Technically Speaking

Recent Discussions from the Comanche Owner's Forum –

Stabilator Flutter

As many ICS members can attest, the best source of information is often other Comanche owners who have faced similar maintenance and operational issues. As a service to all ICS members, the following is a series of online postings from the Comanche's Owner's Forum. This discussion between Comanche owners concerns stabilator flutter. It is printed as it appeared in the Forum.

I just installed an S-TEC 55X autopilot in my 1965 twin and when I go to a vertical speed decent and the airspeed approaches 195 or just about the yellow arc, the stabilator starts to flutter. As soon as I disengage the A/P, it stops. I have checked the cable tension on the elevator and the bridle cables on the A/P. I have had the A/C for nine years with the old Altimatic A/P and this is a new problem. Any insight from anyone would be appreciated thanks.

I would be very interested in hearing about any such flutter problems and their resolution in this forum.

I get stabilator flutter on my TC at about 195 IAS if the bushing or bolt between the control rod and the trim actuator. Just fixed it again last week.

I wonder if the pitch trim bridle is reaching its nose down cable limit and slipping the clutch?

I have seen a low frequency 5 HZ (+-) oscillation with the autopilot on, out-of-trim and some play in the trim drum. I did it by leveling off, cranking in cruise trim (before speeding up) and hitting altitude hold. My guess is that what you are seeing is a similar effect, as the autopilot doesn't have the speed to produce a fast oscillation on its own.

I fixed the tab play and don't hit the hold so early and have not had a repeat. Check the stabilator trim tab play.

I've got a 55X in my 1966 PA 30 and have never experienced anything like you describe. The highest I've ever let my airspeed get was about 220 indicated on a very smooth day and still no flutter whatsoever. Normally, just to ensure no issues in a descent, I'll reduce power to keep the airspeed 5 to 10 mph below the yellow. The 55X has always been rock steady.

Not directed at you Todd but to everyone, are we really talking about flutter guys? Not a term I would throw around loosely! I wasn't aware that you could have a true flutter incident that didn't result in loss or near loss of the aircraft.

Hans, help me out on this will you?

According to Maurice, and other postings on this forum and my own experience as well, stabilator flutter will occur in different degrees of intensity.

Severe flutter will result in serious damage and possible loss of control of the aircraft. The plane in the famous NASA flutter movie managed to land safely although it did need some (a lot of?) repairs.

At the other end, I have experienced what I would call mild flutter, where the airframe vibrated and a slight sensation was also felt in the yoke for a few seconds. This was also an alarm bell to get things fixed immediately.

I would consider all incidents of flutter as quite serious since they all are at least a first step (or last) before loss of control and damage and reflect an airframe in need of immediate maintenance.

Comments are welcome.

To everyone interested in this discussion: True flutter occurs when torsional instability couples to the bending frequency of the structure. Normally, up to flutter speed, structural damping and air damping, prevent these vibration modes from coupling. The torsional mode is when the stabilator tips rotate about the spar, and the bending mode is when the stabilator tips flex up and down.

Looking at the NASA flutter film, one observes that the stabilator tips are both rotating and flexing. The motion is somewhat similar to a manta ray swimming.

What Jack01267, T6, Charlie, James and others have experienced (including myself at one time) is a buffeting caused by looseness in the stabilator trim system, which can be the start of torsional instability.

The two main causes of stabilator trim tab buffeting are 1) Washing the airplane, and getting water into the trim tab (increases tab mass), and 2) Looseness of the trim system (excitation force and reduced damping).

There are three locations where this looseness can occur. The two ends of the trim tab control rod contain bushings, a thru pin, and an AN bolt. The trim drum contains two bushings, which are preloaded by the two cable guard bolts. The entire assembly must allow movement, but with minimum excess play.

So, what is the maximum allowable up/down movement, measured at the aft center of the trim tab? I don't recall if the service manual has a requirement, but I will offer up that ± .050 is maximum.

If there are airplanes out there with more play than that, then the word needs to get out for problem correction. We don't want to lose an

airplane and lives, nor do we want the FAA to give us another AD.

Thank you for your excellent discussion of the stabilator flutter situation. I have never had a stabilator vibration in my airplane, (I did on a brand B I owned years ago) but my A&P will have a copy of your post to review at my next annual. This forum is a great resource.

Regarding washing the airplane, and getting water into the trim tab: Won't the water run out of the trim tab before flight? (Aside: now I have an excuse to not wash my airplane).

The "water in trim tab" possibility was suggested to me by Phil Wiltze, head of aerodynamics at Rockwell during the Shuttle design phase.

One time, about 10 years ago, after washing the airplane, took a ride to "dry it off." On the return leg, straight and level, moderate power setting, I felt the oscillation at the wheel at about 3 Hz, with a total stroke of about 1 inch. Slowing down made it stop.

One time, about 13 years ago, carrying about 600 pounds of sandbags during the Cafe 400 race, had a similar experience. Then, I was coming downhill fairly high in the yellow range. Reducing power and raising the nose to slow it down made it stop.

Thanks so much Hans, I knew you could help us all out on this one. So, is buffet or vibration flutter or the beginnings of flutter or simply related to flutter?

Assume for the moment that a Comanche stabilator is placed in a wind tunnel, and rigidly constrained.

At the flutter speed, where the aerodynamic forces exceed the restraining bending and torsional stiffnesses, the stabilator will start to flex, and couple in with the torsion stiffness to cause twist. When the oscillations become large enough, the stabilator will come off the airplane. Usually, 3 or 4 cycles are all it takes. However, this phenomena does not happen instantaneously, but rather one can sneak up to it.

Now consider a trim tab in the same situation that has a lot of play. The tab, having a reduced flexural and torsional stiffness, will begin to oscillate about its hinge line first. The tab will then start to excite the torsional mode of the stabilator. In flight, we feel this as a low-frequency oscillation of the control wheel.

If we continue to let the tab oscillate about its hinge line, and increase the flight speed, the stabilator torsional mode will couple to the flex mode, and stabilator becomes unstable on its own. The speed at which all this happens (i.e., "how much time do I have") depends on mathematically complicated stability derivatives.

You might recall the crash of a F-117 a few years back. A mechanic left out a bolt at the right aileron hinge bracket. After about 3 cycles, the aileron was gone, and the plane crashed. Prior to that, the plane was flown from its airbase to the air show without any problems. So, at the right combination of airspeed and control forces, things can happen quickly.

Also, a few years back there

was a Comanche that crashed in Anaheim Hills, where I live. According to the NTSB, there was the likelihood of airframe icing, and radar returns show the pilot was making a hard right turn.

Normally, a hard turn shouldn't take the stabilator off of a Comanche, but this one was found about half a mile away from the main crash site. We'll never know what happened for sure.

Message to all, we have 40-year-old airplanes that need maintenance to keep them in near new condition. Flutter speed for the Comanche was established using a new airplane. Bear with me Hans.

So, if a trim tab is loose, you could get into an unstable situation which could cause a low-frequency oscillation of the tab which could then help to induce flutter in the entire control surface but at that point it is probably too late as once the real flutter starts you are probably history.

Is that about right? And is the "buzz" I have heard some people describe here and elsewhere just another symptom of excess play and poor maintenance that could aggravate flutter but not flutter itself?

Sorry, I think I am getting there and I appreciate the education!

To answer your questions specifically;

1. A loose trim tab will cause a low-frequency oscillation to the stabilator itself? Yes. Keep in mind, as a surface, the trim tab itself is not balanced.

2. Could the tab oscillation induce flutter into the stabilator and make for a bad day? Yes. But, only if allowed to progress and diverge, which will require some additional airspeed. How much extra airspeed? Don't know, but a SWAG would be an extra 10 to 15 mph indicated.

3. The "buzz" is a symptom of excess play in the trim tab system?

Yes. Could it cause flutter to occur? Yes, if left unchecked with additional airspeed. I don't believe that the reduced flutter speed due to wear-and-tear has been thoroughly investigated.

The regulatory requirement for CAR 3 airplanes is for a demonstrated →

10 percent margin above red line. For Part 23 airplanes, there is an equation, which works out V(dive) to be 210 kts (twins), which also must be 1.25 times V(cruise), whichever is greater.

Thanks Hans, I have saved all this to help me in the future. I think I certainly understand more than I did. I am sure many of us did.

Your last paragraph is also interesting. In the case of our twins that would mean that they were actually tested to a higher airspeed than they would have been under CAR 23 I think. Of course all of these margins are pretty slim if the aircraft is not maintained properly.

Hans,

I'd like to echo Bill's thanks for clarifying the flutter issue. It's an important one IMO and it's hard to write too much on it.

Our thanks to Dale Vandever for compiling this text. You can view these messages in the context of the entire discussion by going to: http://forums.delphiforums.com/comancheflyer

Technically Speaking

The Power Source You Hope You Never Have to Use

Since 1988 AvTek has been providing back-up electrical power for IFR pilots. Offered in both 12 and 28 volts, the company has sold more than 2,000 units worldwide.

AvTek has a limited number – approximately 50 – of 28-volt units. In a one-time group purchase, these units can be owned for $300 off the already low price. Some 12-volt units are available.

AvTek's standby electrical unit is unique. Unlike a standby generator/alternator, there is nothing to install. The power is from reliable, dependable, rechargeable lead-acid-sealed batteries. Ironically, Boeing uses a similar battery power source in the 737, at 300 pounds. AvTek's unit weights only 8 pounds, which will provide up to and more than one hour of power.

In the 15 years of service, the AvTek unit has been credited with dozens of IFR saves. Electrical failures occur without warning in most aircraft. Even if the panel is equipped with a voltmeter, the electrical failure may go undetected until the ship's cold-cranking battery is nearly dead. And the loss of comm is the first indication of trouble.

When AvTek's unit is properly used and charged, the electrical power inside is discharged slowly at a controlled rate by electronic circuit board. This allows the pilot to operate a No. 1 radio with glideslope, HSI, GPS, turn-bank, marker beacon and more for up to one hour or longer.

These units will never be produced again. This is real and so is the deadline.

Interested pilots should contact AvTek at (800) 570-3265. Or e-mail to avtek21@comcast.net.

Pilot Pointers

Bang and Bolter

by Lloyd Roberts - ICS #12514

Bored with touch and go's? Move up to a bang-and-bolter.

As a frustrated fighter pilot wannabe, I always wondered if I could do a no-flare carrier-type landing in my 1959 PA 24-180. One way to find out is to try it!

During one of my flights a few months ago, I went to a low traffic, uncontrolled airport and set up a little longer-than-usual final. It was surprising how hard it is to slow my approach speed below the recommended 78 mph. It is strangely difficult to pull the wheel back steadily, without ballooning too seriously, to work the speed down slowly.

At first try, I might have gotten a little below 75, but I kept at it. By working at it by increments on successive approaches, I finally achieved my target speed of about 65 mph. I was full dirty with high-pitch prop, full flaps, gear down. When I finally achieved a reasonably well-stabilized attitude before touchdown, I sucked it up and let it bang on without a flare.

The nose was high enough that the mains hit first, and I was surprised at the relatively light impact. As a matter of fact, I've flown worse trying to do it at 78 with full flare. On successive flights I practiced this kind of approach, finding the greatest challenge was in getting my speed down to about 65 and stabilized in the approach. I kept my right hand on the throttle, mentally cued to full power at the first sensation of excessive sink or impending stall.

After seeing our president's plane catch the last wire on his carrier approach and hearing his pilot go to full power immediately upon landing, I became curious about doing a bang-and-bolter. I wanted to see how my plane would respond to a bolter as if I had missed the wire.

At my first opportunity, I set things up for a carrier approach at my uncontrolled home field. Only 5,000 feet of the 10,000-foot runway were available due to work on the far end. So I was forced into a mere 5,000-foot length to work with. Gotta get down and off in that short of space, so it was good to have a plan.

As before, I set up a little longer than usual final and got the speed down to about 65. The runway is 100 feet wide so I felt like I was really flying down to the concrete. But I hung in there and banged it on. Immediately after touchdown, I popped the flaps up with my Johnson bar, and pushed the throttle up to full afterburner.

My longstanding habit of raising the flaps immediately after landing to keep glued to the ground just took over and led me to do flaps-up first.

The plane practically leaped off the ground with a very short run. the nose went up rather easily, but not excessively.

I was always careful not to trim out full nose up pressure on final to avoid strong pitch up with full power and increased speed. On these last bangers, I noted a sink rate of about 500 feet per minute on short final, and an almost level attitude.

After three of these, I declared myself to be a carrier-qualified Comanche pilot. Next, I am going to try doing the bolter without first raising the flaps.

A friend of mine has a 1959 Comanche totally apart in his hangar and I have spent some time thoroughly examining parts I've never seen before. One of the things that impressed me most was the size of the main wing spars. To my unpracticed eye, they looked huge! I don't believe I'm going to bend them unless I step up from bangers to full crash mode!

Kansas City

Convention Logo
(Dianne - I don't have a logo????) or is that the right city shot I have for the airport ????)

The Heart of America

From the 2004 Convention Chairman:

The annual ICS Convention site for 2004 is Kansas City Downtown Airport (MKC) Kansas City, Mo. The success of the convention depends upon the hard work and faithfulness of volunteers. I want you to know many members of ICS are working hard to make this convention a success.

Planning for the 2004 convention began as early as October of 2001. During the last 12 months the intensity of the planning has increased and will continue to intensify over the next eight months leading to the convention.

We are looking forward to hosting you in Kansas City. Located in the center of the United States, Kansas City has become the city of choice for those looking for great shopping, cultural, and sporting events. In each of the coming months look for information and pictures featuring the events being planned for your visit including specifics concerning things to see in Kansas City.

Each month this space will feature an article by one of my committee Chairman detailing their area of interest in your ICS Convention.

Our goal is to provide a great time for all of you in Kansas City. September weather is great, the food is always superb, and we welcome you all to come experience the hospitality and entertainment of Kansas City.

Darrell Norris
Chairman

Kansas City is one of the nation's finest treasures. Visitors to this metropolis in America's heartland discover a jazzy city brimming with surprises; a city with a great future forged by a rich historical past. Part of Kansas City's charm lies in its beauty, which includes an impressive network of boulevards, parks and exquisite fountains.

Kansas City is known as the "Heart of America," centrally located within 250 miles of both the geographic and population centers of the nation. The maximum distance from Kansas City to anywhere in the continental United States is approximately 1,900 miles, or half the distance from coast to coast. And once you arrive in Kansas City, there are nearly 25,000 hotel and motel rooms throughout the area that provide a wide range of accommodations to suit any taste and budget.

Though famous for sizzling steaks and mouth-watering barbecue, the city also offers an incredible variety of cuisine. Visitors are delighted by the abundance of excellent restaurants of every ethnic origin. And with over 90 barbecue restaurants to its credit, the city is the nation's barbecue headquarters!

A Little History

Kansas City played a major role in the nation's history as a gateway for pioneers heading West along the Oregon, California and Santa Fe Trails. In the mid-1800s, settlers, missionaries and traders began their overland journeys from several local points. Today, the city's colorful past is highlighted by an interesting mix of museums specializing in subjects such as Jesse James, Harry S. Truman, the Oregon Trail and Hallmark Cards.

For many generations, the land around Kansas City was shared by several Indian tribes, including the Osage, Kansa and Wyandotte. In the early 1800s, trappers and traders began developing the Town of Kansas (later known as Kansas City) on the southern bank of the Missouri River, a short distance from where it joins with the Kansas River.

A few years later, thousands of pioneers would disembark from riverboats at this point to begin their overland journey, passing first

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Convention and Visitors Bureau of Greater Kansas City

The Kansas City Downtown Airport (MKC)

Convention and Visitors Bureau of Greater Kansas City

A trip to Kansas City is a high point on anyone's calendar. Flying your own airplane into one of the most historical airports in the country makes it even better. Flying your Comanche into the same airport and arriving in the company of some 200 other Comanche's, owners, and families has to be one of the most memorable events ever.

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Convention and Visitors Bureau of Greater Kansas City

2004 ICS Convention MaintenanceSuperSeminar

by Karl Hipp - ICS #10241

That's right, It's all one word. MaintenanceSuperSeminar. Because it's all being combined! It will be unlike any maintenance symposium ever held at any ICS Convention or fly-in.

Instead of a bunch of vendors all holed up in one room and seminars going on in various rooms scattered around the hotel, we will have only a few select vendors in a large room showing their wares and conducting the seminar.

This will be a Comanche-specific event. There won't be anyone selling insurance, engine pre-oilers, headsets or batteries. And there will be no seminar rooms. The exhibitors themselves will be taking turns explaining the various maintenance issues we have with our Comanches. There will be hands-on displays of the landing gear components and other system components, such as trim drums, stabilator tubes and fuel strainers, just as examples. There will be maintenance solutions and procedures explained. There will be discussion on items ranging from gear rigging to engine rebuilding tips. We will be using a closed circuit camera and a public address system so that everyone attending can see what is happening on a big screen.

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Kansas City– The Heart of America

Continued from Page 24

through a lively market area, known today as the City Market. Farmers and vendors still offer home-grown, as well as exotic, produce, herbs and flowers in Missouri's largest open-air farmers market. Unique gift and antique shops, popular restaurants and the Arabia Steamboat Museum are also housed in this area.

What You'll Find Today

Downtown Kansas City mixes an exciting blend of old and new. The skyline offers a striking blend of Art Deco buildings and modern skyscrapers. In 1994, the downtown skyline underwent a dramatic transition when four massive steel sculptures were installed on their perches some 200 feet on the H. Roe Bartle Hall, part of the Kansas City Convention Center. The sculptures, "Sky Stations/Pylon Caps," are lighted at night and can be seen for several miles. The sculptures' Art Deco style reflects the adjacent 1930s era buildings.

Located a few blocks south of downtown, Crown Center, a privately financed project of Hallmark Cards, Inc., surrounds the international headquarters of the world's largest greeting card company. This enclosed shopping and entertainment center offers more than 80 shops and restaurants, live theatres, cinemas and two hotels to five million visitors each year. The Hallmark Visitors Center tells the story of the greeting card giant through 14 exhibits. Guests can visit with a press operator demonstrating the process used in greeting card production, push a button to make their own colorful gift bow, watch excerpts from the company's "Hallmark Hall of Fame" television

Convention and Visitors Bureau of Greater Kansas City

Facts About Kansas City

Nicknames:	K.C., City of Fountains, Heart of America
Sister City:	Seville, Spain
Famous Residents:	Thomas Hart Benton (artist), Harry S. Truman (politician), Charlie Parker (jazz musician), Tom Pendergast (politician), Ed Asner (actor), Jean Harlow (actress), Ginger Rogers (actress), Satchel Paige (baseball player), Walt Disney (writer/producer/director) and Mickey Mouse (born in Kansas City under Walt Disney's hand), Calvin Trillin (columnist); George Brett (baseball player); Tom Watson (golfer).
Hometown Headquarters:	Hallmark Cards, Sprint, Farmland Industries, Russell Stover Candies, Yellow Freight Corporation, H&R Block, AMC Theaters, Applebee's International, American Italian Pasta, among others.
Home of:	Harry S. Truman Library (one of eleven presidential libraries in the nation), Linda Hall Library of Technology (one of the largest privately endowed scientific and technical reference libraries in the country), Veterans of Foreign Wars, American Academy of Family Physicians.
Pro Sports:	Kansas City Chiefs Football Club Kansas City Royals Baseball Club Kansas City Wizards Outdoor Soccer Club
Climate in September:	Ave. high temp: 80 Ave. low temp: 60 Ave precip: 4.39 inches

presentations or step through a keyhole into a room filled with giant pencils, brushes, paint tubes and jars. Other Crown Center activities include the American Heartland Theatre, the Coterie Theatre, a children's live performance theater with family programming, ice skating in the winter and outdoor entertainment in the summer. The complex features 29 restaurants.

A little further south is the famous Country Club Plaza, an outdoor center covering 14 square blocks and containing over 180 of the finest stores in the country, as well as dozens of restaurants. With more than 40 fountains, many unique to the world, and over 50 sculpted works of art and exquisite mosaics, the Plaza is often referred to as an "outdoor museum." A walking art tour of these magnificent works is a delightful way to experience the Plaza. The Plaza's Moorish architecture is modeled after Seville, Spain, one of Kansas City's sister cities. Between Thanksgiving and mid-January, the Plaza is illuminated by over 75 miles of colorful holiday lights.

2004 ICS Convention MaintenanceSuperSeminar Continued . . .

This is your chance to get educated about your bird and ask questions about those issues that have been bugging you about your airplane. It's also an opportunity for you to bring along your mechanic, so he can learn the proper maintenance procedures for your airplane, and find out about the problem areas and nuances of our unique aircraft.

Webco, Johnson Aircraft, B&C, and Altus will be our primary exhibitors. And we also plan to have a few other folks, so make your reservations early.

See you at the Maintenance-SuperSeminar!

The Kansas City Downtown Airport (MKC) Continued . . .

Only a handful of major cities on the continent enjoy a bustling general aviation facility adjacent to the downtown business center - Kansas City is one of them. Dedicated by Charles Lindbergh in 1927, Charles B. Wheeler Downtown Airport (MKC) is the city's first airport and still one of its busiest. Originally home to commercial aviation, the airport now attracts a large number of corporate, charter and recreational flyers. MKC nestles up to the Missouri River that separates the State of Missouri from the State of Kansas.

In the shadows of the downtown skyline, up to 700 aircraft per day takeoff or land at the airport – everything from single-engine aircraft to sleek corporate jets. The facility and its control tower are open 24 hours a day and consistently rank highly among private and corporate pilots for their full range of service to general aviation.

Fixed-base operators service nearly 300 based aircraft, as well as itinerant and charter aircraft, offering fuel, full maintenance, aircraft rentals, sales and flight training.

Your arrival into MKC will be one logbook entry to treasure, but it will be only the beginning of five days of activity learning more about your Comanche and enjoying many of Kansas City's great entertainment choices.

If this will be your first trip to Kansas City you will leave knowing why so many people make KC a regular event. It will not be your last trip to KC.

Look for more information about MKC in upcoming issues of the *Flyer*.

Feature

GABY in front of the Air France Concorde.

Twin Comanche is Even Better Than New!

by Joachim Weith - ICS #15101

Last year I bought the Twin Comanche PA 30B "D-GABY," which was located at the Karlsruhe Baden Airport. I was flying this aircraft on a rental base about 50 hours before and knew it quite well. Some months after the acquisition, I decided to prepare GABY for the next 25 years. She was newly painted and together with Markus Eberle and Peter Strobl from the local DLE Luftfahrtservice GmbH, an avionics and maintenance facility located at the Karlsruhe/Baden-Baden Airport, we planned the new avionics for IFR flying.

DLE and especially Marcus Eberle accomplished an extensive refurbishment of the Twin Comanche. DLE Luftfahrtservice GmbH is a wholly owned subsidiary of motorflug baden-baden gmbh.

The avionics, installation and mechanic departments had several discussions with me before and during the refurbishment to better understand my requirements and personal desires. In this way, I was able to participate directly in the development of the new design of my aircraft. Furthermore, I could realize my ideal interior by choosing my favorite colour composition and by deciding what kind of materials, leather and carpets should be used.

Interior before refurbishment.

Newly designed interior.

The protection of existing equipment, wiring and cables was of first concern to DLE after having removed the existing interior, avionics and instrument panel.

Taking into account my requirements and all existing new technology available today, a computer-controlled CAD program was used to design and develop a new instrument panel that was acceptable to me. Precision is what is required when combining the limited space available and the unique requirements of the customer and this can be difficult at times. However the experienced crew of technicians at DLE are at ease with this type of work.

The Twin Comanche after removal of existing interior, panel and avionics devices.

Old panel with avionics removed.

Old air ventilation valve.

Co-pilot side aft before refurbishment.

Manufacturing of new panel.

New air ventilation valve and shoulder harness.

New co-pilot side aft.

Old panel.

New panel.

Old circuit breaker panel.

New circuit breaker panel.

High polished spinners.

"We have performed several panel redesigns and modifications on different aircraft types, such as the Piper Malibu, Cessna 182, Mooney M20F and F260. Based on this experience, we always carry out work with precision and technical expertise," Markus Eberle promised before starting his job. Like every refurbishment DLE first begun with a mock-up of the panel to determine the accuracy of the CAD design. This also allowed to me to get a first-hand view of my new instrument panel and make any last minute changes.

To allow for better passenger control of the cabin temperature, the heating and adjustable air ventilation system was upgraded.

Being a tall pilot can be uncomfortable when flying for extended periods of time. Therefore during this refurbishment the pilot's seat height and shoulder harness placement were modified to meet my personal needs.

Using modern laser technology, both the instrument and pedestal panels were constructed using 3.2 mm thick aluminium coated with Nextel lacquer. The labels and warning signs were then engraved into the panel by the DLE technicians.

With a new S-TEC 60/2 autopilot installed, which includes altitude preselect and GPSS roll adapter, I have no longer to bother with the long manual process of entering flight plans and heading changes; they are all done automatically.

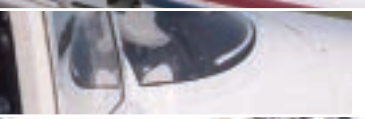
I told DLE that I like the new autopilot system so well I seldom get to touch the newly covered leather steering yokes and "let the autopilot fly." The new panel includes a new MX20 multifunctional display with a high-resolution, 20-foot high terrain warning device.

The highly polished spinners complement the impressive new look of the refurbished Twin Comanche.

Since the aircraft already has a new paint scheme, I am now considering the installation of two new engines with turbochargers for better performance and fuel efficiency, which takes me to my destination in a timelier manner. Yes, that means faster and more fun to fly.

The work was finished after five weeks on May 1, so we could start immediately along the Mont Blanc mountain into a wonderful weekend on the warm Mallorca Island.

The "new" Twin Comanche.



CFF Corner

Pat Wachsman, President - ICS #06061

Goals for the Comanche Flyer Foundation are becoming a reality. The CFF Web page is nearing completion. Web page information is being gathered and will soon be out for viewing. The new CFF brochures tell the story of CFF, Max Conrad and the unbelievable Comanche N110LF. The book, "Into The Wind," a biography of Max Conrad and "110 Let's Fly," covers the life and history of this legendary pilot and plane and is available for interesting reading by the fireside this winter.

The Comanche Flyer Foundation Scholarship Program is going well. The scholarships offered for the year of 2004 are: The Maurice Taylor Scholarship to be awarded in the amount of $2,000. The Cecil Wachsman Memorial Scholarship to be awarded in the amount of $1,500. The Comanche Flyer Foundation Scholarships to be awarded in the amount of $1,500. These scholarships will be awarded to students of Kansas State University, Aeronautical College of Technology in Salina, Kan. The objective of these educational scholarships is to give financial aid to students in the field of General Aviation Maintenance and to assist in training for an FAA Airframe and Powerplant Certificate.

Larry Larkin Comanche Seminar is available to all tribes of the International Comanche Society. A Tribe Chief has only to contact either Mr. Larkin or CFF to schedule these seminars. There is no expense to a Tribe for the seminars as CFF fully funds all expenses incurred by Mr. Larkin. Contact Pat Wachsman, President of CFF for guidelines in hosting a Larry Larkin Comanche Seminar.

Plans are in the mill for another CFI Training Program in the near future. Larry Rackley is working diligently on these plans and information will be available within the next couple months. If you know of a CFI who is interested in this training program, contact Larry Rackley. He will be glad to take their name and talk with you about the program.

Kansas City Here We Come! The Comanche Flyer Foundation is working with the Convention Chairperson in seeing that simulator rides will be available on a first-come, first-serve basis. Be sure to sign up for this ride and for a surprise when you COMPLETE the ride. Plan to attend the ICS Annual Convention hosted by the Mid States Comanche Tribe. CFF still has many goals to meet during the coming year and trustees are working together to meet those goals.

NOTE: The Comanche Flyer Foundation will meet in Oklahoma City on March 6, 2004 along with ICS Spring Board Meeting. The two meetings are planned separately to allow those trustees who also sit on ICS Board to attend both meetings. Details will be available in time for all trustees to schedule their attendance.