AS THE PROP TURNS

EXPERIMENTAL AIRCRAFT ASSOCIATION
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January/February Meeting of EAA Chapter 315

The January/February meeting of EAA Chapter 315 was held on January 27th at the offices of Innovative Power Solutions in order to accommodate a special guest speaker - T. Ladson Webb Jr.—who gave an very interesting talk about the technology behind the next generation of catapults that will be used on the Ford class carriers in the U.S. Navy.

We skipped the business meeting, so that we could listen to this fascinating talk.

Next meeting will take place on Monday, March 3rd at the Old Bridge Airport office.

Next Generation of Carrier Catapults

Our speaker for the evening was T. Ladson Webb, Jr. Mr. Webb is an EVP at Zodiac Aerospace where he has been involved in the project to develop the next generation of catapults for U.S. Navy carriers. Now Mr. Webb knows what he is talking about, as he is a former NAVY pilot with 880 carrier landings.

He briefly told us how, in the 1960s, he decided to join the NAVY, rather than be drafted into the Army. Since at that time he already had earned a degree in mathematics he was sent to pilot school, and went on to be become a carrier qualified pilot.

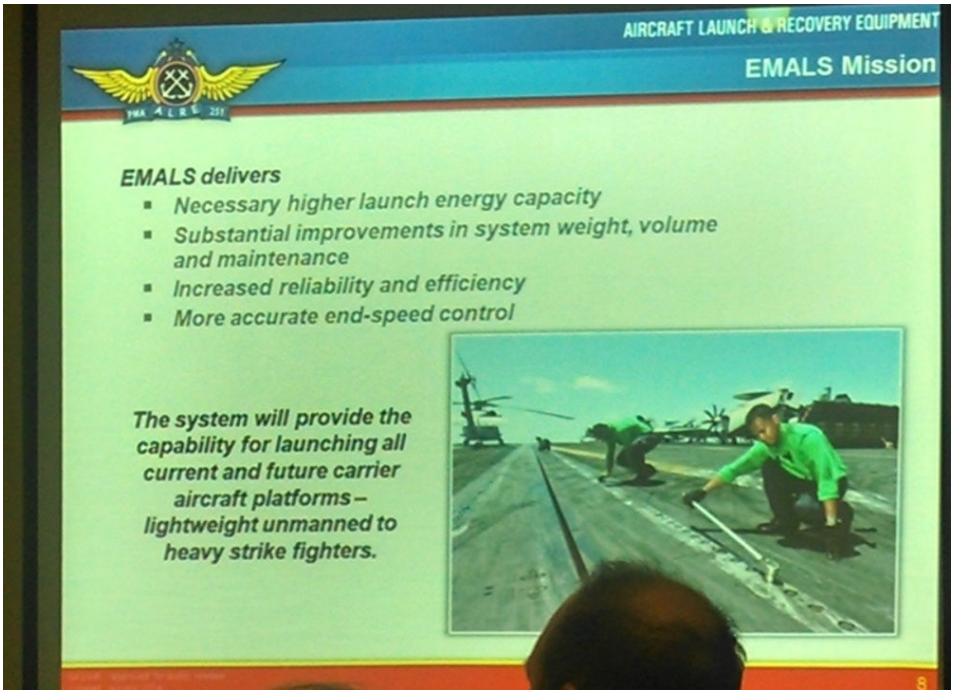
Now the current U.S. fleet carriers are of the Nimitz class. These are nuclear powered ships that were designed to be used for about 25 years, with one refueling halfway through their life. In practice the Nimitz class ships lasted 23 years before the need for refuel and overhaul.

At the time when the Nimitz class carriers were designed and built, ships did not use as much electricity as they need today. Instead steam was used to power many of the ship's systems, in particular the catapults.

It turns out that steam catapults are not particularly efficient. They consume about half of the reactor's energy at about 8% (yes, that eight—not a typo) efficiency.

The new carriers being build, so called Ford class, are designed to use energy more efficiently. Their reactors have fuel for about 26 years and produces about 3.8 times as much electricity as the Nimitz reactors did. The new ships runs on electricity instead of hydraulics or steam. Consequently the catapult needs to be electric as well.

Electrification of the catapult allows removal of complicated system of pipes that used to deliver steam. On the other hand some fat wires are needed.



The electro-magnetic catapult (or EMALS - which stands for Electro Magnetic Launch System) consists of a series of electro-magnets that accelerate the catapult. The catapult is about 310 feet long and it has fewer parts that the equivalent steam catapult.

The basic technology is similar to a rail-gun. Computer software allows the catapult to be very precisely controlled. For example, EMALS can launch light aircraft, whereas steam catapults could not launch anything under 12,000 lbs. The electro-magnets are also used to stop the catapult after the aircraft is launched. This can be accomplished within 7 feet!

A lot of the testing of this system has been done in New Jersey at the Naval Air Station in Lakehurst. In fact we saw videos of the catapult launching F-18s from test set down there.

At present time the first Ford class carrier has been launched, the EMALS system installed on it, and currently it is being tested there with all sorts of dead-loads, before any attempt to launch an aircraft is made.

The program to develop EMALS was started way back in 1996, when some money was allocated to conduct research and design a prototype. So it appears that it will take about 20 years from the initial concept to actual deployment on carriers.

I found the talk fascinating. It is always great to see behind the scenes when new technologies are developed.

We are deeply grateful to T. Ladson Webb for taking time and giving us this presentation!

The Editor

TWENTY YEARS AGO IN SPORT AVIATION

The cover of the February 1994 issue of Sport Aviation featured an inflight photo of the new IAC One Design aerobatic ship. It was intended for a sort of IROC competition class that would use a specific aircraft and offer a true determination of the skill of the pilot, not how much money he or she could throw at a competition mount. The design of the One Design was straight forward, with a fabric covered steel tube fuselage and an all-wood, plywood covered wing. It was powered by a 160 hp Lycoming 0-320 and a fixed-pitch metal propeller. With a wingspan of 19.5 feet and a length of only 17 feet, it was about the size of a monoplane Pitts but with less wing area. The designer was Dan Rihn who had in the past come up with highly modified versions of the Pitts Special among other things. Budd Davisson supplied a pilot report in which he praised the performance and handling qualities of the little ship. In his opinion it was not a Sukhoi, Extra or Laser, but it was so close that only a handful of the world's top unlimited aerobatic pilots would ever be able to tell the difference. For the rest of us we could get our hands on a top performing competition aerobatic mount that was relatively easy to fly and get it at a fraction of the price of one of the big dogs. Aircraft Spruce would initially be the sole supplier of plans and parts, but Budd expected that once the plans were in the field others would supply parts competitive prices.

Jack Cox contributed an article describing the 1940 Klemm 35D owned by Lars du Jounge that won the Champion Bronze Age Award at the 1993 Oshkosh Fly-In. Produced in Germany as a trainer, Lars' ship was one of a batch of 74 ordered by the Swedish Air Force in 1940. It performed its training role until 1948 when the model was phased out and the plane was sold in the civilian market. It passed through several flying clubs until its airworthiness certificate was allowed to expire in 1961. Lars found it in 1966 tied down and rotting away at an airport in the south of Sweden. He purchased it and had it put in storage. In 1976, after he had retired from business and settled in Southern California, he had it shipped to the States along with a Tiger Moth that also needed restoration. The Moth was restored first, and finished in Swedish Military markings of 1932. In 1979 work was started on the Klemm, and it was of course finished in the markings that it wore while in service with the Swedish Air Force. Powered by a 105 hp Hirth 4-cylinder engine, Lars reported a top speed of 124 mph and a cruise speed of about 112 mph. In the 1920's an earlier version of the 35D called the Klemm 25, powered by a 45 hp Salmson engine, was built under license by Aeromarine in Keyport, New Jersey. Apparently about 75 were built before production ceased in 1931. I wonder if any of those planes are still around.

The pilots of the 56th Fighter Group, 8th Air Force were honored at Oshkosh in 1993. Five veterans of the 56th were present at the Convention Fly-In, and Dave Gustafson got a chance to sit down with them. He furnished an article in which he related some of the stories that they shared. The 56th produced more aces and more kills than any other unit in the European Theater during World War II. The pilots at Oshkosh included Gabby Gabreski, Robert Johnson, Gerry Johnson, Hub Semke, and Bud Mahurin. The 56th was the only group that started and ended the war equipped with the P-47 Thunderbolt. Also present were five of the remaining 11 P-47's.

Dave also described the newest version of the KIS that was brought to the Fly-In by designer Rich Trickel. The prototype had flown in 1991 with Limbach power, but the 108 hp Lycoming O-235 soon became the standard engine. When Rich heard about the new 125 hp IO-240 engine that Continental had recently introduced, he knew he had to have one in his KIS design. On the trip to Oshkosh he reported that the cruise speed was 169 mph with a fuel burn of less than six gph. In Museum Highlights Norm Petersen reported that the prototype Questair Venture had been donated to the museum. This is the ship that Robert McLallen had used to set many records, including Chicago to Boston with a groundspeed of 401.79 mph on January 26, 1993. Designer Jim Griswold reported that a new factory demonstrator was being constructed from a quick-build kit that would be lighter and faster.

Mary Jones supplied a description of Ed Fisher's new design based on the Mong Sport that he called the Micro Mong. The prototype was powered by Rotax 277 engine and weighed in at 249 lbs., making it a legal ultralight under Part 193 regs. He reported a cruise speed of 50 mph and a landing speed of 27 mph.
The EAA Chapter Activities column contained coverage of the various EAA sanctioned Regional Fly-Ins. In "Schematics" Charles Wallace discussed using a computer program to draw and electrical system schematic and used a typical system from a Glasair II as an example. In the Craftsman's Corner, Ben Owen discussed getting started in gas welding. In "Hints for Homebuilders" E.H. Marshall shared his drill jig for rod ends. In the "Sportplane Builder", Tony Bingelis offered some tips on building wood wing ribs.

Bob Hartmaier

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Next meeting Monday March 2nd, 7:30 PM
Old Bridge Airport Office