

THE HISTORY PROFESSIONAL

Robert S. Arrighi is an archivist and historian at NASA's Glenn Research Center in Cleveland, Ohio. He has worked on numerous textual and audiovisual collections, many of which have been central for his histories of several historic test facilities at the Center. He is the coauthor of NASA's Nuclear Frontier (2004) and author of Revolutionary Atmosphere: History of the Altitude Wind Tunnel and Space Chambers (2010), Pursuit of Power: NASA Glenn's Propulsion Systems Laboratory No. 1 and 2 (2012), and other works. He has also curated complementary websites and interactives. His Altitude Wind Tunnel Interactive CD-ROM won SHFG's Powell Award in 2009.

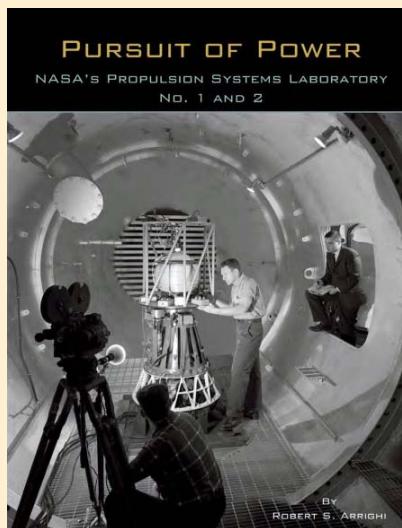


Interview by Benjamin Guterman

Robert S. Arrighi

How did you start working at the Glenn Research Center?

I was a project archivist for Virginia Dawson and Mark Bowles at History Enterprises, Inc. In 2001 NASA contracted us to document its Plum Brook Reactor Facility in Sandusky, Ohio. I spent two years archiving related documents and photographs and researching the history of the reactor. It was during this period that Mark and I wrote *NASA's Nuclear Frontier*, and I worked with Jim Polaczynski on the *Of Ashes and Atoms* documentary. As the project wound down in 2003, NASA hired me into the Glenn History Office.



Glenn has demolished several of its under-utilized test facilities in recent years. Since many of these are historically significant, the Center has worked with the State Historic Preservation Office to develop plans to mitigate these losses by properly documenting the facilities as they are removed. Glenn's Facilities Division has partnered with the History Office to perform this documentation for several of these facilities. Despite the fact that these sites are no longer here, these mitigation projects provide a greater understanding and appreciation of the contributions made by the facilities.

Generally, what types of collections and records have you processed, and have they presented any special archival challenges?

The collections at NASA Glenn are varied. Many of the most significant holdings, such as all of the early Directors Office materials, are duplicates of documents that are in the agency's Records Management system or at the National Archives. In these cases, there are not too many daunting preservation issues. We do have a number of personal paper collections donated by former researchers or managers. There are also collections from facilities such as the Altitude Wind Tunnel (AWT) and Propulsion Systems Laboratory (PSL), or programs such as the Centaur rocket and Space Station Power System. These types of materials have some minor archival issues, but are generally remediated by basic archival methods. The real challenge is finding the time to properly process the backlog of materials.

What prompted the Glenn Research Center to undertake documentation of its historic test facilities?

For nearly a decade, NASA has attempted to reduce its physical footprint. There has been an effort at all of the centers to remove unused buildings and structures. As such,

You write that the AWT contributed vitally during World War II and later. What technological advances occurred in flight engines by 1952 that created the need for the new PSL?

The AWT was designed in the early 1940s to study reciprocating engines. The tunnel was powerful enough, however, to handle the turbojet when it emerged during World War II. The AWT tested nearly every early generation jet engine in the United States. The jet engine developed at a remarkable pace during the postwar years, however. Performance, power, and reliability increased dramatically. The real growth in jet engines was centered on the axial-flow type of engine, which employed a series of fan-like compressor stages that increased the pressure of the airflow. Power was increased by adding additional stages. Designers sought to increase the performance of each stage by perfecting blade shapes and durability, and by using afterburners to augment the engine's thrust. It became clear to the National Advisory Committee for Aeronautics (NACA, later NASA) that the AWT would not be able to keep up with the more powerful engines that would emerge, so PSL was designed specifically to handle these larger engines. PSL was the agency's most powerful engine test facility, and remained active until the late 1970s.

RESOURCES

Glenn Research Center: The Early Years, [http://www.grc.nasa.gov/WWW/portal/gallery/B-1 and B-3 Test Stands](http://www.grc.nasa.gov/WWW/portal/gallery/B-1%20and%20B-3%20Test%20Stands), <http://PBHistoryB1B3.grc.nasa.gov>
 Propulsion Systems Laboratory No. 1 and 2, <http://pslhistory.grc.nasa.gov/>
 Lessons of a Widowmaker, <http://www.nasa.gov/externalflash/aero/>
 Altitude Wind Tunnel website, <http://awt.grc.nasa.gov/>
 Altitude Wind Tunnel interactive CD-ROM, <http://awt.grc.nasa.gov/Interactive/awt.html>

What aeronautical advances did the PSL make possible?

Although designed for airbreathing engines, I think PSL's most significant contribution was with the Pratt & Whitney RL-10 rocket engine in the early 1960s. The RL-10 was the first commercial rocket engine to use liquid hydrogen. Two of the engines were incorporated into the Centaur second stage rocket, which was the first hydrogen-powered space vehicle. The RL-10s were also intended for upper stages for the Saturn rocket. In 1960 Pratt & Whitney began having difficulty with the engines. In fact, two had exploded on their test stands. The RL-10 was brought to Cleveland in early 1960 and put through over a year of testing at PSL. The researchers developed a method to settle the combustion instability and demonstrated a new pre-ignition cooling technique. Both the RL-10 and Centaur have gone on to long, successful careers.

It seems that oral histories helped you gain critical technical understanding and background. They've also enabled you to humanize these stories. Was that your intention from the outset?

To be honest, at the outset, I was just trying to grasp the general significance of the story. There was not a great deal of conspicuous information available. It was later that I was able to go back to the interviews and find clarification on certain issues, contextual information, and of course the personal memories. I have been extremely fortunate to have met a number of former employees who have generously shared their time and stories with me. I agree, it is these stories that humanize what could have been a very technical narrative.

You reserve special credit to Abe Silverstein for helping advance both jet engines and early rocket testing. Can you briefly explain his major contributions?

Silverstein's most significant attribute was his ability to realize the potential of a technology, chart a course for advancing that technology, and appoint his best engineers to tackle the specific problems. In 1943, he was asked to run the first U.S. jet aircraft, the Bell XP59A, in his new Altitude Wind Tunnel. Realizing the possibilities of the jet engine and high-speed flight, he began designing supersonic wind tunnels. After the war ended, Silverstein was a key influ-

ence on the reorganization of the entire laboratory to address turbojet engines.

By 1949 Silverstein supervised all of the research at the lab. He supported three new areas of research—nuclear propulsion, electric propulsion, and high-energy propellants. In 1954, researchers conducted the lab's first firing of a liquid hydrogen and liquid oxygen rocket engine and used liquid hydrogen in a turbojet combustor. Silverstein seized upon the promise of liquid hydrogen and arranged for a successful flight test of a liquid hydrogen-powered Martin B57. Two years later, he chaired a committee to review potential upper-stages for the Saturn rocket, and was able to convince Wernher Von Braun to use liquid hydrogen stages. Marshall Space Flight Center oversaw the Centaur program, using the first rocket powered by liquid hydrogen. After the first attempted launch failed in May 1962, Silverstein, then Center Director, agreed to take on the Centaur Program. He personally oversaw the efforts to get the rocket ready to launch a series of Surveyor spacecraft. The next Centaur launch in 1963 was a success, and by June 1966 Centaur was sending Surveyor spacecraft to the lunar surface.

The images in these volumes are striking. In what ways did you hope that the visual record would help with those stories?

I am fortunate in that the Glenn Research Center has a very robust photographic history that runs continuously from its construction in 1942 to today. There are nearly 350,000 photographs with corresponding metadata. The photographs have frequently served as an essential research tool, particularly for establishing dates, understanding how facility systems worked, and identifying people. In some cases, the photographs are used to reveal things that are difficult to describe. In others, the images are just visually arresting. Many of the images in these publications have not been viewed for decades; some since the day they were taken.

In the complementary websites for these volumes and histories, what are a few of the digital capabilities and components that you and your team incorporated to create a fuller resource?

The websites provide the opportunity to include a greater number of photographs, as well as video clips,

animations, or interactive pieces. They also permit the presentation of resources such as historical documents or technical reports. We hope that the website will be a permanent repository of sorts for anyone seeking additional information on the subject. One of the more unique features on the AWT site is a series of panoramic, 360-degree photographs of the wind tunnel. The user can pan the camera in any direction. The viewer experiences what it was like to stand inside or atop the giant tunnel.

You received SHFG'S John Wesley Powell Prize in 2009 for your Altitude Wind Tunnel Interactive CD-ROM. What do you think are some of the features that made that product successful?

I am fortunate to have a close relationship with Glenn's Imaging Technology Center, which handles all of the Center's audiovisual work. Gary Nolan and I have worked on several multimedia projects together. He is a brilliant designer who is always generating fresh ideas. I am able to provide the historical content for some of these projects. I think the success of the AWT CD-ROM, and several other collaborations, has been the marriage of interesting historical information and images with Gary's modern designs and interactive creativity.

How did you conduct your oral histories for these projects?

The majority of the interviews for the AWT and PSL publications were the result of the efforts of retiree Bill Harrison, former Chief of the Test Installations Division. He graciously facilitated the introductions with a number of his former colleagues in 2005. Others I met while working on the project or through the History Office. I generally met the interviewees at their homes. When possible, I try to submit some questions to them ahead of time so they know what areas I am interested in. Everyone I have spoken to has generously shared their time and memories with me.

What are you working on currently, and are additional projects planned to document historic research sites at the Glenn Research Center?

I am currently working on a project to document a collection of small liquid hydrogen test sites that were active in the 1960s at NASA's Plum Brook Station. I am also creating a retrospective publication on the history of NASA Glenn, which will be observing its 75th anniversary in 2016. I am also hoping to be able to document the Center's rich flight research history, which dates back to 1943.

SHFG DIRECTORY

SHFG is compiling the Directory of Federal Historical Programs online. Visit <http://shfg.org/shfg/publications/directory-of-history-offices/> to complete and submit a directory form. Send form to webmaster@shfg.org

FOIA MATTERS

Sprinkled through some records at the National Archives and Records Administration (NARA) are "Withdrawal Notice" sheets noting the absence of records from publicly accessible holdings

When records are accessioned to NARA, individual documents that are classified or otherwise restricted by statute, Executive Order, or by the agency that transferred the records to NARA are stored separately and marked in the holding with a Withdrawal Notice. You can request that such records be considered for declassification by seeking Mandatory Declassification Review (MDR) or by filing a Freedom of Information Act (FOIA) request.

Under FOIA:

- the request is processed like all FOIA requests, generally in consultation with agency declassification experts.
- requesters who disagree can appeal to the agency's FOIA appellate authority; then, if they still disagree, can request assistance from the Office of Government Information Services (OGIS) or file a lawsuit in Federal court.

Under MDR:

- the request goes to a specific point of contact within the agency; requesters who disagree with the agency's assessment can appeal to the agency within 60 working days or after one year if the agency has not acted on the request; if they still disagree, they can appeal to the Interagency Security Classification Appeals Panel (ISCAP), which is the final appellate authority made up of senior officials from intelligence agencies.
- if agencies disagree with ISCAP's decision, they have 60 days to appeal to the President or must release the records; if requesters disagree with ISCAP, there is no further recourse.

Classified records undergoing review should receive the same evaluation under FOIA or MDR. When choosing between the two, the main considerations are time and options for recourse. MDR typically takes at least a year. FOIA has a 20-working-day statutory response period, but in some agencies delays are inevitable, and MDR may actually be faster. If you disagree with an agency's decision, you can challenge it in court only if you have requested the records under FOIA.

Learn more at <http://www.archives.gov/research/declassification.html>

OGIS

Office of Government
Information Services

NEED FOIA ASSISTANCE?

The Office of Government Information Services (OGIS) is here to help. Created by Congress as the Federal FOIA Ombudsman and housed at the National Archives, OGIS serves as a neutral party within the Federal Government to which anyone—requester or agency—can come for assistance with any aspect of the FOIA process. Contact OGIS at ogis@nara.gov or 202-741-5770.