DAC - MDC - Boeing Retirees
of California

Roundup

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Bill's Corner

It looks like we have turned the corner and begun the climb back up to pre-pandemic status. People are traveling, going to restaurants, and planning to attend Retiree luncheons. Our March luncheon was very good – good speaker, good fellowship, and greatly enjoyed by all who attended. Admiral Sandy Adams gave us a very good history of women who served in the US military, highlighting a few key names from every era. Most of us knew some of the names, but it was interesting to hear more. Sandy also introduced us to The Women's Memorial at Arlington National Cemetery, and I expect most of us passed the info on to a female friend or family member who served so they can join the Memorial. There is a longer report on this speaker later in this Roundup.

One thing that continues to disappoint is the Boeing Company and Boeing stock. The 737 Max is finally approved for service in most countries and deliveries are ramping up, but the 787 is still shut down and the new models of the 777 are delayed. Boeing debt is up and funds for developing the next airplane could be hard to find. The focus for the next airplane has been on middle of the market or 757/767 replacement for a decade but not clear now. We can hope the worst is behind us and that things will improve but progress is very slow. There is a longer report on conditions at Boeing later in this Roundup.

Spring has arrived, a traditional time of hopefulness and optimism. Flowers are blooming, the grass needs to be cut and a few weeds have taken residence in the flower bed. There is something therapeutic about gardening even if it is hard on the knees. We have lost a few more dear friends and colleagues but accept that is part of the cycle of life. We focus on remembering the joys of living while mourning the loss.

Looking ahead to our next luncheon, we are hoping that Bob Dempster will make good progress on his replica of the Douglas World Cruiser and tell us all about it. It is a very interesting project related to the early years of the Douglas company and for Bob it is a labor of love. He has committed years of his time (and money) to the project. We hope you all can make it for that event.

Now that things are somewhat normal, we encourage you to renew your membership in the Retiree Association and encourage your colleagues to do so as well. Getting more people to turn out will make the luncheon even more enjoyable for all. Looking forward to seeing you there!

Bill Rickard
President, DAC/MDC/Boeing Retirees

SPECIAL NOTE

Jill Schaufele has volunteered to handle membership, so we now have two Mailing Addresses:

For Luncheon Checks P.O. Box 5482, Fullerton, CA 92838

For Membership Dues P.O. Box 3271, Seal Beach, CA 90740

March 2022 Luncheon Speaker – Women in the Military

Our speaker for March was retired U.S. Navy Admiral Sandra Adams.

Sandy was born in Michigan, graduated from Michigan State, and was commissioned an officer in the Navy as a Surface Warfare Officer. It was 1982 and opportunities for women to build a career as an officer were quite limited. Assignments to deployed ships were so limited that each woman could expect to get only one in a career. She got this opportunity quickly and decided to separate from the Navy in 1986. A recruiter convinced her to move to the reserves instead and her short term of service turned into a career. She remained on active duty until her retirement in 2015.

Sandy has become a strong advocate for the recognition of the contributions made by women to the U.S. armed forces over the history of our republic. Women's service was unofficial from the Revolution through the Spanish-American War, becoming official from World War I onwards. While the role of women during the earlier era was mainly in nursing and related activities, a few moved from the hospital to the front line in moments of great urgency. We saw pictures of Mary Hays McCauley operating a cannon in 1778 and Mary Ann Cole brandishing a sword in hand-to-hand combat in 1814. The military accepted thousands of nurses in the Civil War and hired contract nurses in the Spanish-American War.

The Army established a Nursing Corps in 1901, followed by the Navy in 1908 in recognition of the essential service provided. The number of women and their roles in military service increased steadily in WWI, WWII, Korea, and Viet Nam. The 70s saw significant changes, with women being allowed as pilots, entering the service academies, and serving on non-combat ships. Anna May Hayes became the first woman general in 1970 and Hazel Johnson became the first Black woman general in 1979. In the 90s, the roles open to women expanded and the number of women in service expanded. Women served in combat roles in the Gulf Wars. Sgt. Leigh Ann Hester was the first woman to earn the Silver Star since WWII and the first ever for combat action. The Silver Star is awarded for gallantry in action and is the U.S military's third highest decoration.

Sandy ended her presentation with information about the Military Women's Memorial at Arlington National Cemetery. In addition to providing recognition to women who served, it provides an opportunity for women to register their service. To preserve privacy, the Memorial does not simply list all women who served. Rather, it lets women choose to be listed by submitting an application. More details at https://womensmemorial.org/

SAD NOTE

It is with great sadness that we announce the passing of **Jack McHale**, former Orbis interim President and CEO, Board Member, and Board Member Emeritus.

Jack McHale was a beloved member of the Orbis community for more than 30 years. After a couple of decades working in aircraft acquisitions at McDonnell Douglas, McHale took on dual positions in the late '80s at both Orbis and FedEx until retiring from the latter in 2008. At that point, he formally joined Orbis in a volunteer position as Director of Aviation Affairs.

In that role, McHale's responsibilities included oversight of the maintenance and operations of the second-generation Flying Eye Hospital, a DC-10 aircraft. He played a vital role in Orbis's acquisition of the plane and also helped to secure free maintenance and parts that were critical for Orbis to carry out our training projects in areas with the greatest need around the world.

He was also instrumental in cultivating our relationship with FedEx, a supporter of Orbis for more than three decades, and in driving the acquisition and conversion of an MD-10 aircraft, donated by FedEx, into our third-generation Flying Eye Hospital.

In 2009, McHale stepped in as interim President and CEO of Orbis, a position he held until 2011, when he retired and joined the Orbis International Board of Directors. In 2014, he was appointed emeritus.

We are so thankful for his invaluable support of Orbis and tremendous dedication to changing the way the world sees.

The DC-8 "SUPER 70'S"

© by Dan Pemble, Douglas/Boeing Field Rep (retired September, 2009)

In 1982, faced with the choice of complying with forthcoming noise restrictions by January 1, 1985 or retiring their DC-8's, several DC-8-60 owners opted for installation of the new high-tech, low-noise, fuel efficient, 22,000-pound takeoff-thrust-rated GE/SNECMA CFM56 turbofan engines. This engine retrofit was conceived and arranged by Cammacorp, a business formed by a group of former Douglas executives. DC-8-61's/-62's/-63's with these new engines installed were then re-designated as DC-8-71's/- 72's/-73's.

The 70 series aircraft easily met the then-established noise limits and had significant performance improvements. Of all model DC-8's, the DC-8-72 has the longest range at 7860 nautical miles (14,223 kilometers). A total of 110 Super -70s were delivered: 53 -71's, 7 -72's, and 50 -73's. The final airplane to be reengined was a -72 for NASA in 1986; then the program was terminated by its originator. Through September/2003, 44 years after the delivery of the first DC-8, 233 of the 556 airplanes that were built were still active! Of course, Super 70 airplanes comprised about half of this total. It is of little wonder that there are currently a number of DC-8-70's still in service, considering that all Douglas-built aircraft have always had an industry-wide reputation for their "extremely robust" structures!

Just today, February 13, 2022, in response to a posting on the "Simple Flying" web site about some DC8-70's remaining in service, I offered the following comments: From late December 1980 thru mid-July of 1985, I served as the Douglas Aircraft Co. Field Rep in San Francisco (KSFO). My primary mission was to support PSA's MD-80 operations. However, during my later years, I also supported several other operators at Oakland International Airport (KOAK), including TransAmerica. During this time, TransAmerica still had 9 of their original 15 DC-8-70's in their inventory. Some years later, based on extensive testing that had been done by Douglas, it was determined that all models of the DC-8 could remain in service until such time as they achieved 58,000 total cycles OR 125,000 flight hours – if they are subjected to a Douglas/Boeing-derived/FAA-approved maintenance program. Of course, this was great news for owners of DC-8-70-series airplanes. These cycle and flight hour limits coincide with the "Limits of Validity" related to the approved maintenance program. When this FAA-approved maintenance program is followed, such program will assure that catastrophic Widespread Fatigue Damage (WFD) will not occur up to the noted limits. If such WFD in critical structural elements goes undetected, it could result in loss of the airplane. Current operators of all DC8's that are to be continued in service up to the noted limits of validity can only do so when they have the noted FAA-approved maintenance program in place; then, once either of the noted cycle or flight hour limits is reached, the airplane should be retired. In fact, at the time when a DC-8 operator applies to the FAA for authority to continue the airplane in service up to the noted limits, the operator must also advise the FAA their future plans to retire the airplane. Interestingly, there are many now-retired DC-8's that could indeed have been continued in service in lieu of being in "bone

yards"; of course, continuing the airplanes in service is mostly dependent on economic feasibility!

Boeing Studies MD-80/717 Mod Plan for NASA X-Plane Bid

Guy Norris Aviation Week, January 04, 2022

Researchers completed TTBW high-lift tests, including stability and control checks and ground-effects evaluations, in September at NASA Langley Research Center's 14 X 22-ft. subsonic wind tunnel in Hampton, Virginia.
Credit: NASA

Seventy years ago, Boeing was secretly preparing to gamble on whether to spend two-thirds of its post-war net profits on a radical new jet-powered long-range transport demonstrator—the Model 367-80.

The company's May 1952 decision to approve the project, dubbed the Dash 80, became a defining moment in aviation history. Targeting the airline and military air tanker markets, the turbojet-powered aircraft would evolve into the 707/KC-135, establishing the blueprint for virtually every modern swept-wing transport with podded engines developed to this day as well as laying the foundation for Boeing's 700-series jet airliner dynasty.

Fast-forward to early 2022 and Boeing is once more preparing to propose a new, potentially game-changing configuration. Although the concept is not yet aimed specifically at a new product, the high-aspect-ratio transonic truss-braced wing (TTBW) is targeted instead at a NASA demonstrator X-plane intended to prove airframe technology for a future highly efficient single-aisle airliner by the mid-2030s.

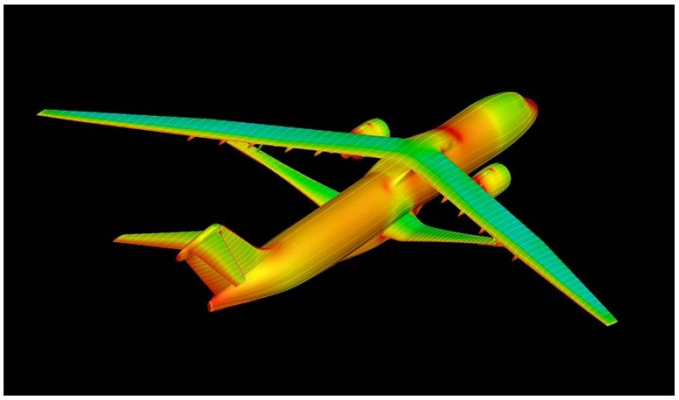
- New NASA X-plane RFP due in 2022
- Boeing seeking industry input for sustainable demo bid
- TTBW to fly on modified McDonnell Douglas T-tail fuselage

While other advanced configurations, such as the blended wing body (BWB), are in the frame for the X-plane—also known as the sustainable flight demonstrator (SFD)—Boeing's TTBW proposal is widely expected to be the front-runner. Not only has Boeing been working on the configuration with NASA for more than a decade, but it is also actively soliciting suppliers to bolster broader industry participation in its bid.

For Boeing, the timing of the competition for the X-plane has assumed even more importance than the research opportunity it presents. Hit by the 737 MAX groundings, the market downturn caused by the COVID-19 pandemic and delays to deliveries of the 787 and 777X, Boeing has had to put near-term plans for all-new commercial aircraft development projects on the back burner. The X-plane therefore offers a chance to continue with tests of key technologies that could play a role in future single-aisle programs semi-independently of the company's market-driven product-development strategy.

But as Boeing deliberates over its next market moves, ranging from long-term 737 replacements to a potential twin-aisle midsize family, the competition is stirring. The SFD

has become increasingly timely in the face of Airbus' plans to develop an all-new sustainable 100-plus-seat airliner in the 2030s.



Green- and blue-colored areas indicate areas of reduced drag in this computational fluid dynamic flow simulation of the TTBW conducted by NASA and Boeing in early 2021. Credit: Craig Hunter/NASA

If all goes according to plan, the new X-plane—which likely will be the largest purpose-built experimental aircraft in the seven-decade-old X series—is expected to begin flight tests in late 2026 and will help mature design, structures and systems technology timed for full-scale development in the early 2030s. The X-plane also forms a key part of NASA's Sustainable Flight National Partnership (SFNP) plan with industry, researchers and academia, which will support the push toward new airliner technology across a broader front that includes developments in smaller engine cores, electrified aircraft propulsion and high-rate composite aircraft manufacturing.

"In 2022, we expect to put out a request for proposal [RFP] for the design and build of the flight demonstrator, and this is really a big, big deal," says Rich Wahls, strategic technical advisor for the Advanced Air Vehicles Program at NASA's Aeronautics Research Mission Directorate. "When was the last time we did a transport-class [aircraft-level] architecture change?" he asks. "My mind goes back to when Boeing did the Dash 80 with swept wings and underslung jet engines. That's what we're looking at here—a large-scale honest-to-God, prove-it kind of aircraft that would demonstrate key aspects that you can only do in flight."

In the run-up to the RFP, NASA awarded study contracts for demonstrator plans to five unidentified companies and is working in parallel with two others on risk-reduction studies—one for the BWB and another with Boeing on the TTBW. "We've had wind tunnel tests [of the TTBW] that have gone on since 2013, and there have been aeroelastic tests, high-speed performance tests and low-speed integration tests," Wahls says. "Often you take these concepts, and as you dig down to the next layer of detail, the benefit goes away. So far, it's not going away on the truss-braced wing or really on the blended wing. We haven't found that thing that completely stops either yet."

Clarifying NASA's role in the further advancement of sustainable concepts, Wahls adds: "We're not about product development and doing the next airplane. Industry has their next baseline airplanes on their drawing boards. We're trying to identify those technologies that are just beyond their risk threshold, both financially and technically, then use those as demonstrations. If successful, we bring them forward into that next generation. If they had enough confidence to put them on the next airplane, then we would have to start looking beyond that. So, we're trying to accelerate insertion of advanced technology into these game-changing architectures across all these projects we're doing."

Following a planned first flight in late 2026, NASA says the SFD research campaign will

last six months and be completed in 2027. Design, ground test and flight research data from the SFD will be used to measure the winning contractor's "vision system" performance relative to a set of midterm performance objectives set out by NASA for future subsonic transport aircraft in the 2025-35-time frame.

These targets call for technology readiness levels of 5 to 6 (ready to transition to production development) for an aircraft capable of cumulative noise levels of 32-42 dB below Stage 4 and landing and takeoff nitrogen oxide (NOx) emissions 80% below the International Civil Aviation Organization's CAEP/6 standards. The requirements also call for cruise NOx emissions to be 80% lower relative to a 2005 best-in-class benchmark, and aircraft fuel and energy consumption levels to be 50-60% lower relative to the same 2005 standard.

As its name suggests, the TTBW configuration is all about maximizing wing efficiency and at the same time opening the aperture for a wide variety of potential future propulsion options, ranging from advanced turbofans and open rotors to hybrid engines and even a tail-mounted boundary-layer-ingesting fan. First developed in 2010 under the Boeing and NASA Subsonic Ultra Green Aircraft Research program to study ultra-efficient airliner concepts for the 2035-time frame, the TTBW has continued to evolve into a flexible and practical configuration.

Despite many tweaks over the past decade, the design continues to hinge on the benefits of a high-aspect-ratio wing to minimize drag. The increased span lowers lift-induced drag because the wing is slender, while its reduced thickness ratio decreases profile and transonic drag due to its thinness. The wing is braced by trusses to minimize the weight penalty of the longer span.

The X-plane was originally designed with an un-swept wing to cruise at a fuel-saving speed of Mach 0.75, but Boeing is basing its X-plane proposal on a revised wing configuration revealed in early 2019. The newer design is optimized around a 20-deg. swept wing to enable a higher Mach 0.8 cruise speed more typical of current jet airliners. The increase in sweep angle necessitated a redesign of the truss, which has increased chord at the fuselage and forward sweep at the trailing edge and tapers toward the junction with the wing. A small jury strut that connects the truss to the wing has also been moved farther outboard and closer to its junction with the wing. The changes have allowed the truss to generate lift, further maximizing performance.

With an aspect ratio of 19.6, the 170-ft.-span wing of any production TTBW version also will incorporate a 777X-like wing-fold feature. The fold, which is positioned outboard of the truss attachment point, is designed to enable the TTBW to use smaller gates, like those used by the 118-ft.-span 737. For the SFD bid, Boeing expects to modify the fuselage of a donor MD-80 or 717, but it is unclear if these precise wingspan dimensions will be reproduced for the demonstrator, which is also unlikely to include the folding feature.

Boeing is, meanwhile, canvassing industry for potential risk-share involvement in the modification of the T-tail fuselage into the X-plane. The company declined to comment on details of the plan, saying it would be premature to discuss its proposal prior to NASA's RFP. Boeing did add, however, that it "enthusiastically supports NASA's vision for a public-private partnership to enhance aviation sustainability under the umbrella of

the Sustainable Flight National Partnership, which focuses industry and government on the critical challenges for products being introduced in the 2030s."

Details of the proposed modification plan seen by Aviation Week show that a significant number of changes and additional systems and structure will be required to transform a McDonnell Douglas-heritage fuselage into the basis for the new X-plane. The biggest of these will involve the design and build of a composite wing with full-span slats and single-slotted flaps. The wing, which will be joined at the centerline above the fuselage, also will incorporate low- and high-speed ailerons.

To meet the required design length of the demonstrator, Boeing plans to remove an unspecified number of fuselage frames as well. This suggests the preferred donor fuselage may be from an MD-80 rather than the shorter DC-9-30-series-size 717. The fuselage will be reinforced with internal bracing from the wing to the existing structure, too, and will utilize the in-situ carry-through torque boxes for the nose and main landing gears. The existing gear will be supported by a new pylon and enclosed in a new fairing.

Other changes will include the relocation of the tail-mounted engines to an inboard underwing mounting, where they will be attached with a new pylon and enclosed in purpose-built nacelles and inlets. The engine's existing thrust reversers will be locked out while the nacelle will feature a purpose-designed anti-ice system.

Several key system changes also will be required, including the development of a fly-by-wire flight control system for the wing-control surfaces. Flight control functions will be hosted in a triplex vehicle management system controlled from a two-crew flight deck that will be modified with an additional flight control computer interface. Among the system changes will be the rerouting of the engine bleed air ducts through the fuselage to the environmental control system packs and the addition of an extra central hydraulic system to augment the existing configuration.

Changes to the interior will include installation of a full flight-test instrumentation suite and accommodation for flight-test personnel as well as provision for a set of pallets for center of gravity ballast.

Guy Norris *Aviation Week, January 04, 2022*

Late News from Press Telegram 4/6/2022

Boeing moving HQ to DC area from Chicago

Boeing Co. said Thursday (4/5/2022) that it will move its headquarters from Chicago to the Washington, D.C., area, where company executives would be closer to key federal government officials.

The company said it will use its campus in Arlington, Virginia, as it plans to develop a research and technology hub in the area.

"The region makes strategic sense for our global headquarters given its proximity to our customers and stakeholders, and its access to world-class engineering and technical talent,"
Boeing CEO David Calhoun said**.**