Skyshark

ALWAYS LOOKING TOWARDS THE FUTURE, THE US NAVY AND DOUGLAS WENT IN SEARCH FOR A REPLACEMENT FOR THE FABULOUS SKYRAIDER. THE TURBINE-POWERED XA2D PROVED TO BE A FAILURE IN ALMOST EVERY ASPECT

BY MARSHALL WAINWRIGHT

The camera aircraft pulls in tight on XA2D-1 BuNo 122988 (first prototype) during a test flight on 20 October 1950. Due to the destruction of photographs and records, finding definitive information on the testing phase of the Skyshark is difficult. This view shows the early form of exhaust, the lip of which protruded into the airstream. This aircraft also had the short vertical fin and rudder, later raised.

When the power from the massive turbine engine of the XA2D-1 prototype was unleashed as it ran up on the ground, six huge, square-tipped, contra-rotating prop blades slicing the air, the high-pitched scream was unnerving. The vibration was even worse, its vortex rattling bones and joints — making ground crewmen and engineers wince with pain. Earplugs did little to combat the whine and even after the powerful Douglas turboprop had taxied out and taken off, its attendants were still shaking. Some compared the seismic churning of the XA2D's props to an earthquake and complained that it made the fillings in their teeth ache, but of all the headaches blamed on the Skyshark — the Navy's new attack plane — as it underwent trials preparatory to cutting its sharp, gnashing combat teeth, none was as severe and no one was to suffer more because of it than the one it gave its creator, Ed Heinemann.

XT40 test bed at the Douglas factory.

Chief Engineer of the Douglas El Segundo Division since 1936, he had designed the Navy's SBD Dauntless dive-bomber, the Army Air Force's A-20 Havoc and A-26 Invader attack twins, as well as the Navy's current shipboard attack ace, the AD Skyraider, but its A2D successor — the Skyshark — was causing him migraines while driving him to distraction. There was nothing wrong with the airframe he had given it. In performance, armament, size, and shape, it did everything expected of it, and more, but the Skyshark's turboprop powerplant was a disaster — its lack of dependability and quirkiness making every test flight a crap shoot. As Heinemann would admit in later years, "The Skyshark was too complicated. We put enormous effort into that plane and while we learned much from it, in the end it was overtaken by jet-propelled aircraft."

But in the summer of 1950, this knowledge had not yet sunk in.

At the end of World War II, just as the jet age was dawning, US designed and built jet engines lacked sufficient power, dependability, and range. The spool up time and instant response required for quick throttle adjustments was over-long — not a very reassuring characteristic when coming aboard an aircraft carrier. Within the next five-years, most or all of these problems would be satisfactorily solved, but during the interim the Navy needed new fighters and bombers and it was decided that a hybrid — combining the jet turbine engine with a propeller — might be the solution it was searching for. Thus was born the A2D Skyshark, America's first post-war tactical turboprop.

Harnessed to a propeller, a gas turbine would not only provide more power than the immensely complicated and huge late war piston engines, which had just about reached the limit of their growth, but with the correct gearing, a new fighter or bomber equipped with such a powerplant would be able to carry a much larger load and burn less fuel. Engineers knew the technology was coming, they just didn't know that, in the case of the Skyshark at least, it would never arrive.

For carrier operations, range and size have always been paramount. Massive late war fighters like Boeing's F8B and attack planes like the Ryan FRs or Curtiss XF15s had all been too large, or too complicated, particularly the latter with the power from their immense, corn-cobbed radial piston engines augmented by 1500- to 2500-lbs of additional thrust from small jet engines. In order to eliminate the need for two power sources, what if a propeller was linked directly to the jet engine? This was the thinking behind the turboprop, which would later prove successful, but in the late 1940s, success was elusive.

For carrier work, the idea of power combined with rapid response seemed ideal. The turboprop provided both, along with improved fuel consumption, and its propellers made it especially responsive at lower speeds. After investigating the merits of such a plane utilizing both General Electric and Westinghouse turbines mounted in the fuselage and/or in separate wing nacelles, the Navy and Douglas concluded their preliminary studies and signed a contract in September 1947 for two XA2D-1 prototypes powered by a still experimental Allison XT-40A engine, consisting of two axial-flow gas turbine power sections mounted side-by-side and connected to a common gearbox by extension shafts.

If this seems complex and intricate, it was, but Allison had benefitted by long experience with its liquid-cooled V-1710 V-12 engine series linked by long extension shafts to the props on the Bell P-39 and P-63. Meanwhile, the Navy's Bureau of Aeronautics had sponsored Aeroproducts research on turboprop propellers and, much like their input in the case of the Curtiss SB2C Helldiver believed this research would lead to success.

It would take a certified engineer to understand all the ramifications of such a power train system but, in brief, it worked like this: The two axial-flow turbines, located just below the pilot's station, each generated some 2700-lbs of