoys macro nature photography, playing classical guitar, and hiking with her son.

**Dorothy Notarnicola** *("All About Standards", p. 12)* is a Senior Librarian at the Kennedy Space Center. She enjoys tracking down esoteric research papers, cruising with her husband, and playing with her Cairn Terrier, Rooney.

**Michele Ostovar** *(Back Cover)* is the Senior Analyst and Editor for the NASA History Division. When she's not working from home in Pacific Grove, CA, you might find her in the Monterey pine forests hunting for mushrooms or hiking the coastal trail.

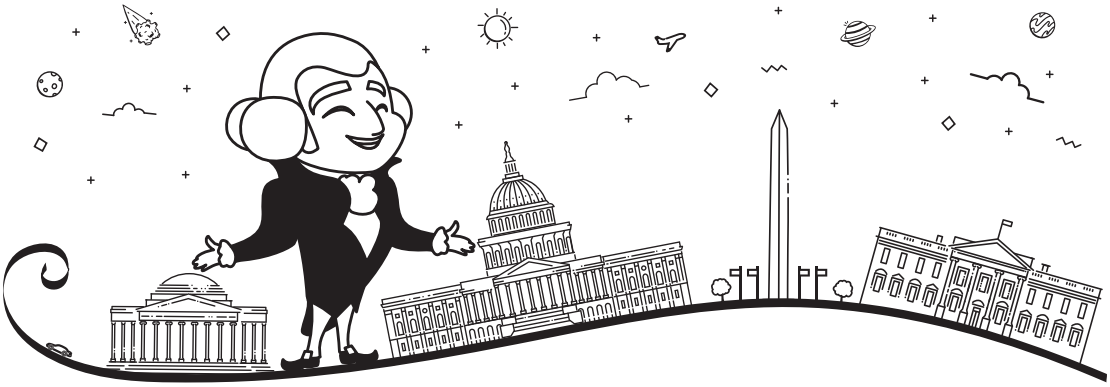
**Jennifer M. Ross-Nazzal** *("Making Space for Women," p. 14)* is the JSC Historian. She is the author of *Winning the West for Women: The Life of Suffragist Emma Smith DeVoe*. In her spare time she enjoys curling up with a good book.

**Kaylynn Ung** *(Meet-a-Librarian, p. 7)* is a Librarian at Armstrong Flight Research Center. She enjoys running with her dogs, yoga, and reading anything by John Green.

# EXPLORE SCIENCE

The artwork featured on the cover of this issue first appeared in the Science Mission Directorate's 2022 Explore Science calendar.

"This feminine face of exploration, composited with the beautiful swirling textures of Earth's biologically rich waters, looks beyond the Moon to future discoveries. The profile also provides a connection to the Agency's Artemis program, which will put the first woman on the Moon. In celebration of Landsat's 50th anniversary in 2022, she is composited from imagery of phytoplankton in the coastal waters off of Argentina, captured by Landsat 8 in January of 2021. Water, a vital life-sustaining force, is a fitting symbol of humanity and the interconnectivity of science. From understanding Earth's changing climate to detecting lunar deposits to fueling human exploration, NASA science lights the way!"



# TALK OF THE TOWN

*Administrator Bill Nelson visits the NASA Headquarters Library in Washington, D.C.*

**BY CLAUDIA JONES**

Senator and NASA Administrator Bill Nelson[1] visited the Headquarters Library on Friday, January 21, 2022. On that cold and blustery afternoon, Senator Nelson and his staff not only brought a ray of sunshine and warmth to the Library by their presence, but arrived with an eagerness and curiosity to learn how the library serves both the Agency and the public.

NASA's only library open to the public, the Headquarters Library is decorated with pictures showcasing successful space events and missions, including those spacefaring missions that ended in tragedy for the NASA astronauts who risked their lives to pave the way for all.

The tour began in the library reception area where a picture of the NASA Challenger astronauts sparked a story from Senator Nelson of how he met and became good friends with astronaut Christa McAuliffe during his days in astronaut training. Originally scheduled to fly on the Challenger mission with McAuliffe, Nelson was reassigned to fly on the Columbia STS 61-C space shuttle mission. In tribute to McAuliffe's memory, Senator Nelson's book **Mission: An American Congressman's Voyage to Space** includes the poem "High Flight"[2], which McAuliffe had carried aboard the ill-fated Challenger flight.

The poem was written by John Gillespie Magee Jr., a Royal Canadian Air Force combat pilot who died over the white cliffs of Dover, England in 1941. "High Flight" also summarizes how Senator Nelson felt about spending time in space on the Columbia STS 61-C space shuttle mission. Nelson shares, "When you look at Earth, you don't see religious or racial political biases; we are all in this together."

Senator Nelson's book is displayed at the library's circulation desk for visitors. With a smile, he signed it, "Reach for the Stars, Bill Nelson, STS 61C." As a payload specialist aboard that mission, Nelson was tasked with a medical experiment important to cancer research, growing protein crystals in the same way they are grown on Earth.

As the tour proceeded, Nelson stopped at a picture of President John

**HIGH FLIGHT**

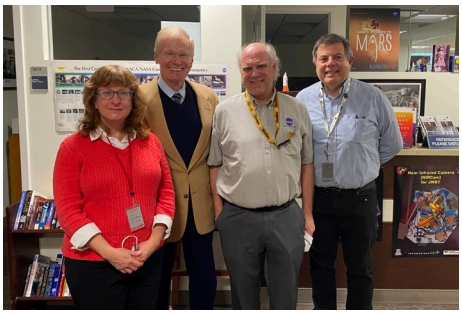
Oh! I have slipped the surly bonds of Earth
And danced the skies on laughter-silvered wings;
Sunward I've climbed, and joined the tumbling mirth
Of sun-split clouds, – and done a hundred things
You have not dreamed of – wheeled and soared and swung
High in the sunlit silence. Hov'ring there,
I've chased the shouting wind along, and flung

My eager craft through footless halls of air…
Up, up the long, delirious burning blue
I've topped the wind-swept heights with easy grace
Where never lark, or ever eagle flew –
And, while with silent, lifting mind I've trod
The high untrespassed sanctity of space,
Put out my hand, and touched the face of God.

— *John Gillespie Magee Jr.*

F. Kennedy congratulating Alan Shepard, the first American astronaut in space. Looking intently at the picture, he said with a smile, "John Glenn was the back-up astronaut to Alan Shepard and Gus Grissom…[He] always wanted to be the first American astronaut to fly in space." A silent moment passed by with all eyes on the Senator as we followed him into the Information Center. Looking at the pictures of the astronauts, he held up a picture of Tyler Hague, who was on a 2018 Russian Soyuz mission when its rockets failed shortly after launch. "He did not know if he was going to survive the explosion," Nelson said. Gently, he put the picture of Hague back in the case. As we departed the Information Center, Nelson strolled passed pictures and models of NASA artifacts donated to Headquarters Library by other NASA offices and centers.

Conversations continued among the staff while Senator Nelson moved to the quiet study area to view a picture of President Bill Clinton visiting the firing room of the NASA Kennedy Space Center following the October 1998 launch of the STS-95 mission, which deployed the SPACEHUB module and carried John Glenn back to space. Nelson then examined artifacts in the display case as librarian Rick Spencer described their significance and how the library obtained them.



With the tour coming to an end, Nelson encouraged the staff to visit both Kennedy Space Center's Atlantis exhibit and Challenger and Columbia memorials. Before leaving, he stopped and asked librarians Claudia Jones, Rick Spencer and Tom Tuszynski to take a picture with him. As he left, Senator Nelson declared "The library is a great and hidden treasure." ◆

**December 12, 1985.** The crew assigned to the STS-61C mission included *(seated left to right)* Charles F. Bolden, Jr., pilot; and Robert L. (Hoot) Gibson, commander. On the back row *(left to right)* are payload specialists Robert J. Cenker, and Congressman Bill Nelson. To the right of Nelson are mission specialists Steven A. Hawley, George D. Nelson, and Franklin R. Chang-Diaz. Launched aboard the Space Shuttle Columbia on January 12, 1986 at 6:55:00 am (EST), the STS-61C mission's primary payload was the communications satellite SATCOM KU-1 (RCA Americom).

### Notes

[1] Senator Bill Nelson was sworn in as the 14th NASA administrator on May 3, 2021, by the Biden-Harris administration. Tasked with carrying out the Biden-Harris administration's vision for the Agency, Nelson will lead the Agency to expand America's exploration and scientific frontiers, advance the nation's commitment to build back better through innovation, combat climate change, re-establish America's standing abroad, and inspire the next generation.

A longtime champion of NASA's missions in the Senate, Nelson will oversee the president's discretionary budget, engagement with the NASA workforce and underscore the president's support for the Agency's missions and science that informs critical policy-making decisions.

Administrator Nelson gave a State of NASA Union Address to the NASA Community on June 2, 2021. In his address, he salutes the Agency's workforce and lays out the plans for NASA's future climate science missions and a robotic and human return to the Moon through the Agency's Artemis program.

[2] Magee, John Gillespie. "Letter to Parents," September 3, 1941. John Magee Papers, Library of Congress, Washington, D.C. Manuscript. In *Respectfully Quoted: A Dictionary of Quotations Requested from the Congressional Research Service*, ed. Suzy Platt (Washington, D.C.: Library of Congress, 1989): 117-18.

**Claudia Jones** found her calling while advocating for a prison inmate who told her that she would make a good librarian. After changing careers, she became the first member of her family to receive an advanced degree when she was awarded an MLS from the The Catholic University of America. Claudia has found her niche working in the Headquarters Library and loves helping patrons find information.

PROFILES

# MEET-A-LIBRARIAN

*Q&A with Armstrong Flight Research Center's Librarian.*

**FEATURING KAYLYNN UNG, MLIS**

A native of the High Desert, Kaylynn Ung grew up in Boron, CA and now serves as the Librarian for the NASA Armstrong Research Library at Edwards Air Force Base. Although the COVID-19 pandemic has wrought a myriad of challenges for library operations, Ung has adapted by steering her library's information services towards a virtual model and meeting her patrons where they are.

### HOW DID YOU GET YOUR START AT NASA?

"Before NASA, I interned at California State University of Bakersfield in their archives area, working to sort 100-year-old letters and other historical items belonging to a well-known Bakersfield architect. I fell in love with the history; touching the lives and gaining perspectives of people I could never meet. Through this experience, I stumbled into library work. In my spare time interning, I helped re-shelve items and assisted students in finding the resources they needed to accomplish their goals. In this way, I connected with people more tangibly. It felt very rewarding to help people find exactly what they were looking for, even when they had trouble articulating it. I felt like a detective.

When I was looking for full-time work close to my undergrad conclusion (BA in English Language and Literature), I stumbled upon a contractor website advertising a Library Technician position on Edwards Air Force Base, about 20 miles away from my hometown. I was so elated to be interviewing at NASA Armstrong. When I got the position, I was ecstatic. I spent a few years mulling over the possibility of returning to school to earn my Master's in Library & Information Sciences as I came to love our tight-knit community at AFRC. With the encouragement of my predecessor Karl Bender, I decided to make the leap and received my graduate degree in 2019 from San Jose State University. The rest is history. Every day is never the same as the last, and I am still a detective hunting down obscure technical resources, my favorite part of the job."

### WHAT ARE THE BIGGEST CHALLENGES YOU FACE AT YOUR LIBRARY?

"I think there is a lack of understanding about just what a Librarian does or can do, particularly in special or government library settings. We truly are an asset, saving our patrons time and most importantly money, which helps the agency to function more productively. Folks right now are under the impression that Google or Amazon can do it better than librarians; however, that feeling may be misguided. They are not taking into consideration that their data—every search, every click, every purchase—is likely being sold for commercialization purposes. Perhaps even the information they're seeking is compromised in this commercial model, as most users are known to only view the first few items in their search query, trusting that the results they see at the very top are the most precise.

Libraries, being a neutral party in the process of scientific research, are one of the last establishments that do not do this. We assist our patrons with the NASA mission, collecting critical scientific information and resources at the least cost, but most benefit. We also are "big picture" thinkers. Librarians often take the road less traveled by the scientific community to process language and calculate search terminology in order to retrieve the best results, rather than simply delivering the first few web links.

Another challenge is quantifying our value to executive leadership in a way that indicates impact. How can we illustrate the value the library provides to a patron who, having searched for a critical piece of research for months, receives that one crucial, missing piece from their NASA library in just minutes? There is qualitative and quantitative information that needs to be collected, but it is difficult to measure as every request is so unique to an individual, project, or research scenario."

**THERE IS AN EXPECTATION THESE DAYS THAT USERS CAN (OR SHOULD) BE ABLE TO FIND EVERYTHING ONLINE. HOW WOULD YOU RESPOND TO THAT?**

"Everything within the Agency costs time and money. This is widely accepted by most parties when, for example, we are considering flight of a new aircraft or a new science mission in space. However, this concept seems to be less tangibly considered when discussing mission-supporting enterprises like libraries. Yes, you can largely find what you are looking for digitally, but it may cost you in the near term. Either the research will be hard to find (time), or it will only be accessible for a fee (money). Information is a big business. Companies charge libraries millions - if not billions - a year collectively for access to various publications and proceedings. This is a huge beast to conquer, but one we keep feeding regularly, reinforcing with more money and critical data as there is no other available solution for the monopoly some vendors hold.

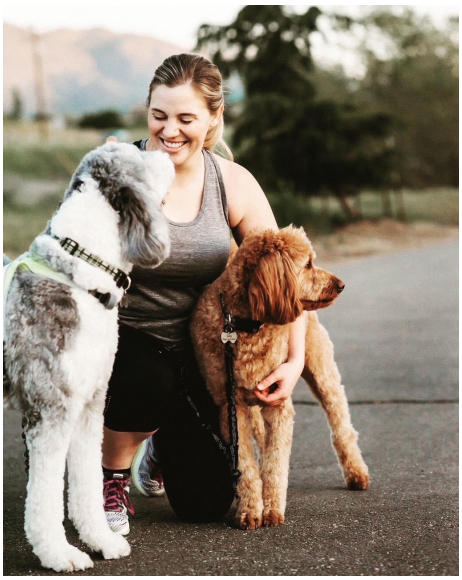
Most difficult for me is the instance in which a patron inevitably asks me why I cannot provide the money to supply an item behind a costly paywall that should be available to the public. I feel their frustration and match it entirely. The information industry needs a re-work in the regard, and that is why I am excited for NASA to develop an open-science enterprise, supporting and creating transparent and accessible knowledge. I have hope that in doing so, we will see a destabilization on the monopoly vendors have on scientific and technical research that can benefit humanity."

**FAVORITE PART ABOUT YOUR JOB?**

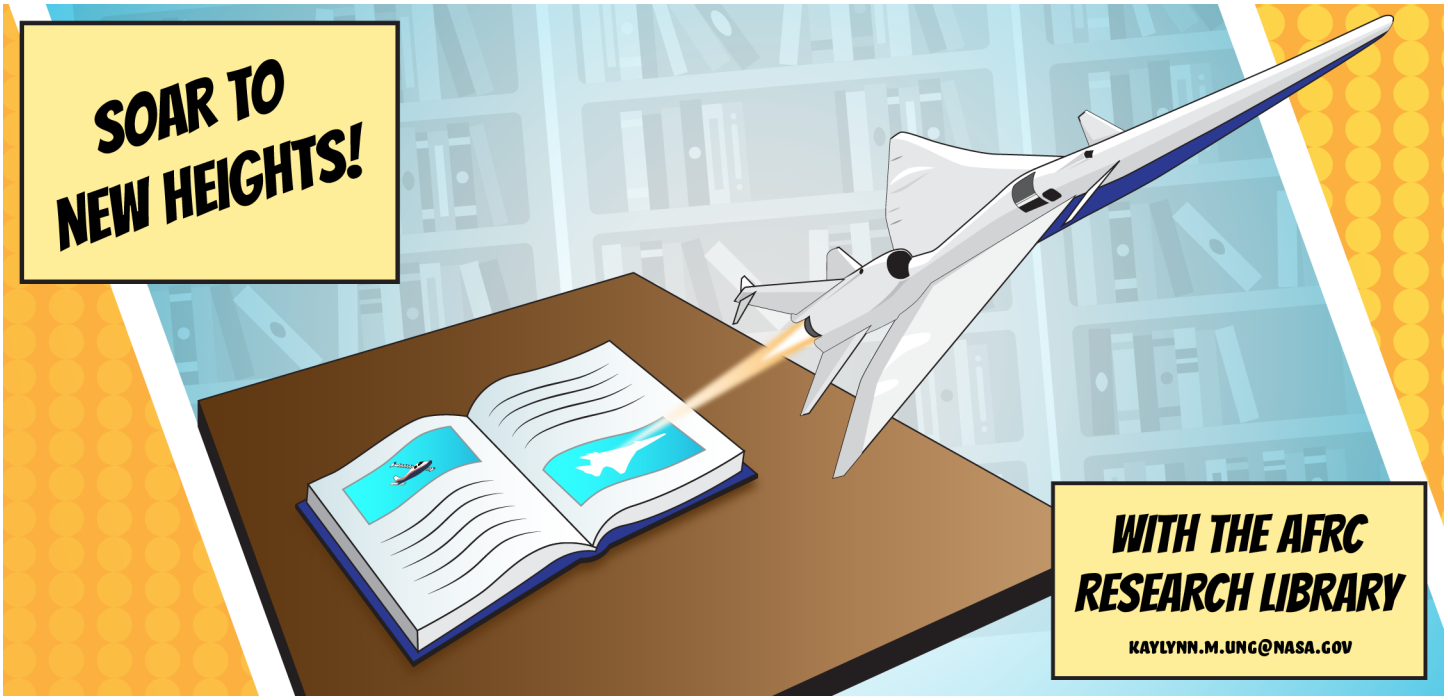
"Most people picture libraries as these almost medieval and dusty institutions - places where you need to be quiet for fear of being shushed by a caricature of an ancient and cross librarian who otherwise makes no contact with you. This could not be further from the reality of libraries today, especially at AFRC. My library provides a future-forward space for folks to meet, assisting all who need help finding research or just those in search of a welcoming place to park for the afternoon. We are the center of our community at Armstrong, embracing NASA's mission with the same vigor as the wonderful individuals who explore the unknown reaches of aviation and space. I really love the atmosphere here and being at the center of it all to witness the work; the true partnership and collaboration we have with our research community here is really fantastic."

**FAVORITE HOBBIES OUTSIDE OF WORK?**

"I've read that "everyone thinks they have the best dog, and none of them are wrong." I truly believe my dogs are the best. I am a dog-mom to two wonderful doodles, a Goldendoodle named Sulley, and a Sheepadoodle named Douglas. I enjoy taking them with me on runs, one of my favorite activities to decompress after a long workday. I have run up to a half-marathon (13.1 miles), and dream of one day accomplishing a full marathon (26.2 miles)." ♦



*In her spare time, Ung enjoys running with her two Doodles, Douglas (left) and Sulley (right).*



TRANSFORMATION

# ALPS!

*Climb to new heights of information access with NASA's forthcoming Agency Library Portal System.*

**BY CHARLES BEEBE**

When the NASA Library community's leadership approached our team in 2020 with a request to build a prototype for the Agency Library Portal System (ALPS), we had no idea what a stroke of luck had befallen us! Being selected to prototype the digital library platform of the future for the Agency has been a dream come true - we still have to pinch ourselves sometimes.

So, what is the ALPS? Put simply, ALPS is the Agency's future shared suite of essential digital library tools. Whether you're a postdoctoral research fellow, librarian, archivist, or even an intern, the NASA Library community is currently building you a prototype of a platform which will allow you to access the majority of NASA's library content quickly and easily from any device on a NASA network. ALPS connects to both external reference collections & internal NASA systems, and is centralized, cloud-native, and scalable under the hood. This will avail all Agency employees to all Agency-wide collections, as well as any additional collections their Center's library provides. It will modernize, consolidate, and unify the operation of the Agency digital library resources needed for the efforts of the Office of Communications

⁙ *Currently in the prototype stage, the Agency Library Portal System is expected to deploy in early 2024.*

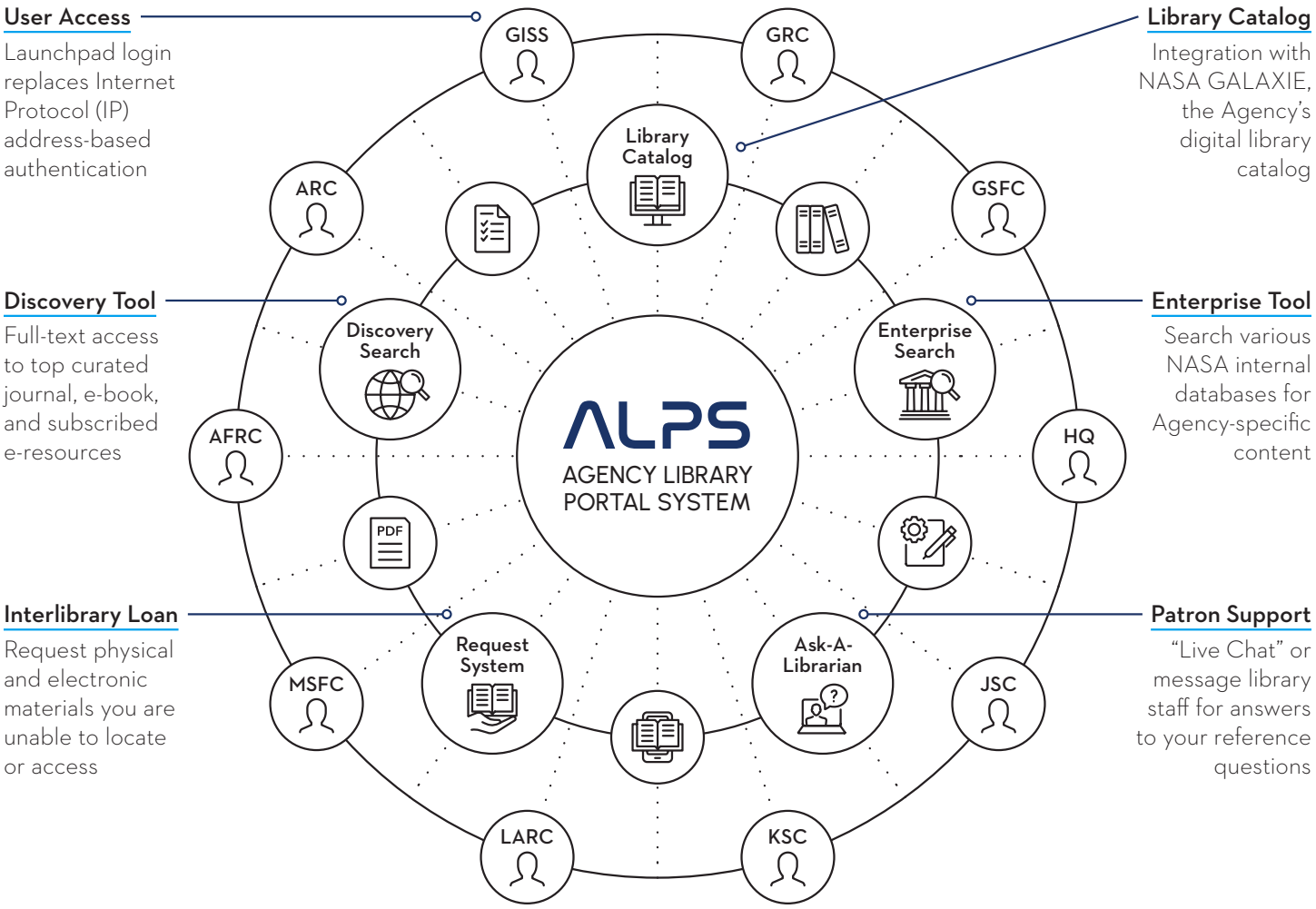
(OCOMM) in conjunction with the Information, Data & Analytics Service Line (IDAS) and Applications & Platform Service Line (APS).

The 18-month process of project development was quite an adventure. The project got off the ground just a few months into the COVID-19 pandemic, however Bob Sherouse (HQ), Robin Dixon (GSFC), Greta Lowe (LaRC), Kate Dunlap (GRC), and their teams handled that challenge with the utmost professionalism and made it a delight for us to start getting smart on library tech. Even for a team with years of experience and multiple awards for Agency-level custom cloud application development, there was a lot of potential scope to explore for the ALPS prototype!

Also, a huge thank you to everyone in the OCIO who worked with us and our fellow 2021 IT Innovation Fund (ITIF) cohort to secure project funding. We were incredibly grateful to work with the aforementioned Library stakeholders and Lori Parker from IDAS to identify the core features most valuable to the Agency's future shared suite of essential digital library tools, including: Replacement of Internet Protocol (IP) address-based access to the Agency's $7M subscription portfolio with Launchpad login; "Discovery" (library search) across all integrated external & internal reference collections; Enterprise search via integration with NASA's Enterprise Data Platform (EDP); "Ask-a-Librarian" chat with reference librarians; Integration with Galaxie, the Agency's digital card catalogue; Inter-library loan service for physical and electronic items; An Agency-level portal which Library personnel can maintain; A Center-level Library portal for each Center which Library personnel can maintain; and Visualization of subscription and user analytics via integration with NASA's Enterprise Data Platform (EDP).

When NASA Library stewardship transitioned from the Office of Strategic Infrastructure (OSI) to OCOMM last Fall, Perri Fox (HQ) took the reins from Bob Sherouse and masterfully kept up the momentum needed to close out the 18-month project development period and kick off a 12-month Technology Demonstration to create an ALPS prototype. Perri and Robin's commitment and engagement as a part of the integrated product team has enabled us to make progress at an exceptional pace and with a keen attention to detail. From the beginning of persona interviews with Janine Bolton (JSC)

**ALPS: Visual Breakdown.** The Agency Library Portal System (ALPS) will consolidate access to NASA's most essential digital library tools and resources from a single, centralized platform.



and Ken Wright (HQ), to roadmap development in December of 2021, it's truly been a treat to have stakeholders who are willing to roll up their sleeves and nerd out with us!

As we've made our way through core feature development, we've also been impressed by the vendors in the library technology community. It turns out we're not the only ones inspired by the NASA Library community's passion! The teams from all the library tech vendors have been great to work with, which has allowed us to fully consider a wide range of the best-in-class tools for this new platform. And, of course, shout outs to our NASA-internal vendors: Jordan Rasmussen (LaRC) and the Galaxie team; Jason Duley (HQ) and the Enterprise Data Platform (EDP) team at Marshall; and Ian Sturken (ARC), Heather Thomas (JSC), and our teammates in the Web Services Office (WSO).

We've saved the best for last: a huge thank you to everyone in the broader NASA Library community for their warm reception at this year's Library Face-to-Face at Goddard. From the welcoming and inquisitive atmosphere to their enthusiastic participation during our presentation, we have seen that they all have a passion for their craft. It was super fun to get to meet all of them and play "ALPS: The Game!" with them, and we're excited to work with Perri and Robin to incorporate all of their feedback to bring every patron of the Agency's libraries the best possible platform.

The NASA Library community inspires us to do our best work every day, and we earnestly hope to continue this collaboration for years to come. ♦

## ALPS Team Members

**Charles Beebe**
Scrum Master

**Perri Fox**
Product Owner

**Robin Dixon**
Library SME

**Megan McCarty**
Frontend Developer

**Karina Garces**
Backend Developer

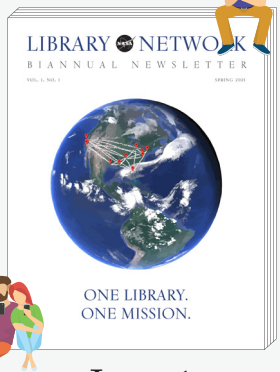
**David Nagarpowers**
Backend Developer

**Mckenzie Kane**
UX & Design

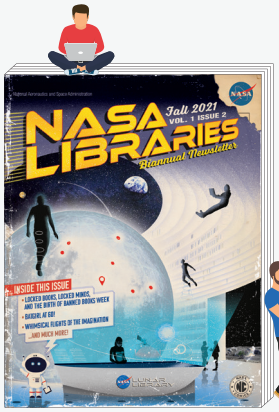
**Gamble Gilbertson**
Area Manager

**Chris Shenton**
Cloud Architect

# NASA LIBRARIES NEWSLETTER




Issue 1
**"One Library, One Mission"**




Issue 2
**"The Comic Book Edition"**

Issue 3
**"Making Space for Women"**

Read every issue online at
**library.larc.nasa.gov**

RESEARCH TIPS

# ALL ABOUT STANDARDS

*A Librarian's Guide to Finding & Ordering Standards.*

**BY DOROTHY NOTARNICOLA**

Finding standards can oftentimes be complicated and confusing. There are hundreds of thousands of standards from thousands of organizations. Luckily, the **NASA Technical Standards System** (NTSS) is here to help. The NTSS provides access to technical standards from a wide range of institutions, with the overall aim of:

- Promoting technical excellence and furthering mission success by enhancing NASA's technical capabilities through standardization.
- Facilitating participation in development of voluntary consensus standards and their adaptation for use to meet NASA's needs.
- Managing development of NASA technical standards, specifications, and handbooks to meet NASA's unique needs.
- Providing the NASA community with access to essential standards, specifications, and other documentation, related application notes, and lessons learned; notifications when changes to these documents occur; and access to engineering tools from a single access point, saving NASA time and money.

On the left-hand side of the NTSS homepage, you'll see a **User Menu** that provides access to a number of helpful links, including NASA and center-specific standards, NASA Directives, and NASA Technical Reports.

Under the **Welcome** banner, NTSS provides access to contracted Standards Developing Organizations (SDOs) via either an electronic subscription delivery service or on a pay-per-document approval basis. Both are offered at no cost to end-users.

## SEARCHING

The best way to begin your search is to determine which database to use. You will notice that in the middle of the Standards homepage there are two search options: TechStreet™ Enterprise (left button) and Engineering Workbench by IHS (right button).

*To access the NASA Technical Standards System (NTSS), visit https://standards.nasa.gov/.*

### TechStreet™ Enterprise

TechStreet provides the majority of technical standards for NASA, and the Agency's subscription bundle includes documents from the following publishers: AA, AIAA, API, ASHRAE, ASME, ASQ, ASSP/SAFE, ASTM, CGA/GAS, ESO/ESD, GOV, IEC, IEEE, IEST, ISO, MIL, NASA, NBBI/NBBPVI, NEMA, NFPA, RTCA SAE, UL, and others.

### Engineering Workbench™

Engineering Workbench by IHS Markit provides standards for which they have exclusive rights: AIA/NAS, AWS, ECPI, IPC, and TIA.

## OPENING

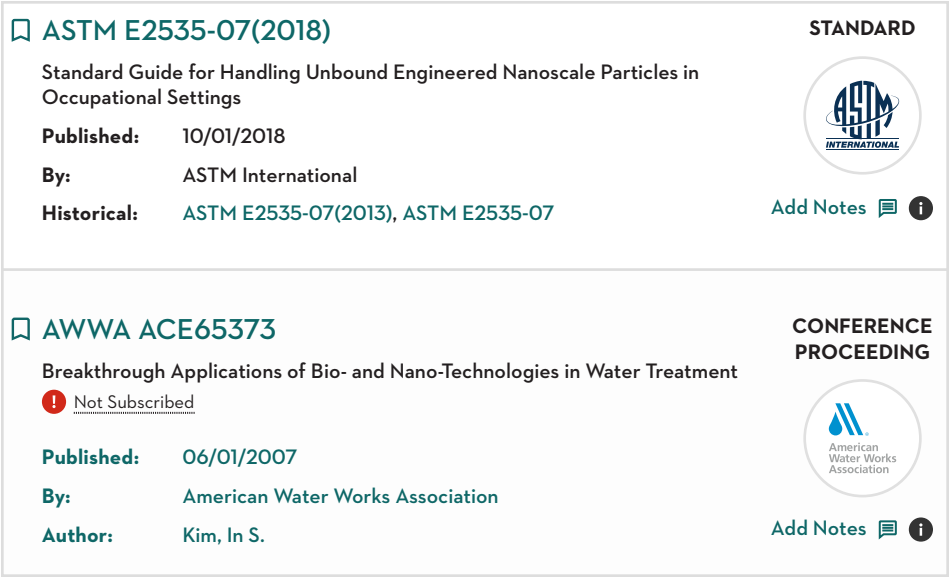
There is an Adobe Acrobat utility add-on called **FileOpen** that is required to read most documents as they are locked (SECURED). FileOpen associates the standards with your computer so that they're only accessible from your device. TechStreet provides a link to the free plug-in that can be used to access documents encrypted with the FileOpen software.

To install FileOpen, you'll need to access TechStreet via the NASA Technical Standards System:

1. In the middle of the NTSS homepage, click the blue box on the left that says **"Search the SDOs below for Standards"**. (If you hover over this box, it says "TechStreet Login Button".)
2. Scroll down until you see the **Tools** menu on the left-hand side.
3. Click **"Install FileOpen"**. Follow the instructions.
4. Click **"Test FileOpen"**. Follow the instructions.
5. Once your machine is correctly configured to view SECURED PDFs, you can download and view SECURED standards.

## ORDERING

Unfortunately, not all standards in TechStreet are available to the NASA community. Fortunately, you can request a copy of any standard and, if approved, receive it at no cost to you or your organization.




In the graphic above, the standard at the top (ASTM E2535-07) is part of the NASA subscription, meaning you can click on the title and download the standard immediately. The bottom standard (AWWA ACE65373) shows that it is *not* provided via subscription. When you click this standard, you can order it using the **Request** button with the shopping cart icon.

**Note:** While the service is provided at no cost to the user, justification of need and program or project supported for the pay-per-document is carefully considered before the request is approved by the NTSP Manager or designee, as this is an additional cost to the NASA Technical Standards Program. You may be contacted for additional information prior to approval.

## TECH STREET TIPS

- The Search feature is set to "On Subscription" standards only. You can uncheck the box each session to search all standards in the collection or you can change your default setting by clicking on your name at the top right of the page and updating your **Search Settings**.
- You can create **Lists** to group a set of documents. You can create as many lists as you need, put as many documents as you want into each list, and share lists with your NASA colleagues. Whenever a document is updated you will receive an email notification.
- There is a tab at the top of the page labeled **Search History**. You may flag any search as a "Favorite" by bookmarking it. You can also schedule a bookmarked search to run periodically and send you an email alert whenever new results are available.

## ADDITIONAL NTSS FEATURES

- There is a **Glossary of Standards Acronyms** on a tab across the top of the NTSS page.
- There are additional **Engineering Resources and Tools** listed at the bottom of the NTSS page.

## DID YOU KNOW?

Each Center has its own collection of print standards. If you ever have any trouble, questions or issues with Standards, you can reach out to your Center librarian. For technical support, email standards@msfc.nasa.gov. ◆

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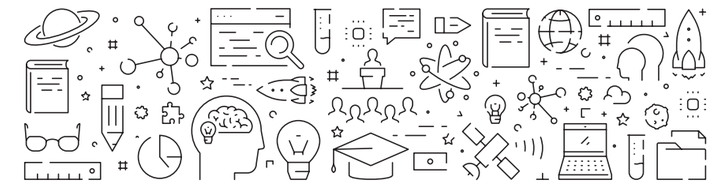
**Dorothy Notarnicola** received her M.L.S. from the University of Pittsburgh and her M.B.A. from the Pennsylvania State University. She started working at NASA Langley Research Center in 2008 and recently (2022) moved to Florida and now works at the Kennedy Space Center. Dorothy has worked as a university librarian, a public library librarian, and a private high school librarian. She enjoys going on cruises with her husband and walks with her husband and Cairn terrier.

# PEOPLE OF NASA



FEATURE STORY

## MAKING SPACE FOR WOMEN

*An Interview with Author & Johnson Space Center Historian, Jennifer M. Ross-Nazzal.*

Dr. Jennifer M. Ross-Nazzal is the historian for the NASA Johnson Space Center. She is a two-time recipient of the Society for History in the Federal Government's Charles Thomson Prize and a member of the editorial board for Quest: The History of Space Flight Quarterly. Her new book, **Making Space for Women: Stories from Trailblazing Women of NASA's Johnson Space Center**, was published in January 2022 by Texas A&M University Press.

### WHY DID YOU DECIDE TO WRITE "MAKING SPACE FOR WOMEN"?

"When I came to the Johnson Space Center as a doctoral student, I was interested in learning more about the women at NASA. (I am a historian of women and have written a biography of suffragist Emma Smith DeVoe.) I couldn't find exactly what I was looking for. I started looking for a book about the topic at the STI Center, but all I found was Sheryll Goecke Powers' monograph about female engineers at the Dryden Flight Research Center. I mined the JSC History Collection, but most of the documents were related to the flight programs and institutional history.

As an oral historian, it made sense to compile a book on conversations with women in the Agency. JSC's History Office has a vast collection of interviews, and several publications from the office include edited transcripts featuring interviews with staff. Glen Swanson's book, "Before This Decade is Out," was the first book I received when I arrived so many years ago. The title included fourteen personal recollections on the Apollo Program. "NASA at 50: Interviews with NASA's Senior Leadership," which came out years later, featured oral history interviews conducted by my colleagues Rebecca Wright and Sandra Johnson during 2007 and 2008. Both titles and many others influenced my decision.

I also wanted readers outside of NASA to understand how women's occupations changed over time and how they eventually became part of the astronaut corps and flight control. At the start of NASA, the most common job for women in the Agency was

secretarial work. I wanted to include several women from this field because their work was invaluable to NASA's mission. So too was the work of the first aerospace nurse, Dee O'Hara.

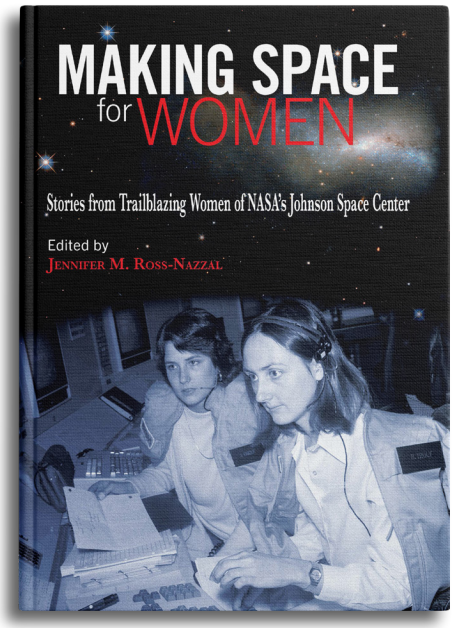
I compiled this book to inspire young women to pursue jobs in STEM careers and aerospace. But, as I point out throughout the book, even those who do not have technical training can pursue a career with NASA in a wide variety of mission support roles."

**WHO IS THE AUDIENCE FOR "MAKING SPACE FOR WOMEN"?**

"The original audience, as I envisioned it, was young women in high school or college considering their career options. But the more I reviewed the manuscript I realized that there was potentially a much larger group of readers. "Making Space for Women" might be of interest to early career professionals beginning to think about their roles and broadening their view of how to move beyond an entry-level position into a position of leadership. The title also might appeal to those in management, leaders who want to learn more about how best to support their employees. (Many of the women give some excellent examples of stellar bosses throughout their careers.)"

**TELL US ABOUT THE IMAGE YOU CHOSE FOR THE COVER. WHO ARE THE TWO WOMEN AND WHAT ARE THEY DOING?**

"I spent a lot of time looking for cover images. It wasn't until I conducted an interview with Michele Brekke, the first woman to be selected as a Flight Director, that I discovered this image. At the end of our final session, she shared the photo with me. I never would have seen it otherwise. I thought it encapsulated the ideas contained in the book. The photo features Brekke and Susan Creasy, both flight crew trainers, working at the Instructor Console for the Shuttle Mission Simulator. If you look closely at the photograph, you will see that they are wearing the jackets of STS-2 crewmembers Joe Engle and Dick Truly. Brekke and Creasy illustrate just how well women fit into the training team at JSC. They were considered one of the guys and




**"Making Space for Women"** can be checked out from your NASA Library, or purchased online at tamupress.com.

even given the opportunity to don the jackets of the Shuttle crew."

**HOW DID YOU DECIDE WHO TO INCLUDE, AND WHY ISN'T SALLY RIDE INCLUDED?**

"I wanted the book to be accessible to a variety of readers, not just fans of NASA or readers with technical training or know-how. Readers might be put off by too much government speak or technical terms, so I reviewed all our existing transcripts. I found a handful of interviews with women that met my requirements, but I noticed that they were all white. I needed a more diverse group of subjects, so I approached the head of our oral history committee and together we came up with a list of women from diverse occupations that also included women of color. It was important to me to include women in fields people do not often associate with the space agency, like human resources and procurement. I knew that I also wanted to include at least one of the six women from the first class of astronauts to include women and minorities.

Many have asked why I included Kathy Sullivan instead of Sally Ride. Wouldn't it have made more sense to include the first American woman to fly in space? But Sally was known for being reserved and not sharing much, and if you read our interviews you'll see that she continued to value her privacy years later. Kathy, however, is a true storyteller. Her tales of those years are much more colorful than Sally's and provide more detail, which is why I chose to include her."

**THE BOOK INCLUDES EDITED AND ANNOTATED ORAL HISTORY NARRATIVES. WHY DID YOU CHOOSE THIS FORMAT OVER THE INTERVIEW STYLE?**

"It's funny that you ask that question, because I intended to keep them in interview style: question, answer; question, answer. After editing a couple and thinking of the original audience I thought reading narratives would be a way to draw in younger readers. Reading a story from a woman who worked at NASA, written in her own words, seemed a more approachable way to reach girls who might not be inclined to pick up the book in the first place."

**WHAT ARE SOME OF YOUR FAVORITE STORIES FROM THE BOOK?**

"There's so many to choose from, so to save space I'll just include two. Both are funny, and I hope readers find the humor in both.

In 1973, many men had pinups of women in the office. Women employees did not, and Ivy Hooks, who was then working in an all-male group, told a story about what happened when the actor Burt Reynolds appeared in a nude centerfold in "Cosmopolitan" and that risqué photo mysteriously appeared over her desk one day. Once that photo was on the wall, the deputy of the office suddenly decided that the men could no longer post images of sexy women on the walls. It wasn't nice, and they had to come down.

Ten years later Ride became the first American woman to fly in space. Kathy Sullivan remembered that the decision to name another female astronaut for that honor hurt her pride. Things changed when the STS-7 crew were unable to land in Florida at the Cape because of weather concerns. Instead, they landed across the country at Edwards Air Force Base in California. All the VIPs expected Ride in Florida

and Sullivan had to fly there and stand in for her colleague. The crowd was huge, and Sullivan thought that being the second or third woman to fly in space wasn't such a bad thing. Kathy told Ride, "If this is what you get for going first, [you] can have it."

**HOW DID YOU ARRIVE AT NASA? WHAT ARE YOUR MAIN TASKS AS AN HISTORIAN?**

"I was a PhD student at Washington State University when I applied for an internship with the Johnson Space Center. That internship eventually turned into a full-time job, and I've been here ever since.

I work on a wide variety of assignments. My days are never dull! I handle research and reference requests from the Agency and the public. I also do a lot of public outreach and talks. I write about the space program, and I sometimes help with preservation work. I am also an oral historian and conduct interviews for the Agency."

**WHAT DO YOU LIKE TO READ FOR FUN? DO YOU HAVE A FAVORITE BOOK?**

"I love to read anything I can get my hands on. Recently I just made my way through the Maisie Dobbs series and am now rereading the Harry Potter series. Of course, I enjoy reading about history, especially any books about woman suffrage. It's difficult to name a favorite author, but my favorite writer hands down is Amy Sherman Palladino—writer, producer and director of *Gilmore Girls*. I wish I could be that witty and funny!" ♦

*Ross-Nazzal and the Mars Automated Giant Gizmo for Integrated Engineering (MAGGIE), a replica of the Curiosity Rover located at the JPL Mars Yard.*

# TRAILBLAZING WOMEN OF NASA'S JOHNSON SPACE CENTER

*Coming from different backgrounds, education, training, and life experiences, the women of the Johnson Space Center have forged careers in a field once reserved almost exclusively for men—and still often represented that way in popular culture. In* Making Space for Women, *Jennifer M. Ross-Nazzal challenges this perception and opens STEM fields to new generations of women by bringing forth 21 interviews conducted by the JSC Oral History Project, including...*

**ESTELLA GILLETTE**
SECRETARY

Hired as a stenographer just after becoming an American citizen, Gillette began working at the Manned Spacecraft Center in 1964. After more than 40 years she retired as Deputy Director of the External Relations Office.

**SHARON MCDOUGLE**
TECHNICIAN

A former aerospace physiology specialist at Beale Air Force Base in California, McDougle (left) came to JSC in 1990. She became a suit tech, working on the launch entry suit worn by astronauts following Challenger.

**EILEEN COLLINS**
ASTRONAUT

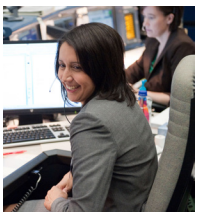
Selected as an astronaut in 1990, Collins became the first female to serve as a pilot and later commander onboard four Space Shuttle missions, including the Return to Flight mission after the Columbia accident.

**DOTTIE LEE**
MATHEMATICIAN

Lee, originally an NACA computer, became an engineer thanks to the on-the-job training she received from spacecraft designer Max Faget. During the development of the Space Shuttle Orbiter, Lee designed the nose of the spacecraft, which was named "Dottie's Nose" in honor of her contributions.

**CAROLYN HUNTOON**
CENTER MANAGER

Huntoon came to JSC in 1968, just before the Apollo 8 flight, and remained at the Center where she worked on medical research. Encouraged by conversations with former Center leaders, she accepted Daniel Goldin's offer to become the first female Center Director of the Johnson Space Center.



**GINGER KERRICK**
FLIGHT CONTROLLER

Kerrick decided she wanted to be an astronaut at five. When she was permanently disqualified from becoming a spacefarer because of a medical condition, she went on to become the first non-astronaut CapCom and served as a flight director for Space Shuttle and Space Station missions.

# FAME IN THE STARS

FROM TOM CORBETT TO X-15 AND BEYOND.

**BY KARL BENDER**

The rapid development of rockets during World War II led to a post-war craze that carried over to the new medium of television, and by 1950, every broadcaster had a science fiction rocket show. The CBS television contribution to this craze was "Tom Corbett, Space Cadet", starring Frankie Thomas, Al Markim, and Jan Merlin as three Solar Guard cadets learning to save the galaxy each week.

The show was an overnight hit that resulted in spinoff books, toys, and a space cadet club you could join for 25 cents. While the series only lasted five years and the three actors went on to other shows, the popularity of "Tom Corbett" never waned.

Fast forward to April 18, 2011: Amateur astronomer James Melka, a devoted fan of "Tom Corbett, Space Cadet", writes to the International Astronautical Union (IAU) proposing that unassigned asteroids be named for the three eternal cadets of the Solar Guard Academy. The IAU agreed, and issued each actor his own Minor Planetary Body (MPB)[1]. MPB 13441 Janmerlin was named for Jan Merlin, whose character Roger Manning the Astronavigator was always on the lookout for asteroids.

On July 29, 2011 Jan Merlin wrote an email to his son, NASA historian Peter Merlin, to let him know that the next IAU catalog would include the three named asteroids. Peter shared the news with his friend and fellow NASA historian, Curtis Peebles, who suggested pilots from the X-15 hypersonic flight program receive the same honor. Curtis personally knew this author, and requested library assistance in finding the rules for the submission process. The request first required a legal review, and several edits and much government red tape later, a formal written proposal was submitted to the IAU Secretary:

"An interest has been expressed in naming unclaimed astronautical objects after the 11 remaining members of the X-15 program flown from this site, as the twelfth pilot in the program, Mr. Neil Armstrong already has an object named for him. After reviewing the IAU Naming Astronomical Objects page, we believe that the other names of these pilots would also qualify. Therefore, we are in need of information as to the process of identifying and registering 11 additional unclaimed objects for this project. Could you please assist (or redirect this email) with the procedure(s) for requesting unnamed objects greater than 10 years old to us as we are excited to honor these early space pioneers".[2]

The IAU responded favorably to the request later that year, and the team asked the naming committee if they could find a block of asteroids that were grouped together in the catalogue. In turn, the IAU asked the historians to prepare a name for each MPB to be included in the catalog. Names were to have no spaces, and only a brief text inclusion (no greater than 76 characters per line, not to exceed four lines total). Getting historians to keep to these strict limits quickly turned into a major tug-of-war with all team members. After much back-and-forth, the citations were submitted. Normally, IAU submissions are reviewed and approved every two months; however, due to scheduling conflicts and some ongoing science work, the IAU committee's final approvals were not received until February 2012.

Upon receiving a copy of Minor Planetary Circular 78269, dated February 7, 2012, the NASA Branch Chief for the Public Affairs Office (PAO) and History group informed the Armstrong Flight Research Center (AFRC) Center Director of the news

**Stan Stokes, X-15, Acrylic on canvas, 45 x 60", 1986.** *The X-15 was a much-beloved experimental aircraft. The rocket-powered vehicle soared to altitudes over 300,000 ft. and speeds in excess of 4,500 mph. The aircraft was launched from a B-52 mother ship and used its rocket engine to climb to near-space altitudes. It glided to a landing.*

Between them, a decision was made to have the Center create some type of award to give each pilot, or present posthumously to their families. Again, the historians went back to the librarian, suggesting the following: Since you provide for books, can you make us a diploma book to award each X-15 pilot. (The author intentionally disregarded question mark, as this was not really a question.) Fortunately, the author's graduate program included a class on bookmaking and repair, so, "challenge accepted".

Making the diploma book was an easy task; getting the PAO staff to agree on what should be on the award page was not. Besides the award page wording challenges, AFRC had recently approved an X-15 flown challenge coin[3] that the Center Director wanted to include in the final book design. Furthermore, the Center Director had invited an X-15 pilot to speak at AFRC in the coming weeks and wanted to conclude the upcoming program with the diploma book presentation. After 73.42 work-hours (full cost accounting rules required - we tracked our time on this project), the diploma books were done and ready for delivery. Of note, all 11 diploma books were created at the same time. On August 2, 2012 Center Director David McBride presented the first X-15 MPB to General Joe Engle of the United States Air Force, who not only flew the X-15 aircraft to space but also the Space Shuttle. Around the time of the annual Gathering of Eagles[4] event in October of that year, the remaining diploma books were given to Bill Dana - the only other living X-15 pilot - and the families of the deceased X-15 pilots.[5] ◆

### Notes

[1] Merlin, Jan and William Russo, *Frankie Thomas: Eternal Cadet*, Long Time Ago Books, Boston & Burbank, pp.143-144, 2012.

[2] Email to the Secretary of International Astronautical Union (IAU), August 11, 2011. Final version edited and sent by Karl Bender.

[3] Challenge medallions have a long military history, including being used to commemorate specific events like the X-15 program. Flown medallions may either be flown as minted or contain a small quantity of metal that was carried into space.

[4] The Gathering of Eagles is an annual event sponsored by the Air Force Flight Test Center Museum Historical Foundation (Edwards, California). Started as a fund raiser, the event has evolved to acknowledge significant Edwards Air Force Base aviation pioneers, events, and anniversaries. The annual dinner event was started by retired General Chuck Yeager (as Foundation President) and is scheduled around the anniversary of the first supersonic flight on October 14, 1947.

[5] Below is the final text of the letter sent to invite the families to the October event:

"It is my pleasure to inform you that the International Astronomical Union has named an asteroid for _____. He was one of eleven X-15 pilots which have been so honored, in recognition of their contributions to flight research and the advancement of spaceflight. The naming of the asteroids, often called minor planets, was suggested by a member of the Dryden Flight Research Centers History Office, who was assisted by the head of the Technical Library in preparing the citations for submission to the IAU. In the end eleven names were approved; Neil Armstrong's submission was declined by the IAU since he already has two asteroids named for him.

The accompanying citation is a more formal expression of our gratitude of _____'s contributions.

Like citations have been awarded to the pilot's families and the Dryden's Public Affairs Office will be issuing press releases to local media about these awards soon."

[6] Phair, Rio H., "Retrospective: Curtis Peebles," *News & Notes: NASA History Program Office*, Vol. 31, No. 3, 2014 Third Quarter, p. 17.

**2012 AUG 2:** *Joe Engle receives the X-15 MPB from AFRC Director David McBride.*

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**Karl Bender** was hired as a contractor librarian at Armstrong Flight Research Center in 2007. He advanced to Senior Librarian in 2012 when he joined the Civil Service as the Scientific & Technical Information (STI) Administrator. In 2021, he moved on to new endeavors at NASA. This article was written while still active in the AFRC library.

TRANSFORMATION

# A CENTURY OF SERVICE

*The NASA Langley Technical Library's historic past ushers in a new era of modernization.*

**BY JASON A. JACOBS**

The NASA Langley Technical Library has a history that is almost as old as the history of NASA. In 1915, not long after the Wright Brothers made their first flight at Kitty Hawk, North Carolina, the National Advisory Committee for Aeronautics (NACA), was established by Congress. In 1917, the Langley Memorial Aeronautical Laboratory (LMAL) was created as the first civilian aeronautical laboratory in Hampton, Virginia.

The NASA Langley Technical Library holds the oldest and largest aerospace specific collection in the United States, containing unique NACA, NASA, foreign, military, and industry research information dating back to the 1800s. The library maintains a classified collection that dates back to the 1940s. The collection includes hard copy, microfiche and electronic formats.

## LIBRARY HISTORY

Although the exact year is unknown, the official Technical Library was likely established sometime between 1920 and 1923, according to the second organization chart of the LMAL (Langley Memorial Aeronautical Laboratory). Early LMAL offices were located in the LMAL East Area. The library was part of the "Library and Report Section" and housed inside the Services Building. By the 1940's, the West Library, which housed the library's collection and served the LMAL community, was initially located on the second floor of Building 1229 and later relocated to the second floor of the West Area Hangar (Building 1244).

In August 1969, the Technical Library moved to NASA Langley's main area in Building 1194. In 1972, renovations on the Technical Library were completed, and by 1978, the building was renamed "The Floyd L. Thompson Technical Library," in honor of the former LaRC Director.

Digital transformation of the library collection began in 1991. Starting as a research project, the library produced a prototype CD (compact disc) consisting of 33 full text NACA reports. In 1993 an extension was proposed to produce a prototype of 110 NACA and NASA full text reports. Eventually in 1995, in cooperation with the NASA General Aviation Program Office, the library produced a "Legacy" CD-ROM as part of the Advanced General Aviation Transport Experiments (AGATE) program. The goal of the project was to make the full text of a core body of classic aeronautical research easily available to the General Aviation (GA) community. The CD-ROM included bibliographic description and full text images of 179 NACA and NASA reports (10,000) pages. The CD-ROM was well received.

Developed in 1995, the DigiDoc (DIGital DOCuments) System was a collaborative effort by the NASA Aeronautics Center Libraries (Ames, Glenn, Dryden and Langley as the lead). DigiDoc was an in-house developed system which worked in conjunction with NASA Galaxie to deliver the electronic full text of NACA and NASA technical reports. To accomplish this task, records from the NACA Historical File on NASA RECON were exported to a password protected database on NASA Galaxie and renamed the file "Core Aero". The Center Libraries modified the Core-Aero records or created records for the NACA report series into NASA Galaxie. NASA Galaxie provided the search engine and metadata for each full text report. Each record was linked to a PDF file on the DigiDoc System and displayed using Adobe Acrobat Reader. Approximately 14,000 reports were available on the system.

**1925.** *Staff of the Library, Files, Stenographic, Purchase, Personnel, Telephone Exchange, and Property, including Minnie Cimmino; Walter Reiser, Chief of Maintenance; Lucy Bainbridge, Head of Report Typing and Steno; Ruth Belle, Office of the Director; Clyde Lumpkin, Head of Office Services; Rosa Smith; Lynton Burr; and "Babe" Martin.*

## LIBRARY MODERNIZATION

In 2020, Technical Library operations were downsized from a 50,000 square foot building to a 5,000 square foot space located in Building 1268A.

Leading up to the move, for over a 15-year period, the NASA Langley Technical Library digital transformation team modernized the nation's largest physical aeronautical collection dating back to the 1800's, into a digitally available asset enabling greater accessibility and preservation of the collection, reduction of staff needs, reduction of physical space needs, and overall cost-savings. The project involved the management, digitization, preservation, declassification, downsizing, and moving of physical assets for a multitude of mediums including; documents, books, journals, microfiche, card catalogs, and film reels.

The library digital transformation effort was conducted in three primary phases; focused digitization of assets, online cataloging, and reduction of the physical collection that cumulated in a move of the physical library. For approximately eight years, a team of 13 employees worked two shifts (at its peak) to digitize 90% (or roughly 900,000) of the technical documents contained in Langley's massive collection considered by historian James Hansen to be "one of this country's most treasured guides to aeronautical information" (Engineer In Charge, p. 588). The document collection consisted of technical reports and research from NACA/NASA core aeronautics/aerospace and other sources including foreign and domestic government agencies. Many disciplines are covered that are key to NASA's mission including aerodynamics, structures, materials, planetary science, space exploration, and fluid dynamics. Also digitized were ~2,800 reels of historic NACA/NASA research films, including 31 films that were used by the Smithsonian for the Apollo 50th anniversary, and ~800,000 cards from the card catalog. The team sought creative and innovative solutions to the challenges presented including partnering with Center organizations to fund the $140K needed to digitize film reels and deploying a scanning van to digitize the card catalog. The scanning effort completed ahead of schedule and at 50% of the anticipated cost, allowing opportunities to digitize more materials. Due to challenges finding working projectors, the team improvised and visually inspected and cataloged the footage.

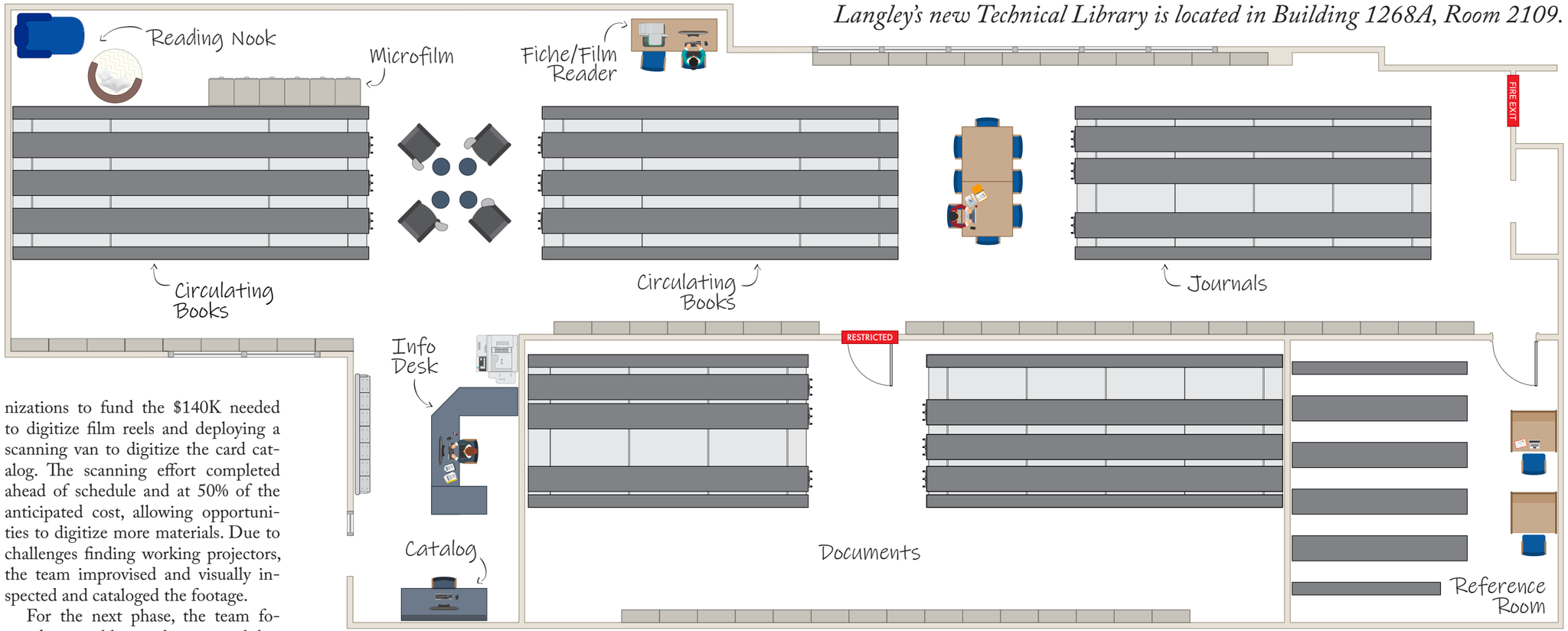
For the next phase, the team focused on enabling online accessibility of the documents by standing up three online digital repository systems (for sensitive, non-sensitive, and data) and electronically cataloging the assets. This involved establishing technical connectors between metadata contained in an existing agency system (Galaxie), and the files themselves housed in Langley's systems. As a result, 90% of the digital collection can currently be discovered online.

The last phase, reduction in the physical size of the library and moving the collection, took approximately 5 years to accomplish and resulted in a reduction of ~40,000 square feet of library space requirements. As a result of this multi-year digitization effort, the physical collection saw a 97% reduction of microfiche, 95% reduction of hard copy documents, 33% (~8,000) reduction of books, a 45% reduction of hardbound journals, and a 85% reduction in card catalog content.

Reducing the physical collection allowed the team to fully relocate the library to a much smaller space (4,500 sq. feet) and will save $416K annually in facility operations. The physical library move itself contained many unforeseen challenges the team overcame including; packing and monitoring movement of the sensitive collection; coordinating the physical move itself; new shelving issues requiring multiple last-minute work-arounds; and weekend staff coverage throughout.

Collaboration efforts included extensive on-going communication and outreach with NASA Langley organizations, NASA Agency Centers, Center libraries, National Archives and Records Administration (NARA), Federal Records Centers (FRC), and the Smithsonian. As a direct result of digitization, the Center has achieved significant cost savings while enabling greater digital access to the NASA Langley Technical Library collection.

*Langley's new Technical Library is located in Building 1268A, Room 2109.*




In 2020, the NASA Langley Technical Library Move Team was recognized with a prestigious NASA Agency Honor Award for accomplishing this modernization.

Today, the Library has a staff of five, including two Civil Servants and three Contractors. We are enjoying our new, reduced and manageable library space. Noted aviation historian, Tom Crouch, once proclaimed "No place has played a larger role in the history of American flight technology or flight technology in general than Langley Research Center." The research information that contributed to that technology and the information published about that technology was, and still is, found in the documents collection of the Floyd L. Thompson Technical Library.

Future plans for the Library include more scanning of our documents, allowing further digital access to our unique collection; Agency-level subscription management; and updates to the Agency library catalog, NASA Galaxie. The Library also plans to hold an open house to showcase its new space in Building 1268A. Hours of operation are Monday through Friday from 8:00am–4:30pm. Please visit us to explore the collection and meet our staff! We always welcome your comments and feedback.

To learn more about the Technical Library's collections and services, download our informational brochure at library.larc.nasa.gov. ◆

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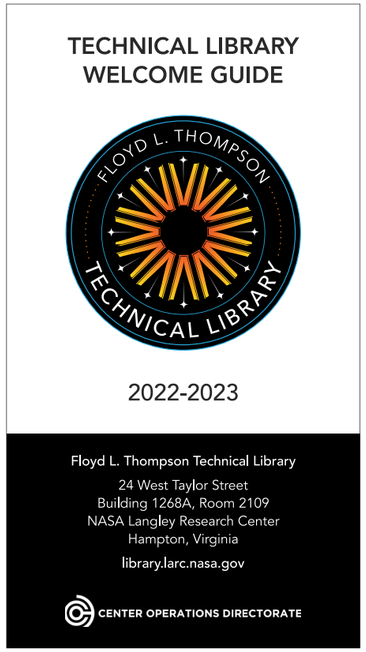
**Jason A. Jacobs (B.A., M.L.I.S.)** has been with the NASA Langley Technical Library since August, 1994. Before joining NASA, he taught ESL and Spanish and worked briefly in Admissions for a Community College. A native of southeastern North Carolina, Jason enjoys exploring the historical sites and parks of Virginia.

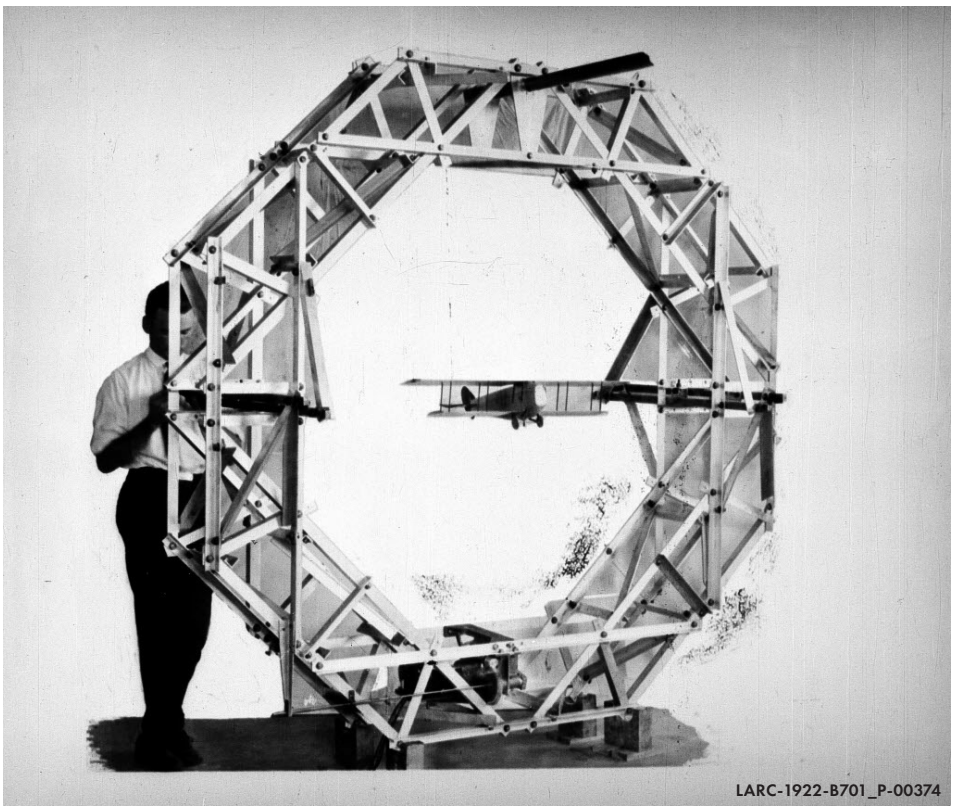


NASA HISTORY

# PIONEERS OF NACA

*The Life and Times of Dr. Max M. Munk, Inventor & Aerospace Engineer.*

**NASA LANGLEY OFFICE OF COMMUNICATIONS**




Dr. Max M. Munk (1890 - 1986) achieved lasting fame by conceiving, developing, and placing into operation the Langley Variable Density Tunnel. This achievement was the most significant accomplishment of the embryonic NACA, and placed the Langley Memorial Aeronautical Laboratory (LMAL) at the forefront of the world's aeronautical leaders. Dr. Munk only spent six years with the Committee, but he did more to shape the history of the NACA than any other researcher in a comparable period of time.

Munk was born in Hamburg, Germany. He earned an engineering degree at the Hanover Polytechnic School in 1914, and doctorates in physics and engineering from the University of Gottingen in 1917. Because of their world-wide reputations as leaders in aeronautical sciences, Munk and other Europeans became targets of the managers of the new NACA. He was a well-known protégé of Ludwig Prandtl, the noted German aerodynamicist. NACA management anticipated that Munk's abilities as a theoretician and generalist would allow him to augment the work of experimental engineers at the new LMAL. President Woodrow Wilson signed orders allowing Munk to come to the United States and work in government, required because Munk had been a former enemy. (This same process was followed again after World War II, to bring Wernher von Braun and his rocket team to the U.S.) In 1920, he left his native Germany and became a technical advisor to the NACA at its headquarters in Washington, D.C., working on theoretical problems.

While in Washington, in 1921 Munk made his proposal for what would become one of the most revolutionary facilities ever constructed by the NACA. At that time, the fledging Langley laboratory operated only one wind tunnel -- a simple atmospheric tunnel based on a European design that was essentially obsolete. It was used for training the young, inexperienced staff in the process of wind-tunnel testing more than as a research device. One of the major issues facing users of atmospheric tunnels was a well-known, potential impact of the aerodynamic parameter known as "Reynolds number" on test results. Significant differences were known to exist between results obtained in wind tunnels compared to flight data for certain critical parameters, such as the magnitude of maximum lift used to lower landing approach speeds.

Munk proposed a wind tunnel in which the Reynolds number conditions in the tunnel were directly comparable to those in flight. The key to his remarkable concept was air density. By increasing the pressure in the wind-tunnel test section (and, therefore, the air density), flight conditions could be replicated. Although this concept was known prior to Munk's proposal, no one in the world had used it. Munk's idea became the Langley Variable Density Tunnel (VDT), essentially a wind tunnel in a steel tank that could be pressurized.

When the VDT went into operation in 1922, and produced remarkable results, it was regarded as revolutionary; and although other nations quickly began building pressurized tunnels, the NACA would lead the world in this area for over a decade. The success of the project and its value to the world of aeronautics was underlined by additional funding for the NACA from

⁘ *Photo published in "The Variable Density Wind Tunnel of the National Advisory Committee for Aeronautics," by Max Munk & Elton Miller, 1925. [NACA TR 227]*

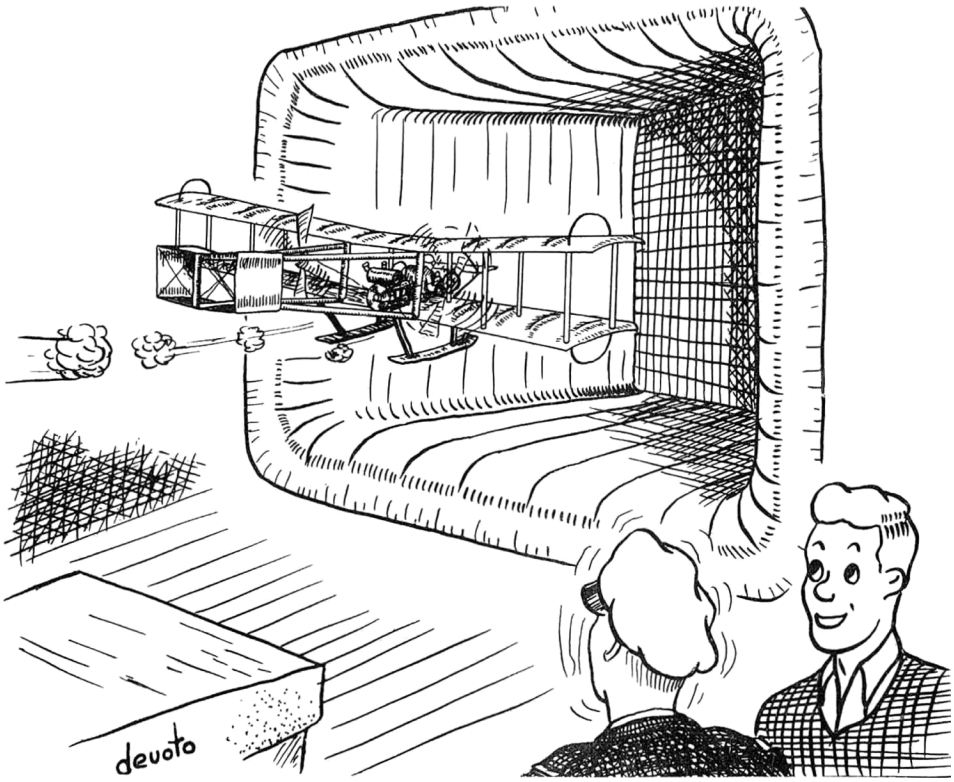
Congress, which was deeply impressed by the new facility.

In addition to his landmark contribution of the VDT, Munk revolutionized airfoil theory. His doctoral thesis, developed under the tutelage of Ludwig Prandtl, had been on parametric studies of airfoils, discussing the genesis of what would become airfoil theory. He became best known for his development of thin-airfoil theory, a means of modeling the aerodynamic characteristics of airfoils by separating their shape factors, such as thickness and camber. Introduced in 1922, his theory remained the primary theoretical technique applied to the design of airfoils, until the development of laminar flow airfoils by Langley's Eastman Jacobs in the 1930s. From this work flowed the achievement for which the NACA is perhaps best known among aircraft designers -- the NACA family of airfoil shapes.

Munk was stationed with the NACA in Washington for six years; but, in 1926, following his brilliant success in initiating airfoil research in the VDT, Munk was transferred to the LMAL as Chief of the Aerodynamics Division, making him second-in-charge at Langley. The position included responsibility for all wind-tunnel, flight-research, and analytic research conducted at the lab. Munk was extremely successful in his research efforts. In his years with the NACA, he authored or co-authored 57 reports.

However popular he may have been with NACA management in Washington, he was not well liked at Langley. The brilliant theoretician had become a serious problem, regarded as arrogant and eccentric by many of the Langley employees; and he was forever at the center of controversies characterized by extremely strong opinions on all sides. The situation quickly degenerated into battles between the celebrated scientist and the renowned engineers that attempted to work with him.

Langley's future Director, Floyd Thompson, recalled sitting in one of many heated debates between Munk and the legendary researcher, Fred Weick. (Weick led researchers at the Langley Propeller Research Tunnel in their research on engine cowlings, for which Langley was awarded its first Collier Trophy.) According to Thompson, an argument between the two stubborn people degraded to the point where Munk said, "Mr. Weick, we should agree, so that when we get in meetings, we say 'this is the way it should be.' No one will dare stand against us. Therefore, we should agree on my position!" Weick left the meeting and proceeded to use his own personal position.




**"Oh, that flies through here every year on Wilbur Wright's birthday."**

LMAL AIR SCOOP, 2 FEBRUARY 1945, ISSUE 5, VOL. 4

• •

Munk resigned from the NACA in 1927, and subsequently held jobs with Westinghouse, the American Brown Boveri Electric Corporation, and the Alexander Airplane Company in Colorado. He also taught mechanical engineering at Catholic University. In 1945, he joined the Naval Ordinance Laboratory as a research physicist working on turbulent fluid motion. He then returned to Catholic University and retired in 1961. He donated his entire collection of papers to the Langley Historical Archives.

Dr. Max M. Munk died on June 3, 1986, in Ocean City, Maryland, at the age of 95. He was inducted into the NACA and NASA Langley Hall of Honor in 2015. ♦

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The Langley Research Center NACA and NASA Hall of Honor recognizes those persons whose contributions have had the most sustained and far-reaching influence on the leadership, direction, mission and capabilities of the NACA Langley Memorial Aeronautical Laboratory and NASA Langley Research Center and/or whose work at Langley enabled unprecedented and fundamental advancements in either a scientific or engineering field and made significant contributions to the United States' aerospace industry for commercial and military aircraft and/or spacecraft. To learn more about Dr. Max M. Munk as well as other NACA and NASA Langley Hall of Honor inductees, visit nasa.gov/langley/hall-of-honor.

# BRIEFLY NOTED...

**GALAXIE**
Explore our Library Catalog.
galaxie.larc.nasa.gov

**LIBRARY REQUEST SYSTEM**
Request library materials.
requests.ndc.nasa.gov

**ASK-A-LIBRARIAN**
Ask questions, get answers.
nasa-gsfc.libanswers.com

*Miscellaneous news, notes, and impressions from around the NASA Library Network.*

## ARMSTRONG

### ACHIEVEMENT AWARD

MARCH 24, 2022 – Armstrong Flight Research Center Librarian **Kaylynn Ung** was a team member recognized as part of a NASA Group Achievement Award for local historical scanning and digitization efforts.

### NEW ON SHAREPOINT

JULY 2022 – The Armstrong Research Library's local webpage received a major update and makeover in July, connecting AFRC users more intuitively to the information they need.

*—Kaylynn Ung*

## GLENN

### LOGO REFRESH

MARCH 24, 2022 – The Glenn Library has a new logo! Library staff worked together with the center's graphic design team to create a new look featuring Glenn's iconic Hangar in flight. The logo's resemblance to an airplane is a nod to the history of Glenn, which was founded as the Aircraft Engine Research Laboratory in 1941. Aircraft wings, which generate lift and hold a plane aloft, signify the library's mission to support NASA researchers in their quest to advance human knowledge through new discovery. The color blue is traditionally associated with knowledge, inspiration, and trustworthiness, and represents the sky. Finally, the library's name prominently underpins the graphic representation of Glenn Research Center taking flight. This symbolizes the library as a foundation of research, information resources, and research services at Glenn.

### INFORMATION CAFÉ

The Glenn Library is having success with its new Information Café– a series of monthly events that are open to all NASA employees, highlighting different topics of library-related interest. Previous cafés have covered everything from history and archives to data literacy and product demos. Featured guests have included speakers from Scientific Technical Information (STI), Records Management, and flight research. All are welcome to join—look for Information Café announcements on the NASA Community Events calendar.

### LEADERSHIP MEDAL

APRIL 11, 2022 – GRC Library Supervisor **Robin Pertz** was awarded the Outstanding Public Leadership Medal at a ceremony in April. This prestigious honor recognizes a non-government employee whose leadership has significantly influenced the Agency's mission, with demonstrated excellence in achieving results, leading people, influencing change, and modeling NASA's core values.

*—Dawn Sedor*

GLENNLIBRARY

## GODDARD

### ICESAT COAUTHOR UPDATE

A bibliometrics paper on user communities of the ICESat missions, coauthored by the Deputy Program Manager on the Select Federal contract, Michael Chesnes, is now in peer review. "Literature Review shows that Engagement of Stakeholders Accelerates Applications of ICESat-2 data when compared to ICESat" has been submitted to the Elsevier journal *Remote Sensing Applications: Society and Environment*. This collaboration between Earth scientists and a librarian used the scholarly database ProQuest and the network analysis tool Quid to identify applications for satellite lidar data.

### FEDLINK AWARD

MAY 11, 2022 – The NASA Goddard Library was presented the Large Federal Library/Information Center of the Year Award, awarded by FEDLINK, a consortium of Federal libraries headquartered at the Library of Congress. The award recognizes outstanding, innovative, and sustained achievements during Fiscal Year 2021 by a Federal library or information center. GSFC Branch Head, Robin Dixon, recognized our staff by name during the award ceremony on May 11, for achievements such as our curbside pickup service for customers and our virtual staff watercooler social events, as well as sharing Quid access with the Office of the Chief Technologist, our catalog migration to LaRC, our support of an audit of Code 600 authors, and updating the Goddard Knowledge Exchange.

*—Michael Chesnes*

## JET PROPULSION LABORATORY

### COSPAR 2022

JULY 16-24, 2022 – Library Group Supervisor **Caroline Coward** attended the COSPAR 2022 Scientific Assembly in Athens, Greece, and presented an update on activities around infusing an ethical foundation into artificial intelligence algorithm development. The presentation titled *NASA's Emerging Approach To AI Ethics* was co-written by Coward, AI and Machine Learning Transformation Lead Ed McLarney (LARC-B7), and Airspace Operations & Safety Program Assistant Program Director Yuri Gawdiak (HQ-EL000), and was part of the newly formed COSPAR Panel on Social Sciences and Humanities (PSSH). Coward is a thought leader in the area of ethical AI at JPL, and has been working closely with McLarney and others across the Agency to formulate guidelines and recommendations for this critical area.

The panel's inaugural session, entitled *Engaging Space In Society*, included research presentations on the Russian and Chinese space agencies, an analytic framework for economic resilience of national space agencies, a history of the partnership between COSPAR and The United Nations Committee On the Peaceful Uses of Outer Space (COPUOS) from UNOOSA acting director Niklas Hedman, a historical and philosophical comparison of the concepts of "cosmos" and "space" given by noted space theorist and philosopher Jacques Arnould, and posters on astrobioethics and the legal and economic aspects of orbital debris. Anchoring the panel was a 90 minute introduction and discussion of COSPAR's new initiative and formal commitment to the values of diversity, equity, inclusion, and accessibility.

Coward participated in several other sessions focusing on DEIA, including a JPL-hosted breakfast spotlighting scientists and engineers from underrepresented groups and detailing JPL's commitment to inclusion, it's newest core value. She also became a member of COSPAR's IDEA initiative (described above), and brought in several more volunteers to help draft a white paper to include a mission and values statement, an analysis of the state of the practice, defining objectives, metrics, and scope of work, and strategic recommendations for the organization.

*—Caroline Coward*

## KENNEDY

### WELCOME & FAREWELL

JANUARY-MARCH 2022 – KSC librarians Elaine Liston and Lori Uffner retired after more than 25 years of service. Dorothy Notarnicola, a librarian at LaRC for the last 13 years, moved to Florida and was hired at KSC. A new librarian, Kylie Taffer, was also hired.

*—Dorothy Notarnicola*

## LANGLEY

### DOCTORAL RESEARCH

MAY 4, 2022 – With a little bit of aid from Langley's Technical Library staff, University of North Dakota doctoral student **Caitlin Milera** completed her PhD dissertation, an historical analysis on Ms. Pearl I Young,

who was the first woman to hold a technical position at the NACA. Dr. Milera's study explored Ms. Young's experiences throughout her academic and professional journey through critical feminist perspectives. Young persisted through acts of advocacy, connectedness with friends and colleagues, and in remaining true to her authentic self. Dr. Milera's dissertation, "Ms. Pearl Irma Young: 'Raising Hell' For Women In Stem Fields And Women At NASA, 1914 - 1968"[1], can be accessed at UND's Scholarly Commons site: https://commons.und.edu.

Dr. Milera is the Director of the North Dakota Space Grant Consortium and ND NASA EPSCoR, and a Research Assistant Professor in the Department of Space Studies at the University of North Dakota.

[1]Milera, Caitlin, "Ms. Pearl Irma Young: "Raising Hell" For Women In Stem Fields And Women At NASA, 1914 - 1968" (2022). *Theses and Dissertations*. 4279.

*—Michael Pritz*

### SITE VISIT

JUNE 9, 2022 – Langley hosted a visit from Library Transformation Manager, Perri Fox, and GSFC Librarian Robin Dixon. They toured the new Technical Library facility, met with staff members, and participated in several meetings with members of Langley's Communications and Logistics communities.

*—Jason Jacobs*

### MENTORING AWARD

JULY 27, 2022 – **Sally Schwaner** was recognized at the 2022 Mentoring Awards Ceremony hosted by the Mentoring Employees to Realize Goals and Experiences (MERGE) employee resource group. This award gave employees the chance to recognize the training and counseling provided by their outstanding mentors. As a new librarian, Sally has been effortlessly guiding me as I take on the responsibilities of meeting NASA research and information needs, and it was a perfect opportunity to thank her.

*—Melissa Kondysar*

## MARSHALL

### ALPS TEAM

JULY 2022 – **Karina Garces** has filled the final slot on the ALPS prototype's engineering roster. Like many modern web developers, Karina comes to us with

"fullstack" experience: she has experience launching websites, from DNS record to database schema. She also has experience working on and leading IT Support teams, so she is a natural fit for our user-centered design approach. As she puts it on her GitHub profile (@imanirak): "As a software engineer who demands to be constantly intellectually challenged, I am eager to experience the continuous journey the world of software development has to offer."

Karina will be focusing on ALPS backend code, implementing NASA's business logic "under the hood" as well as making sure it is correctly wired up to all the internal and external systems it integrates with. We're very excited to welcome Karina as the newest member of the ALPS engineering team.

*—Charles Beebe*

OF NOTE • **NASA LIBRARIES STRIKE DEAL WITH WILEY**

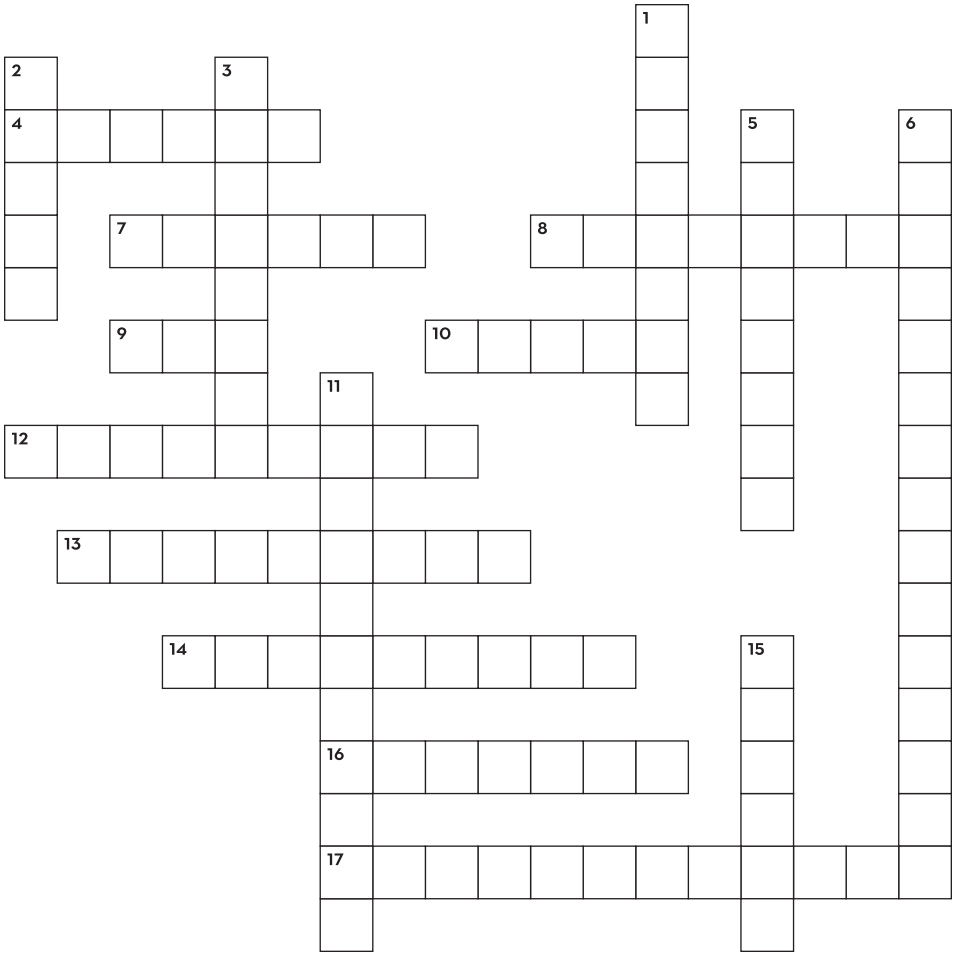
JOHN WILEY & SONS, INC. is one of the leading providers of published content in the areas of science and engineering. Thanks to a new agreement with Wiley, NASA's Libraries now provide access to a curated collection of more than 30 journals and 25,000 e-books. Civil servants and contractors have immediate access to full-text research and publications that support the Agency's core competencies. Titles include: Advanced Energy Materials • Advanced Materials • AIChE Journal • Ecological Monographs • Geobiology • Geophysical Research Letters • Global Change Biology • International Journal of Climatology • Journal of Geophysical Research • Journal of the American Ceramic Society • Journal of the American Water Resources Association • Limnology and Oceanography • Meteoritics & Planetary Science • Microwave and Optical Technology Letters • Paleoceanography and Paleoclimatology • Quarterly Journal of the Royal Meteorological Society • Radio Science • Reviews of Geophysics • Systems Engineering • Water Resources Research... and more! Access the new Wiley collection today at **onlinelibrary.wiley.com**, or contact your Center librarian for assistance. *—Kate Dunlap*

PUZZLES & GAMES

# THE CROSSWORD

*Computers & Networks.*

**BY PAULA LAURITA**



## ACROSS

4 Computer that is not a server, used by an individual

7 Used to centralize data and share it in a network

8 Retrieve files from a server

9 A group of computers in a small geographic area

10 SMTP's most common name

12 Networking standard for short range wireless connections

13 The data rate supported by a network

14 The beginning of HTTP stands for ____

16 Location that provides wireless Internet access

17 It physically connects computers to one another in a network

## DOWN

1 Acts as security between the Internet and a network

2 Just one byte

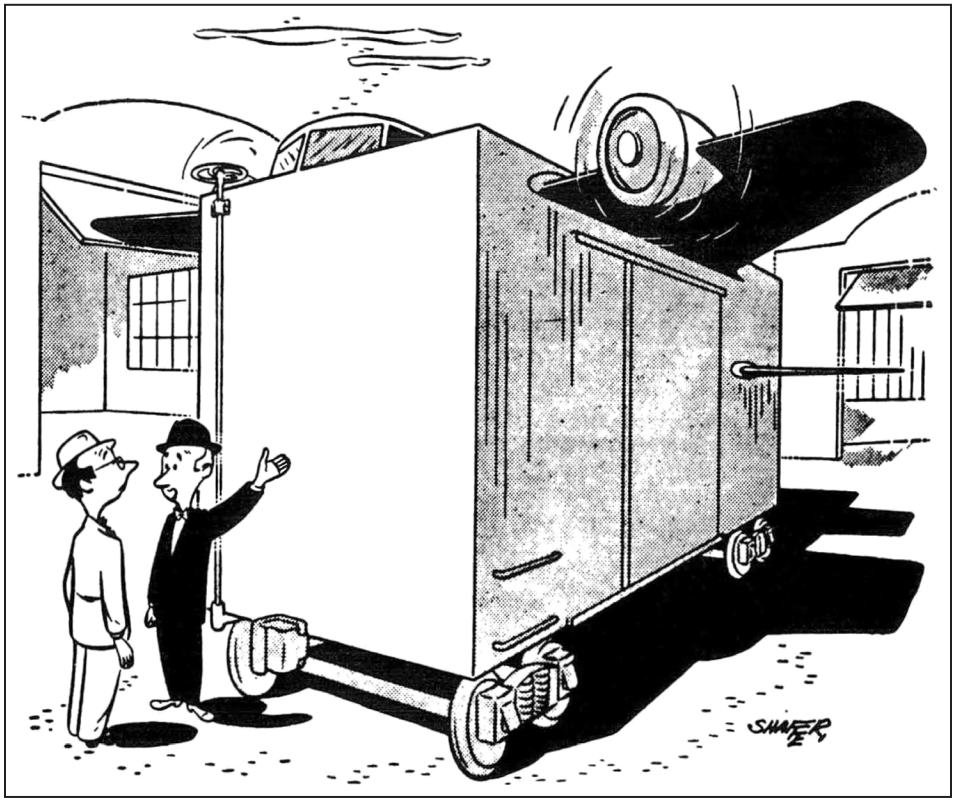
3 Private network, similar to the Internet, using a web browser

5 Working from a remote location using computers and network technology

6 Real-time, face-to-face meeting, using Zoom or Microsoft Teams

11 Also called a cell phone

15 Transfer files to a server



**"It's my own fault - I walked into the engineering department and said, 'Gentleman, build me a flying box-car.'"**

LMAL AIR SCOOP, 30 JUNE 1950, ISSUE 26, VOL. 9

**PUBLISHED BY THE NASA LIBRARY NETWORK**

For close to a century, NASA's libraries have supported Agency projects and research by providing exceptional information services. Throughout that time, the libraries incorporated industry trends to provide the best resources and services that budgets allowed. The name of the group has changed over time, but the commitment to provide unparalleled support for NASA programs, projects, and research has remained constant. Today, the NASA Library Network continues that commitment as a formal program under the History and Information Services Division of the Office of Communications. This extraordinarily proficient cadre of information professionals comprises civil servant and support service contractor librarians and technicians. The diversity of skillsets, education, and experience combined with a customer-centric mission is the NLN's greatest asset.

**ARMSTRONG FLIGHT RESEARCH CENTER**
KAYLYNN UNG*

**AMES RESEARCH CENTER**
RYAN RUIZ
LISA SEWELL*
ASHTON VAGNONE

**GLENN RESEARCH CENTER**
KATE DUNLAP*
KATHY HAMILTON
ROBIN PERTZ
MARCIA STEGENGA

**GODDARD INSTITUTE FOR SPACE STUDIES**
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CAROLINE COWARD*

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MAURA OCHOA

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MICHAEL PRITZ
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JOHN SHRECK

* LEAD LIBRARIAN

"One Library. One Mission."

NASA LIBRARY
N E T W O R K

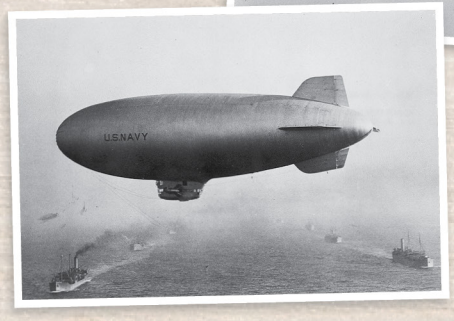
History & Information Services Division (HISD)
Office of Communications (OCOMM)

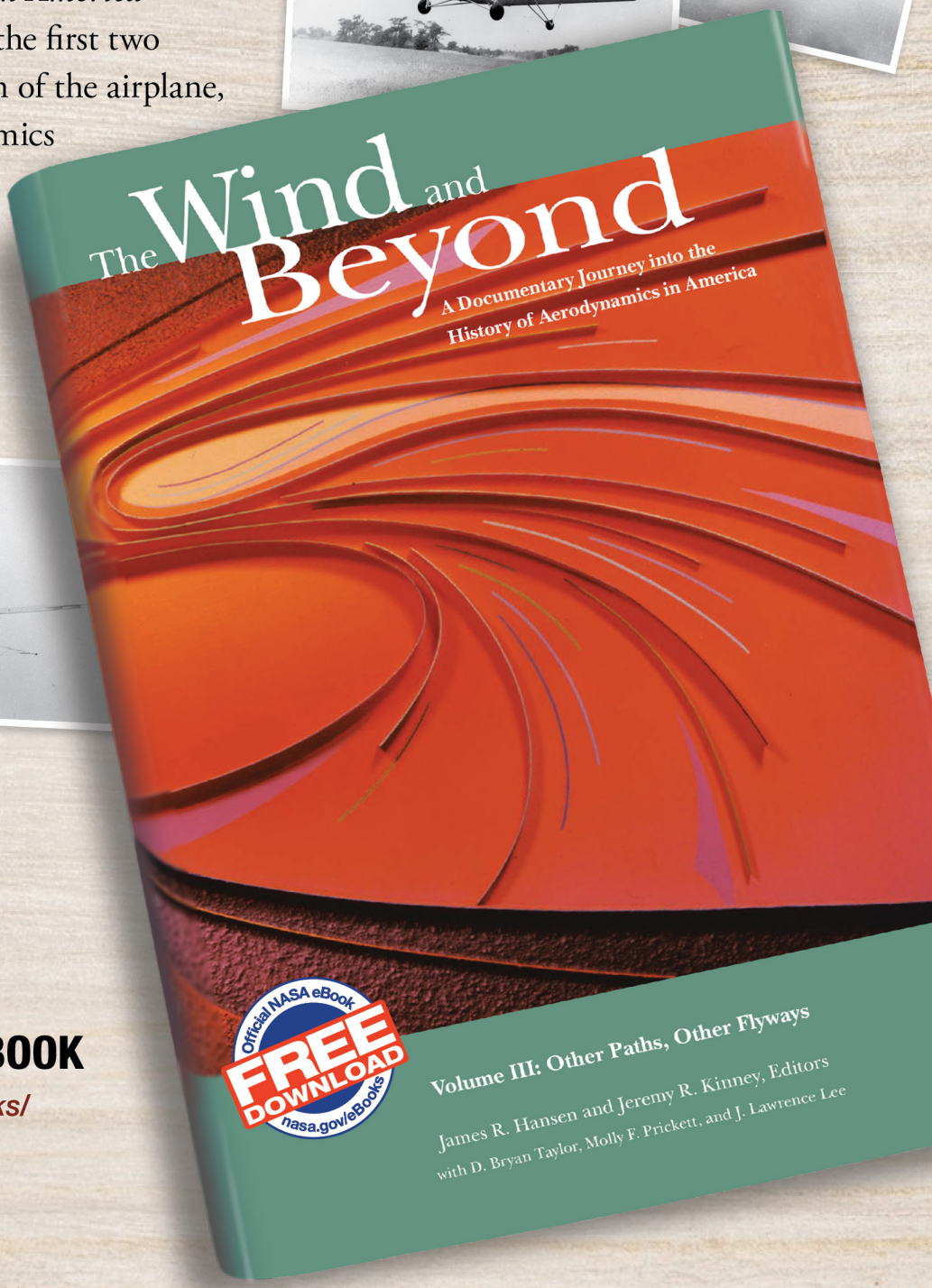
NASA HISTORY DIVISION

National Aeronautics and Space Administration

# NEW RELEASE

**THE MUCH-ANTICIPATED THIRD VOLUME** of *The Wind and Beyond: A Documentary Journey into the History of Aerodynamics in America* is now available. Following up on the first two volumes on the birth and evolution of the airplane, this volume explores the aerodynamics of airships, flying boats, and rotary-wing aircraft.



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www.nasa.gov