Mark Kirchner
2020 Pathfinder Award Recipient in the Engineering Category

FROM BIRTH, MARK KIRCHNER was destined to be an outstanding aeronautical engineer and a major contributor to the aviation industry. He came of age during WWII, and volunteered for US Naval flight training, but the war ended before he earned his wings. Rather than pursuing a career as a Navy pilot, he mastered out and applied to MIT, where he received his BS and MS degrees in Aeronautical Engineering.

After graduation from MIT and a previous summer job with The Boeing Company during his junior year, Kirchner permanently joined Boeing in 1949.

Mark Kirchner’s managerial capability showed in every leadership assignment he had during his Boeing career including Chief Engineer for Aerodynamics, Director of the Commercial Airplane Technical Staff and Director of Technology at Vertol. His decisions were fair, decisive and technically powerful. There were also numerous times when his technical knowledge and imagination stood out and made an unusual contribution.

When Mark was just beginning his Boeing career and working on the B-47, he pointed out that the US Air Force’s plan to use gasoline as fuel rather than kerosene would result in a 20-30% loss in range because of fuel boil-off at high altitude, an issue that both the Air Force and Boeing had failed to appreciate.

When preparing the pilot's performance handbook for the B-47, he arranged for the calculations to be done on the company’s punch card computers used to calculate paychecks, which enabled the handbook to be completed in only 6 months, much shorter than could have been done with manual computation. In addition, the handbook consisted of “chase-around” charts for determining such things as takeoff and landing distances. This type of chart still is used today in pilot handbooks.

Kirchner was sent to Vertol with the goal of improving the technical level of Vertol helicopters. To test new ideas he needed a wind tunnel configured to handle the large down-wash created by the helicopter rotors. He led the design and construction of this wind tunnel, working hard to get the approval of George Schairer. The tunnel was very successful and led to improvements in both the Chinook and Navy Sea Knight helicopters.

Kirchner’s greatest technical contribution having worldwide significance was his analysis of the wind shear problem during the landing of large aircraft. The problem occurs when the atmospheric wind shear causes a sudden large tailwind component to the airplane’s airspeed. To understand the problem of wind shear in more detail Kirchner built his own digital computer from a kit and used it to calculate the path of the airplane using different control techniques to avoid hitting the ground. He came to the conclusion that the current Boeing technique was the proper method.

Kirchner was a member of a committee of the National Academy of Sciences (NAS) that had been formed to study the wind shear problem, and he presented his results as they prepared their report. He couldn't get agreement from another member of the committee, an ALPA pilot, and it appeared the committee's report would not endorse Boeing's methodology. Kirchner then proposed a simulator fly-off to settle the issue. He let this ALPA pilot choose the type of wind shear that he wanted to fly through in the simulation, and Kirchner would tell him exactly how to fly through it. The pilot picked 10 different examples, and Kirchner’s technique proved to be the most favorable in every case. This result changed the thinking of the entire committee, who then endorsed the procedure in their report, and it became the standard for the world. The seriousness of this problem was represented by the fact that the world commercial fleet was losing an airplane a year from this phenomenon. Kirchner undoubtedly saved many lives through the years, a true Pathfinder’s accomplishment.

Kirchner also put his considerable aerodynamic skills to work as an outstanding pilot. He held an instrument-rated commercial pilot license for fixed wing, helicopters and gliders. Soon after joining Boeing in 1949, he started the Seattle Glider Council. In the 1950s, he purchased and flew a surplus Fairchild PT-19, a Navy open cockpit trainer called the Timm. This airplane played a major role in convincing his wife, Mary Lu, to marry him. They became a great flying team, and she also became a licensed pilot. Kirchner, Dick Taylor and 8 other Boeing friends, built an experimental aerobatic biplane, the Christen Eagle, which they built in Kirchner's basement and Taylor's garage. After Kirchner made all his friends airsick from rides doing aerobatic stunts, he sold his share and decided to build a new high-performance kit plane, the Lancair IV-P. This was a four-place, turbo-charged, pressurized piston airplane, capable of speeds over 300 mph at 25,000 feet, with a range of 1,000 miles. It was constructed of carbon fiber composite, so it was light and stiff, but complex to build. He built this in his basement in about five years.

Before he retired from Boeing, Kirchner created a nonprofit organization named the Flight Research Institute to provide a way for Boeing Company engineers to use Boeing computers during off-hours to pursue personal research interests, like man-powered flight.
Kirchner also joined The Museum of Flight Board of Trustees, and rose to the Chairmanship.

Mark Kirchner was a modest person, with exceptional intelligence and analytical ability, who was able to make most everything he touched better. The one word that describes him best is integrity. He was indeed a Pathfinder during his lifetime.

Written by Alison Bailey, Associate Director of Development