To Boldly Preserve: Why We Need to Collect and Preserve the Next Stage of Space Exploration and Exploitation

Jonathan Coopersmith[1] and Geoffrey Nunn.[2]
Texas A&M University, College Station, TX 77843 USA
Museum of Flight, Seattle, WA 98107 USA

Erik Rau[3]
Hagley Museum and Library, Wilmington, DE 19807 USA
and

Angelina Callahan[4]
Naval Research Laboratory, Washington, DC 20375 USA

The expansion of private firms into space exploration and exploitation challenges the previous paradigm of federal archives and other institutions collecting and preserving that history. To ensure that future generations accurately learn about current space activities, it is imperative that private organizations act now preserve their historic records, which will also benefit their contemporary operations. Toboldlypreserve.space provides companies, organizations and individuals a framework to guide thinking about preserving their history as well as tools, collection strategies, best practices, and other assistance to reduce barriers to their involvement.

I. Introduction

Every person attending ASCEND is here because you believe in the historical importance of space exploration and exploitation as we enter the seventh decade of spaceflight. Yet how many of us are helping preserve the history you are making? When your children and future generations look back at the early 21st century, what records will they find to show what you, your colleagues, and your firm or organization did?

For the first half-century of spaceflight, the history of United States space activities could be found in National Archives and Records Administration (NARA), the Smithsonian's National Air and Space Museum, and the History Offices of NASA, the Department of Defense, the National Reconnaissance Office, and the CIA. Government projects and spending dominated those decades and a measured part of those efforts included resources to preserving records, writing histories, recording oral histories, and other efforts to document achievements and lessons learned.

Today, collecting those records faces new challenges as the government experiments with new contracting mechanisms, novel cost-sharing measures, and other innovative means for industry partnership—and as the private sector embarks on Space 2.0 or New Space. Much of this unfolding chapter of American innovation and its broader impact, will occur beyond the purview of federal archives. Furthering this challenge, the companies in this increasingly dynamic sector, are typically focused more on changing the future than preserving their past.

To ensure that future generations can accurately learn about current space activities, it is imperative that private organizations preserve their historic records. With the burden of preservation shifted to innovative firms, some of them start-ups, the risk that these records will vanish before they can be preserved is non-trivial. After all, firms and industry associations are focused on current and future operations; their resources and appetite for preserving historical documentation over the long term, beyond what is mandated for legal and tax reasons, are typically low. Although not opposed to preservation, such activities are typically not a core competency of most businesses, especially cash-strapped start-ups. The recent challenges of preserving electronic ("born-digital") records has only complicated this problem.

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[1] Professor, Department of History, AIAA Life Member.
[2] Exhibit Developer.
[3] Director, Library Services.
[4] Historian.

II. To Boldly Preserve

"To Boldly Preserve" provides a solution to the problem of preserving contemporary space activities. Funded by the National Science Foundation, the "To Boldly Preserve: Archiving the Next Half-Century of Space Flight" conference at the American Institute of Physics on March 1-2, 2018 created a network of historians, archivists, museum curators, record managers, and others with the goal of encouraging domestic and international space actors to collect and preserve aerospace history by providing pragmatic historical and policy justifications as well as archiving best practices, models, and support networks aimed at the preservation of this unique experience. Corporate and NGO history will not be collected and preserved by accident but only by organized efforts.

TBP will be a conduit to aid that collection and preservation but not do any preservation itself. This both avoids potential professional conflicts of interest among its member organizations and allows more local initiative and experimentation. "To Boldly Preserve" will fulfill its objectives in two stages.

The first stage is to provide the different audiences of space actors with an online toolkit of best practices, standards, models, and principles from our professional communities. The second stage, of which this presentation is a small step, is to proactively engage the space community, to communicate and educate about preservation and collection. While SARS-CoV-2 has disrupted physical meetings, we will increase outreach about preservation in 2021.

The website, toboldlypreserve.space, is a *vade mecum* offering companies, organizations and individuals a framework to guide them in thinking about what they want to accomplish. To Boldly Preserve will help them collect their history by providing tools, collection strategies, guidance, and other assistance that will reduce their barriers to involvement.

The toolkit explores four basic questions:
Why should we preserve and collect our history?
What should we preserve?
How do we preserve our history?
What are common concerns to consider?

III. Why should we preserve and collect our history?

Consider why you want to do this. Beyond the principled goal to benefit the future, preserving history can be justified for pragmatic reasons. Mergers, moves, and milestones are the three most common prompts to preserve a firm's history. The first two often necessitate reducing corporate records while the third is a celebration. All three are opportunities to start preserving your organization's past as well as institutionalizing procedures to collect its ongoing work.

More concretely, archiving your firm's history provides an anchor for corporate leadership. As firms like Daimler Benz have discovered, harnessing company history may also serve as an income center, a means of marketing and company promotion, and a way to strengthen company self-identity [1-3].

Indeed, the Business Archives Section of the Society of American Archivists found archives support eleven distinct business activities, ranging from litigation and trademark protection to staff training and investor relations. The Section stated,

> "The corporate archivist selects and preserves the key documents that reconstruct a company's history, products or services, and development. The result is a unique corporate asset--information and documentation that can be used for important legal, marketing, communications and financial decisions. A business archives can give managers perspective and the ability to make decisions today confident that they understand the historical context.
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> "A business archives creates a reliable internal information system. It manages the information and significant records concerning a company's key strengths--and its weaknesses. Without the ability to select and retrieve archival materials and information, a company forfeits access to its own history lessons. With an archives, that same company gains the advantage of remembering what others forget" [4].

The flow of government space programs from the early days of space exploration to today offer other examples of the benefits to a strong historic record. As NASA's programs and priorities have shifted over the decades, they have often turned to or even leaned on their programmatic history to overcome mission challenges. The mission architecture of the current Artemis program offers a concrete example of the advantages of turning to history to build the future.

During the early development of the Space Launch System (SLS), which is designed to launch NASA's return to the Moon, the agency turned to its past successes to inform the design. A new generation of propulsion engineers at NASA's Marshall Space Flight Center used technical documentation dating back to the Apollo era to inform their decisions for powering SLS. In 2013, a team of engineers even went so far as to pull an Apollo-era F-1 engine from mothballs at the Smithsonian to test fire its gas generator. Ultimately, NASA turned to a different legacy program to power SLS. The first stage of NASA's new Moon rocket will be powered by evolved versions of the Space Shuttle's RS-25 main engines and extended solid rocket boosters [5-6].

Earlier this year, NASA's selection of the multi-company National Team to develop a lunar lander candidate for Artemis offered another example of the power of history and legacy to move the future forward. The team, which consists of Blue Origin, Lockheed Martin, Northrop Grumman, and Draper, is relying on proven hardware and technical knowledge dating back to the Apollo program for designing its integrated landing system. The press announcement at the formation of the team emphasized this depth of historic knowledge when making its case for its new lander [7].

Historic thinking permeates the Artemis program through the emphasis on the use of "legacy hardware" as a means to reduce costs, accelerate development timelines, and build confidence in mission assurance and represents the practical application of historical preservation.

IV. What should we preserve?

Saving everything you generate is expensive and unnecessary. Archivists historically have collected written material like meeting minutes but increasingly have expanded to oral, photographic video, and digital material.

The Hagley Museum and Library, one of the largest repositories of business archives, lists as priorities [8]:
1. Foundational documents like charters
2. Meeting minutes of boards of directors, subsidiaries, and special committees
3. Executive officer correspondence, email, and records
4. Financial records
5. Departmental records
6. Images and recordings (including Powerpoint presentations)
7. Publications

For technologies, collecting the records of experiments, unsuccessful paths, and drafts is important for accurately preserving the challenging path of invention, innovation, and commercialization.

Oral histories are increasingly important for preserving memories and adding perspectives that often are not captured by documents. As the appendix illustrates, a strong institutional and academic framework supports the growing popularity and increasing quality of oral history efforts. Many historical repositories maintain active oral history programs as part of their collection development (Computer History Museum, Science History Institute, Hagley Museum & Library, The Museum of Flight), while professional organizations and cultural heritage businesses (IEEE History Center, Winthrop Group) will consult on or even undertake oral history projects.

If you have physical artifacts you think should be preserved, an air and space museum and not an archive is the place to contact. .Like archivists, however, museum curators seek accompanying documents to understand the objects and place them in their historical context [9]. Museums seek items that their curators consider historically important and match the museum's interest. The Smithsonian National Air & Space Museum has seven criteria for collecting:
1. "The object is consistent with the Museum's goals.
2. It is appropriate for exhibition purposes and proves useful as an educational tool within an exhibit.
3. The object was associated with a notable, historical event related to aviation and/or spaceflight or depict such an event.
4. The object was owned by, associated with or created by a notable person associated with the history of aviation and/or spaceflight.
5. The object has significant intrinsic value because it is the best of its type or one of a kind.
6. The object will contribute to research and scholarship in disciplines related to the history of aviation and/or spaceflight.
7. The object represents a technological innovation or invention associated with the history of aviation and/or spaceflight" [10].

V.   What are common concerns to consider?

Collecting and preserving your history will demand sustained effort and resources. To Boldly Preserve wants you to be active; we also want you to appreciate what you are initiating. Resources are a major concern: You should tailor your efforts to be as thorough and efficient but also affordable as possible. Take advantage of the specialists in archiving and history to develop a program that meets your needs while producing high-quality results.

Legal concerns about archiving aerospace history fall into three areas: complying with International Traffic in Arms Regulations (ITAR), keeping Personal Identifying Information (PII), and fear of exposure to lawsuits by keeping records. The first two areas are usually addressed by your existing records management procedures [11].

Fear of attracting lawsuits is sometimes used as an argument against preserving your history. Some firms do practice "archiving by lawyers," systematically throwing away everything not required for immediate corporate operations or legal requirements. In reality, keeping documentation helps your legal case, not hurts, because that collection enables you to fully tell your story. For patent cases, a well-organized archive like AT&T Archives and History Center can provide a formidable defense and offense [12].

Perceived company "failures" also represent common concerns when considering what to archive but may yield important historic insight. Failure is rarely discussed but is normal, especially in high technology fields [13]. From a historical perspective, a canceled project or closed firm can be as interesting as an ongoing success. Preserving records seen as failure from a business perspective, however, often proves difficult for reasons ranging from a reluctance or embarrassment about the unsuccessful venture to the disappearance of a failed firm. When viewed from the perspective of history, however, even so-called dead ends can add valuable insight and depth of knowledge. Boeing's Dyna-soar as a predecessor to the Space Shuttle, and the evolution of the Iridium satellite constellation into Iridium NEXT following the original company's bankruptcy offer just two examples of history made richer by events that could be seen as business failures.

A separate issue is what level of access and openness you want. You may feel comfortable putting some documents online or you may prefer to restrict your materials for a decade or more. There is a distinction between the practices of historical preservation and education/communication. If your company has historically significant records which should be preserved but is not comfortable having those records in the public eye at this time, there are several solutions. Perhaps the simplest is to keep those records internally for potential disclosure at some future time. If internal preservation is undesirable or impractical, external preservation in a museum or archive may still be possible. Museums will often work with donors (whether corporate or individual) to make sure their records are handled according to their wishes. This includes restrictions around sensitive material. Collections containing sensitive correspondence, for example, may be held away from public access until some designated event takes place such as the passing of the donor, or even their descendants. For corporate archives, the Hagley Library offers another option: Donations can be taken in with an embargo built into the agreement that records not be released until a certain designated amount of time has passed.

By separating the preservation and communication aspects of historic recordkeeping, companies, archives, and museums may be able to overcome concerns about public disclosure while simultaneously capturing a more robust account of corporate history.

VI.   How do we preserve our history?

The toboldlypreserve.space toolkit provides a wide set of options depending on your interest, commitment, and organization. The two basic rules of establishing a preservation policy are 1) do no harm, and 2) think through what you want to accomplish before beginning.

At the small end are having a records management policy as basic as keeping an updated backup of materials and conducting occasional self-conducted oral or written responses to a set of questions by key individuals. The growing practice of personal archiving offers useful guidance for such efforts. At the other extreme, a large firm like Boeing may have its own archive and archivist. In between are numerous options to collect, preserve, and sometimes disseminate corporate history including preserving your materials in-house, outsourcing or hiring archival experts (e.g., Winthrop Group or a free-lance archivist), or depositing or donating records with the Hagley Library, The Museum of Flight, the University of Alabama, Huntsville, the Huntington Library or other academic or 501(c)3 repositories.

Another consideration is to capture the recollections of key personnel through oral histories, in particular those who may be outgoing or already retired from an organization. As earlier generations of researchers, engineers, technicians, administrators, and users retire, they form both a treasure of untapped personal histories about the first decades of

spaceflight and a disappearing source as people age and die. Toboldlypreserve.space offers "self-help" for the folks who took their boxes of material home from the office and now want to know what to do with them.

Done well, oral histories can provide an invaluable window into the past. As John Goodman, author of *History and Archives Contribute to the Success of Space Flight Programs*, wrote, "I ask engineers to talk to me about organizational structure, not personality. That gets engineers talking. I regret I did not record older engineers with fading memories earlier, so I tell younger engineers to record themselves now" [14].

Done poorly, however, OHs can inadvertently conceal or mis-remember as much as they reveal. Understanding your options with oral history, including the tradeoffs and sensitivities surrounding different approaches in generating these important historical documents is an important function of toboldlypreserve.space. Options range from Do-It-Yourself guides to professionally managed projects.

In an ideal world, trained oral historians would conduct interviews. In a resource-constrained and decentralized world, training volunteers to conduct oral history interviews may be more realistic. As elsewhere, the goal is to first do no harm, but to collect material that otherwise would disappear. Institutions like the Computer History Museum and the Science History Institute will provide training to instill the importance of structure and guided interviewing, based on their biographies, of interviewees.

An expanding world of resources exists to help you. We strongly urge you to consult with an archivist, historian or other professional preserver. A potential source of support is a local archive, sometimes at a nearby university or historical society.

VII. Conclusion

Whether a corporation, association, nonprofit, or government entity, your work comprises part of the tapestry of the human exploration and exploitation of space. You know you are making history by venturing into space. To Boldly Preserve wants your records collected and preserved so that future generations will have an accurate and complete history of what happened. Your story – our larger story of space exploration and exploitation -- cannot be told without your data.

Appendix: Useful Websites

What are archives?
    https://www2.archivists.org/about-archives

Community-Driven Archives
    https://library.unc.edu/wilson/shc/community-driven-archives/about/

"Why do companies manage their archives?"
    https://managingbusinessarchives.co.uk/getting-started/exploiting-the-archive/why-do-companies-manage-their-archives/

Company archives guide
    https://www.historyfactory.com/insights/guide-to-company-archives/

Engineering and Technology History Wiki (ETHW)
    https://ethw.org/Main_Page

The Library of Congress, "Personal archiving"
    http://digitalpreservation.gov/personalarchiving/

Special Collections, Williams College, "Personal archiving" https://specialcollections.williams.edu/personal-archiving/

Libraries and School of Information Studies, Purdue University, "Personal digital archiving"
    https://guides.lib.purdue.edu/PDA

What is oral history and how do we do it?
    http://www.oralhistory.org/web-guides-to-doing-oral-history/

Oral History Association
 https://www.oralhistory.org/

Oral History for the Digital Age
 http://ohda.matrix.msu.edu/

Designing an oral history project
 http://ohda.matrix.msu.edu/2012/06/designing-an-oral-history-project/

Oral history best practices
 http://ohda.matrix.msu.edu/best-practices/

 "The costs of doing oral history,"
 http://lib.lsu.edu/sites/all/files/oralhistory/resources/Oral_History_Budget.pdf

Computer History Museum Oral History Program
 https://computerhistory.org/oral-histories/

Science History Institute Oral History Training
 https://www.sciencehistory.org/OHTraining

Acknowledgments

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[9] Museum of Flight, "Donate an Artifact," https://www.museumofflight.org/Collections-and-Research/Donate-an-Artifact.

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