Matt Kuekr

THE COMANCHE "400"

by

Walter Jamouneau

Greetings! I regret that I am not able to share with you in person the story of the birth and development of the elite of the Comanche series, the "400", but your enthusiasm in flying this top member of the family is great compensation for the time and effort spent on the creation of this model. My part in producing the "400" was largely centered on the engineering and testing phases so I will ask your indulgence if I lapse from time to time into engineering terms which may not be familiar to you.

Although I was not a party to the first talks, I understand that Mr. Piper and Howard "Pug" Piper saw a version of the North American Mustang P-51 in Florida in 1957 and were intrigued by the thoughts of producing a high performance plane for the utility market. As the single engine Comanche was in production at the Lock Haven plant, what would be involved in powering this model to give outstanding performance. First, we needed to know what engines were available either in the production phase, or at least with most of the development work completed.

To be perfectly frank, the success or failure of any airplane hinges on the power plant. The history of airplane development is intimately connected with engine availability. The best airplane design will be a failure if the engine is lacking in any essential characteristic - reliability, power output, maintainability, and other characteristics.

A review of engines available pointed to the Lycoming 720 cubic inch eight cylinder engine as a likely candidate and about mid-1958 a high level meeting was held with Piper and Lycoming management present to talk about powering the Comanche. I would be remiss if I did not say that Lycoming took a very realistic position, pointing out that the ID-720, had been developed but would require considerable additional development to make it ready for use in the Comanche. They also raised the question of who would finance the work needed. As Piper was Lycoming's number one customer for small engines, they finally agreed to undertake the project although assigning a fairly low priority and late the same year (1958) we were told that a sample engine would be available in mid-1959.

Work at Lock Haven Piper engineering proceeded in engine mount design, structural calculations and tests in anticipation of receipt of the engine in July of 1959. But true to form, when the sample engine was put on the scales, it is my recollection that it was some 40 pounds over the specification weight of 570 pounds. This overweight problem initiated a weight saving campaign by Lycoming which brought only limited results as some of the sources of weight were vendor items such as the starter motor, magnetos and carburetors which were "off the shelf" items adapted from military procurement or for larger engines.

Work on the "400" was held up for three weeks in mid-1959 as the shop employees at Piper Lock Haven went on strike and took with them the workers in the experimental department. All office

workers were prevented from entering the plant so work at Lock Haven ground to a standstill. Work resumed in September and parts were made to install the engine on a mock-up to work out the cowl, cylinder baffles, exhaust system, air intake system and engine controls. In order to insure proper power output and service life, these parts are installed on an operating engine in Lycoming's test cells where the engine is run for many hours at full power and along with power and temperature checks, all parts of the installation are studied from a durability standpoint.

Although Lycoming was busy through the fall testing the engine and related parts, they had to postpone delivery of an operating engine a number of times and finally delivered the engine on December 24, just in time for Christmas. The test engine developed 390 horsepower at 2575 RPM. This engine was installed in Comanche N5316P and flown for the first time on February 22, 1960. This model was used for general evaluation and gave a good account of itself so that in early summer, a number of important points were discussed with Lycoming including the fuel injectors to be used and magneto developments needed. Meanwhile flight tests of the prototype uncovered a problem that Piper would have to resolve. The FAA rules required the stall speed of a single engine plane not exceed 70 miles per hour but early tests indicated the original configuration at 3800 pounds gross weight stalled at 74 miles per hour. This occasioned many hours of experiment in flight with the solution resulting from a redesign of the wing flap system and tail surface modifications.

At this point, I should mention that delays in progress of certification and production of the "400" were caused by change in priority emphasis. Lycoming was held up by vendors as well as their own work load and Piper had a number of other projects on the fire in Lock Haven, thus, this model was put on the back burner a number of times. At this stage in the development, a weekly meeting was held with the top brass of Lycoming to push for progress and strangely enough it seemed to work. It would not be correct to leave the impression that no progress was made, as a number of necessary steps were taken, such as measurement of blade stresses in the propeller, and static tests of airplane parts. Meanwhile Piper management and sales were talking about pricing of the various models for 1961 production and set a tentative figure of $25,800 list price on the "400", production of 10 planes in July of 1961, 20 in August, and 20 in September. Such optimism! I'm certain that Lycoming did not share this feeling for the schedule as there were a number of engine problems still to be resolved. For example, they were still considering the use of 4, 4-cylinder magnetos in case the alternator magneto development at Bendix did not pan out.

Meanwhile, the FAA were visiting the plant to witness static tests of airplane components and to examine detail design features. In March of 1961 the prototype "400", N8380P, was test flown and was planned for FAA certification testing, but for insurance against delays due to possible damage, a second "400" was produced in the experimental shop - N7511P. With two planes flying, it was possible to evaluate a number of designs of engine and installation parts while building up time. As the engineering

test pilots were busy with a number of other projects a young pilot, who was a student in the Harvard Graduate School, was hired to fly N7511P during the summer months. The object was to get as many hours as possible on the airplane and give it a thorough inspection at frequent intervals. As some hot starting problems had been encountered, he took his lunch break sitting in the pilot's seat with the engine idling. This testing proved very worthwhile as parts that did not stand up in service were redesigned and subjected to more testing. Other pilots from the sales and engineering departments also few this plane from time to time.

In mid-1961 it was decided to delay scheduling production of the "400" until Lycoming and Bendix had time to solve some of the problems which testing had uncovered. Cold starting tests were underway at Pennsylvania State University's cold room and an engine with a more rugged crankshaft was installed in N7511P. This change necessitated a recheck of propeller blade stresses.

Throughout the development period I would fly one of the experimental test planes and one day as I was flying N7511P over Hagerstown, Maryland at 12,000 feet I noticed a phenominally high rate of fuel consumption although the engine ran OK. After landing at Lock Haven, I looked inside the cowl and found a fuel line fitting cracked through in the threads and the engine compartment washed clean with high octane fuel. This included the exhaust stack. And this happened on February 13. Some one up above must look after pilots.

Meanwhile throughout the spring of 1962, Lycoming had many talks with Piper about producing the IO-720 and more than one time it was very close to being abandoned. But finally in June of 1962 the President of Lycoming agreed to gamble on changing the crankshaft dies for the engine as he felt Piper was serious about building the plane. Also a tentative price of slightly less than $5,000 was set on the engine. Lycoming spent the summer and much of the fall working on fuel injector development, and Piper styling had produced a deluxe interior for the plane with maroon leather and coordinated paint and plastic parts. Engineering had suggested all "400s" have the maroon interiors as a "limited edition" model but that suggestion was later overruled by sales.

During this period considerable cross country flying was done on N7511P and those who took these trips returned very enthused with the performance. Here was an airplane with enough power to allow loafing along at part throttle yet capable of moving at a very respectable speed when needed.

Early in 1963 a new problem surfaced. The test pilots reported a strange noise under certain power conditions which they dubbed "machine gun noise." Many hours were spent trying to cure this, 12 hours of flying on one day in March looking for answers. It was thought that detonation in the engine was the cause but as it turned out later, the noise was caused by contact or bottoming of one of the engine mounting bushings and when this was cleared, the noise disappeared.

Starting early in 1963 the production department had built tooling and purchased parts for the "400" and two planes were produced in the late summer for showing at the fall meeting of Piper sales people. The first production plane was N8400P and the second was N8401P. "Pug" Piper flew N8401P to Vero Beach on November 11, 1963 and I flew this plane at Lock Haven several days later. It was the practice in Lock Haven engineering to take the first few planes off the production line to be given a thorough inspection for quality and conformity with specifications, then to be flown through a series of flight tests to evaluate performance and conformity with FAA requirements.

Through the late fall, the FAA had been conducting flight checks and on December 23, 1963 the Type Certificate was granted by the FAA but testing did not stop there, improvements in starting and in engine components continued well into 1964. N8401P was turned over to the Lock Haven airport to build up time and was sent to Des Moines, Iowa for use in producing a film story on a flying vacation. On May 25, 1964 the first production "400" was sent to the delivery center and on August 19, Barry Goldwater, Jr., arrived in Lock Haven to deliver a "400" Comanche to Medina Aircraft.

This, then, is a general summary of the development history of this fine aircraft and based on the good account it has given in service, some will still be flying in 2030, the 100th anniversary of the company.