



The Wright Flyer Test

A look back to the Wright Brothers' first successful flight

by Veronica Goldman



Wright Flyer model being lowered into the 40 x 80

Almost 100 years have passed since Orville and Wilbur Wright completed their 1903, historic 12 second flight at Kitty Hawk, North Carolina. Now, a 20 year planning effort centered around flying that famous aircraft is becoming a reality. The wind tunnel replica of the 1903 Wright Brothers Flyer built by the Los Angeles Chapter of the American Institute of Aeronautics and Astronautics (AIAA) has recently completed testing in the 40x80 wind tunnel. The results of these tests should provide the missing data that will help to better understand the flight characteristics, and explain the problems that Orville and Wilbur Wright encountered in 1903.

Two tests were conducted in the early 80's on a 1/6-scale wood and fabric model, and also a 1/8-scale steel model. The Ames test is the first to use an actual full-scale replica. Taking the final step in testing the Flyer in the 40x80 WT is a source of great pride.

The excitement and anticipation peak as national news organizations and Aviation Week and Space Technology magazine gave national coverage of the story. The personal satisfaction of being a part of this historic project is amazing, and having it covered by the news media is inspiring.

(continued on page 2)

Wind Tunnels: A Profitable Enterprise?

A closer look at the FO Retreat

by John Allmen

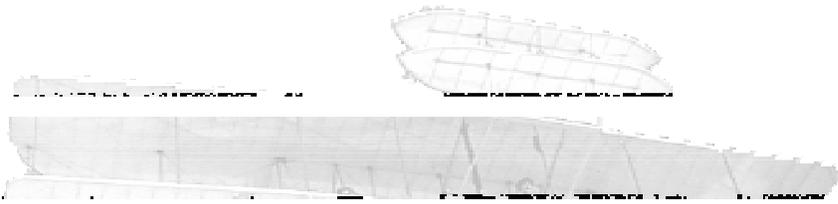
NASA and Sverdrup management teams held a joint retreat in late January and early February, asking each other tough questions that gave deeper insight into our business development. The discussions acknowledged our strengths of world-renowned facilities and extremely talented staff, while focusing on the unknowns facing us. The teams' activities highlighted necessary improvements for customer satisfaction, more cost-effective testing, attracting new customers, and emphasizing culture changes.

The initial questions identified our interfaces, i.e. the 'major players' (customers, competitors, suppliers, etc.). There are over 61 customer groups or companies who can or have used our services; 26 competitors offering similar and in some cases identical or better services than we do; 26 suppliers providing critical things we need; 30 strategic partners we can cultivate and develop for mutual support; and more than 30 distributors who can market and distribute our capabilities. Developing these major players will be critical to our business success.

Another major question explored was "How are we meeting our customers needs and wants?" Our customers can be simple or complex, and run the entire gamut from bringing in a 'partial model' (and wanting 'complete service') to the other extreme where the customer supplies and does everything but run the tunnel. However they come, our existing customers and potential new

(continued on page 4)

**Inside... New FO Web Page - IST Phase 3 Summary - Your Role In Safety
HPADS Safety Milestone - Y2K Project - SWTS Retires - Employee Awards**



Wright Flyer Employee Day

On March 18th, the employees at Ames got a chance to take a look at the Wright Flyer (pictures were also available). From 11:00am to 2:00pm the doors were open for all employees to come and bring their families to check out the Wright Flyer, before it was removed from the wind tunnel. This was a chance for many to acquaint themselves with a piece of history, which has greatly influenced our lives. The aura of excitement was in the air, and felt by everyone who got a chance to see the Wright Flyer. Many took their lunch break to climb the stairs, and take a look at the biplane. They were greeted by Ron York, dressed in a turn-of-the-century suit, similar to those worn by the Wright Brothers.



A crowd of onlookers admiring the Wright Flyer in the 40x80 wt, on March 18th, Employee Day.

The New FO Document Page

by Andy Crozier

Good document control and ISO compliance require a Master List of all controlled documents be created and maintained. Additionally, a readily available source for all official controlled documents needs to be in place. An effort has been underway for over a year to create an online location for all FO Division official documents and the master list. The N227 SERVER at Appletalk zone AO4/N227 is used for this purpose.

When the WT documents are placed online using the Appletalk Network, some people using the Windows Operating System could not access the documents. It was decided to see if a web site could be developed to solve this problem. Then all interested people, regardless of operating system, would have access to the documents using any web browser. The Technical Publications Group is developing a web site with a working prototype at <http://pubsgroup.arc.nasa.gov>. This site covers four areas:



Andy Crozier

- 1) General — FO Division Documents, FO Division Forms, Master Document List.
- 2) FOF Branch Documents.
- 3) FOI Branch Documents.
- 4) FOW Branch Documents — 12ft Pressure Wind Tunnel, NFAC Wind Tunnels, Unitary Plan Wind Tunnels.

Until the prototype web site becomes operational, the documents on this site may not be current. The current version of all documents still reside on the N227 SERVER at AO4/N227. FO Division personnel are reminded to continue using the server to verify the status of their documents or to obtain new printouts. Notice will be given when the web site becomes the official document source.

The address again is : <http://pubsgroup.arc.nasa.gov>. Please access this site, look around, and pass on your comments or suggestions to either Andy Crozier (acrozier@mail.arc.nasa.gov) or John A. Campbell (jcampbell@mail.arc.nasa.gov). The Technical Publications Group is continually striving to make the process of accessing and obtaining the current versions of all documents as user friendly as possible.

IST Phase 3 Summary

by Frank Kmak



Composite Compressor Rotor Blades

Phase three of the 11x11-Foot Integrated Systems Test (IST) was started on November 4, and completed on December 23, 1998. This first wind-on phase of the startup of the facility was extremely successful in meeting the defined objectives. The primary objectives of the initial subsonic operation were to operate the tunnel over the entire subsonic envelope, up to maximum total pressure, monitor the internal tunnel structures, demonstrate initial operation of the four main drive motors, and clean the tunnel allowing installation of the composite compressor rotor blades. The new internal structures performed well, and none of the structures or components approached critical red line stress or deflection values. The Main Drive Speed Control (MDSC) was tuned and the major functions of this system checked out. All four drive motors were activated and performed well under local control from the MDSC. Drive speed stability after preliminary tuning of the system was about ± 1 rpm for most speed set points. The tunnel pressure control system was tuned and performed well at total pressures from atmospheric to the maximum of 32 psia. The emergency shutdown panels and processes were also exercised and worked well. After operation at Mach numbers from 0.35 to 0.94 at total pressures from 14.7 to 32 psia, all factors indicated that the tunnel was clean enough to install composite blades.

A variety of mechanical, electrical, and automation work was finished during the six week shutdown period prior to phase 4 of the IST. During this time the composite compressor rotor blades were installed and the turbulence reduction screen seams will be repaired in addition to other work.

Are We Prepared for Y2K?

by Herb Finger

With just nine months remaining before the year 2000, the Wind Tunnel Operations Division is concerned about the effect the year 2000 may have on our computer resources. To make sure there are no problems when the millennium hits, the The FO Division is working with the Center's Y2K Project Office to verify and test computer systems' abilities to properly function after January 1, 2000.

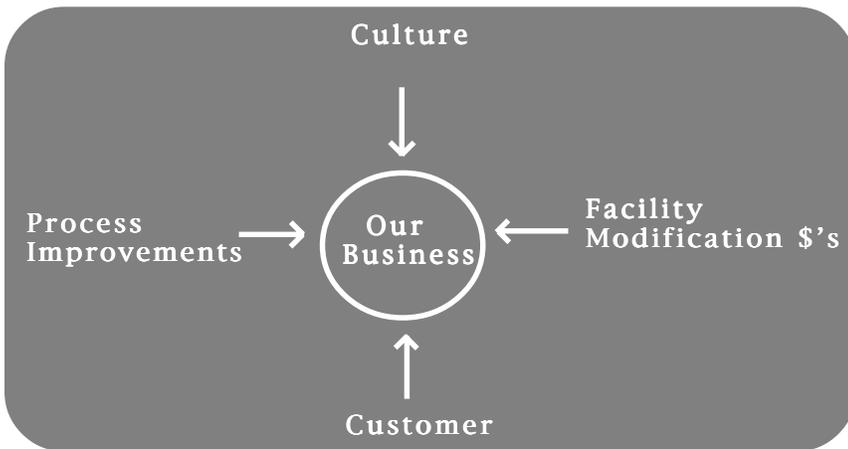
Among the systems being reviewed and tested are the data acquisition systems (NPRIME and SDS), the facility control systems (DCS and the PLCs), the wind tunnel net, DARWIN, and the various desktop computers and workstations.



As a result of having to work around wind tunnel testing, Y2K testing efforts are slightly behind schedule, however all indications are that there will be *no* problems next New Year's Day. Nonetheless, it is anticipated that most, if not all, computers will be recommended for shutdown on December 31, 1999 to ensure that no harm will come to them because of possible failure as midnight arrives. Like death and taxes, Y2K is inevitable. Preparing for it is the key.

Major elements we can influence to change our business.

How We Can Improve:



Two areas in our business that often require large amounts of funding for change are Facility Modifications and Process Improvements for new technology. Three areas that require little funding for change are personal commitments to Culture, Customers and Process Improvements.

Here are two questions to help this thought process:

- 1) "What must I do to make our collective process work more smoothly?"
- 2) "What must I do to make sure our customer is fully taken care of today?"

SWTS Retires After 25 Years

by Herb Finger

In the mid 1970s, a team of engineers, software developers, and technicians designed and implemented the Ames Standard Wind Tunnel Data System (SWTS). The system, which was developed by Teledyne Controls of El Segundo, CA, eventually became the primary data acquisition system for all the major wind tunnels at Ames, the Arc Jet Facility, and several research aircraft such as the early Tilt Rotor. The system had a design life expectancy of approximately 10 years.

On February 26, 1999, more than 25 years after the original installation, the final Standard Wind Tunnel Data System was retired. Nearly 50 developers and users of SWTS from throughout its 25-year history were on hand as the final shutdown occurred. Retirees and former contract employees participated in the event. Foremost among these was Joe Cambra, the original SWTS Project Manager, who was given the honor of entering the final command. Along with remembrances, a skit, refreshments, and a final toast was given to a data system that served Ames well beyond its expectation. To all in attendance, the event brought a bitter-sweet closure to an era of flight and wind tunnel testing.

Wright Flyer...

(Continued from page 2)

lots of instruction materials, but no practical skills when they receive their pair of blades. It will be a challenge.

Following its wind tunnel testing, the AIAA wind tunnel model can be seen on display at the new FAA headquarters in Los Angeles. This entire effort recognizes our heritage as the leaders in aeronautics, stimulates public interest in our legacy, educates our youth, and those not familiar with the genius of the Wright Brothers and their amazing accomplishments.



Your Role in Safety

by Phil Stich

The importance of safety in our work environment has been expounded at great length in recent times. We have placed a significant priority on improving safety in the workplace. Strong management emphasis to improve safety performance will not carry the day by itself. Genuine results are achieved by ownership of safety standards by work teams and individuals within the workforce.

As we re-activate our wind tunnels, making them available for the next century of testing, we are operating new systems and equipment. New risks to personnel and equipment safety can arise from the changes if proper preparation and training are not accomplished. Utmost care and attention must be given to bring the facilities safely to operational capability. We cannot afford to stumble in our quest to retain our position as a preferred provider of aeronautical test and evaluation services.

It is incumbent upon every person to promote safety in his or her work place. Even if your work assignment is typically in an office environment, you have a role in the safety program. *Good judgement is the key.* Here are some things that you can do to contribute to a safer NASA Ames workplace:

- * **Submit suggestions on safety improvements** (Tom Aiken, Safety Board chair, x-46855)
- * Observe safety requirements such as hard hats, safety glasses and hearing protection
- * Report hazards – For example, if you see an oil spill report it to the safety office (Scott Nikodym x46823)
- * Practice good housekeeping – Keep work areas organized and neat – if you see a piece of trash on the ground, pick it up and throw it away
- * Know how to obtain emergency services – Back page of Ames phone directory
- * Take responsibility for safety – Don't let your co-workers take unnecessary risks

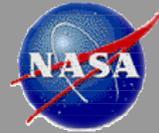
Your support is essential for improving the safety of our Ames work environment. Please take your role seriously.

FO OUTLOOK

*Editor: Veronica Goldman
Contributing Editor: Lee Vieira*

URL: aocentral.arc.nasa.gov/WhatsNew/Whats_new.html

*phone: x 4-2787
mail: vgoldman@mail.arc.nasa.gov*



HPADS Crew Meets Safety Milestone



On February 3, 1999 the crew of the High Pressure Air Distribution System (HPADS) celebrated the outstanding safety accomplishment of three consecutive years with no lost time accidents. All members of the crew received award certificates and were provided pizza to mark this milestone.

The HPADS crew consists of eleven Sierra Lobo employees who are teamed with Sverdrup Technology in the operations and maintenance contract for the FO Division.

This significant safety accomplishment warrants recognition due to the complex high-energy controls required to safely perform maintenance activities in their facilities, as well as the HPAD crews' ability to continue a long held standard of no lost-time accidents.

This crew has proven that maintaining a professional attitude and dedication to providing excellent service need not compromise safety priorities.

*Standing, l to r: Alex Saura, Eddie Tamez, Robin Townsend, Ken Hubar, Larry Harmon, Art Beede
Kneeling, l to r: Robert Mora, Manuel Silva, Steve Bent
Not Pictured: Luiz Cuasay, Ben Reduta, Robert Cruz, Bruce Wood*

by: Mike Weiss

Employee of the Month Awards

Outstanding Work by Ruben Torrecampo and Ron York

Ruben and Ron have shown exceptional dedication and drive throughout the aerodynamic test phase of the 40x80 IST. They constantly kept an eye out for anomalies that might lead to problems. This diligence and attention to detail did avert severe problems and delays that would have added weeks to our schedule. There are four occasions when their keen eyes allowed us to avoid more serious consequences that come immediately to mind. These involved the fan blade instrumentation, the FM 5 oil leak, the vortex generator acoustic treatment and the overhead door intermediate hinge panels.

As wind tunnel mechanics they perform inspections before and after each run, and it was during these inspections that the four items mentioned above were noticed. Their amazing attention to detail caused them to notice the slightly peeled back tape edges and small oil drops, which clearly identified the need for preventative work. A few hours to better secure the fan blade instrumentation averted three days of re-installation, and we were able to watch FM 5 to diagnose the problem and schedule the fix to coincide with a long model change.

Ron and Ruben really kept us on track when problems with the vortex generator acoustic treatment surfaced. Removing the covering from the eight vortex generators required a tremendous amount of physical labor. Four of the vortex generators required working overhead from a man lift. Ron and Ruben seemed to work non-stop for two and a half days in order to get the tunnel back on line quickly. Though this was arduous work, they maintained an exemplary attitude and completed the job in roughly half the time anticipated.

Their great work ethic was once again displayed when the overhead door intermediate hinge panels began to deteriorate. Ron and Ruben had another opportunity to practice their teamwork while working overhead from a work stand. A total of twenty-four 4 ft.-by-5 ft. panels had to be removed and replaced with 1.25-inch thick plywood. Their efficient work was key to resuming the IST in a timely manner.



Ron York and Ruben Torrecampo

Sreedhara Murthy, Contractor of the Month

Dr. Sreedhara Murthy has provided leadership and demonstrated exceptional research in support of the design and installation of a new turbulence reduction system, expected to significantly improve the flow quality in the Unitary 11-Foot Transonic Wind Tunnel. Documentation of this work was presented as a paper at the 20th AIAA Aerodynamic Measurement Technology and Ground Testing Conference. This paper was chosen as one of two outstanding papers from the 95 papers in the conference and has been recommended for publication in the appropriate AIAA journal. Mr. Murthy is recognized as Contractor of the Month for his significant contributions to this important facility improvement project and for the distinction awarded him as primary author of this exceptional publication.



Sreedhara Murthy



Brian Koss and Frank Kmak

Spotlight Awards to Frank Kmak and Brian Koss

Frank Kmak and Brian Koss have provided significant contributions to the design and installation of a new turbulence reduction system which is expected to significantly improve the flow quality in the Unitary 11-Foot Transonic Wind Tunnel. Documentation of this work was presented as a paper at the 20th AIAA Aerodynamic Measurement Technology and Ground Testing Conference. This paper was chosen as one of two outstanding papers from the 95 papers in the conference and has been recommended for publication in the appropriate AIAA journal. This spotlight award recognizes Mr. Kmak's and Mr. Koss's demonstrated exceptional research on this project and their achievement as co-authors of this paper.

(Awards continued on page 8)

Employee of the Month Awards

Krista Clapp

Krista has taken the frustrations discovered in not having employee information centralized. She coupled these loose requirements to a modest Code FOF's funding source and supervised the modification of an existing Calspan training database into a very powerful and useful Code FO training and certification management tool. In addition to being an effective management tool, this database also has the potential to solve significant ISO-related documentation issues. Many thanks to Krista and to her computer consultants.

Krista Clapp received a Contractor Of The Month Award for the month of November .



Craig Stephens

Craig Stephens made an outstanding contribution to the success of the 40x80 High Pressure Air System installation and checkout. The system was brought online with a very tight schedule in order to meet the needs of the upcoming SHARC test. Craig's contributions in designing and overseeing the mechanical installation, designing the control screens, and serving as project manager during the last phase of the installation were an integral part of the success of the project. The 40x80 high pressure air system has received excellent reviews based on performance and reliability.

Craig received a Contractor of the Month Award for December.



Tom Hegland

Tom Hegland has coordinated the Main Drive Combined Subsystem Test and the Auxiliaries Makeup Air Combined Subsystem Test over the past several months. Tom is extremely diligent in organizing and documenting test activities. This coordination has proven very effective and has freed up the time of the mechanical and electrical system owners to focus on the technical task at hand. Tom's work is a primary reason for the success of the initial IST.

In January Tom received a Contractor of The Month award for his work on the Subsystem tests leading up to the IST



George Rupp

George took on the challenge of checkloading the new honeycomb structure in the Turbulence Reduction System settling chamber of the 11x11-foot. This structure is unique in any US wind tunnel because it is self-supported and free standing rather than supported by an additional frame. This feature made it critical that the relationship between the structure's deflection and the outputs from 24 strain gages be well understood. After investigating and rejecting optical methods of measuring the deflection, George developed a simple, but effective method using string pots. His innovations made this difficult task a success.

A Contractor of the Month Award for January goes to George Rupp

(Continued from page 7)

