

Notice To Members:

Would you like to participate on the CPA Executive Board?
The board is looking for a member to fulfill the duties of CPA Secretary.

If interested contact Bart Jones, CPA President 719 / 488 0653

CPA Members if you have difficulty logging on to the CPA website, please contact Terry Barbo to update your email address and obtain a new password.

Terry Barbo, Membership Records
303 / 367-0670 or TBarbo@comcast.net

Please Send Photos From CPA Activities!

Send photographs, digital photos, prints or slide images with a brief caption describing the image.

FLIGHT LINES Needs Your Stories & Photographs!

Photocopies prints and slides will be returned after digitizing.

Carl and Beverly Boecher, CPA Flight Lines Editors

303 / 697 5161 or N34552@wisptel.net

Jun 17, 2006

**CPA MOUNTAIN FLYING - HIGH ELEVATION
AIRPORT OPERATIONS GROUND SCHOOL**

**Holiday Inn, Centennial Airport (APA), Englewood, CO
8:30 a.m. - 5:00 p.m.**

This course designed to prepare pilots for flight over mountainous terrain and high elevation airports.

**Fee: \$120 for CPA members, \$145 for nonmembers
(inc. course materials).**

Optional flight portion of course may be taken at pilot's discretion, and cost, at a later date. Qualifies for FAA Wings Program and Biennial Flight Review.

**Info: Terry Barbo 303/367-0670, tbarbo@comcast.net or CPA
Website at ColoradoPilots.org**



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March 2006



*The proud new owner of a Commander 112 with daughter and
CPA President Bart Jones and Vice President Sara Dolliver.*

*Congratulations to Rob Melnick and his daughter, Alexandra.
Rob won the AOPA totally refurbished Commander 112!*



www.ColoradoPilots.org

President's Message, by CPA President Bart Jones



Planning a getaway flight in February is always problematic. Nevertheless Mary and I have gotten

away with it over the past several years with great trips to Mexico, the Bahamas, and to Nicaragua. Not so this year. All week we have been anticipating the fun of hiking and exploring Big Bend National Park in west Texas, not to mention the warm temperatures the local folks were reporting. We are supposed to leave in the morning but tonight it is blowing snow and the temperature is headed below zero. I could deal with the cold weather if it would just clear-up but the cold front, and all the arctic air behind it, has moved deep into Texas and covered-up our destina-

tion. Nice try but we will be doing something else for the Presidents Day Weekend.

But all was not lost. We had great fun planning the trip. The maps are all marked up and the flight plan is in the GPS. Over the phone we talked to nice folks at Terlingua Ranch (1E2), our destination. They have an airstrip, lodge and restaurant and helped us arrange ground transportation. They were gracious when we called to cancel and confirmed that this was not the weekend to come down.

So I guess we will just go skiing, darn! We are all packed with everything planned out and we will leave it that way. I bet next weekend will be beautiful and we will try it again. That is the beauty of an airplane. Even if the weather won't cooperate it is always ready to go for the next time. *Bart*

Changes in CPA Membership

New Members

Richard Barclay
24795 Kolstad Loop
Elbert, CO 80106
Mark McGann
4733 Torrance Blvd., #681
Torrance, CA 90503
Russell Moore
13316 Cherry Circle
Thornton, CO 80241
Brian Brent
1340 W. County Rd.64
Ft. Collins, CO 80524
Barton Rose
2367 Shortridge Court
Erie, CO 80516
Doug Weibel
1981 Amethyst Drive
Longmont, CO 80504

New Members Continued

Michael Tobias
3158 E. Hinsdale Ave.
Centennial, CO 80122
David Suckling
1414 Turin Drive
Longmont, CO 80503

Membership Renewals

Tony Garrett Golden
Bill Reeves Salida
Jerry Schofield Castle Rock
Lucile Bledsoe Wray
Dennis Lovold Englewood
Barbara Fey Greenwood Village
Cleon Biter Lyons
Allan Johnson Parker
Paul Stooksbury Ft Collins

Renewals Continued

Rodney Eisenbraun Lakewood
Mark Dahl Johnstown
Milt Gray Elgin, IL
Chris Lechman Centennial
John Underwood Colorado Spgs
Kathleen Bennett Estes Park
Mike Fox Centennial
Frank Hutchins Pagosa Spgs
Stanley Specht Lakewood
Kevin King Longmont
Dan Morse Crested Butte

The Surprise of a Lifetime,

by William Hamilton,
J.D., PhD.

AOPA Executives, President, Phil Boyer and Senior VP, Jeff Meyers award Rob Melnick the AOPA Better-Than-New Commander 112.



CPA members converge to congratulate Rob Melnick.



Responding to a request from AOPA President Phil Boyer, over 50 CPA members were on hand at Centennial Airport's Denver Jet Center on Super Bowl Sunday morning to witness what was for Denver pilot, Robert Melnick, age 50, the surprise of a lifetime. Melnick had been invited by Boyer on that Super Bowl morning to take part in what Melnick thought was to be the video-taping of a segment in a brand-new Project Pilot video designed to be shown world-wide as a means of getting existing pilots to "mentor" pilot wannabes, both young and old, to find a CFI and start learning to fly.

A certain amount of deception was involved in getting a totally unwitting Melnick and his 15-year-old daughter, Alexandra, to come to the Denver Jet Center for the video-taping. While the unsuspecting Robert Melnick was

sitting under the stage lights illuminating Melnick and AOPA President Boyer, AOPA Executive Senior VP, Jeff Meyers, was sitting to one side quietly in radio contact with AOPA Pilot Magazine Associate Editor, Steve Ells. Ells was slowly taxiing the totally refurbished Commander 112 (now worth over \$250,000) up behind the big window separating Melnick from the flight line. When Meyers and Ells had the Commander 112 in position, Phil Boyer steered the "interview" around to ask what Melnick might do if he were to own a Commander 112 in better-than-new condition? While Melnick was thinking of an answer, Phil Boyer suggested he turn around and look at his new airplane. The look of surprise and shock on Melnick's face was, as the TV Ads say, "priceless."

Surprise continued from page 3



AOPA Senior VP, Jeff Meyers presents the Better-Than-New Commander 112 to Rob Melnick

At that moment, Jeff Meyers gave the signal for over 50 cheering CPAers to burst out of hiding from all over the Jet Center. Under a canopy of festive balloons, the CPA celebrants were wearing T-shirts emblazoned with “Congratulations Rob” on the front and with the logo for the Commander Give-a-Way on the back side.

After Robert Melnick had shaken dozens of hands, Boyer, Melnick and the excited crowd of CPAers went out onto the ramp to examine Melnick’s Commander 112. Virtually all of Denver’s TV news stations were on hand to film the “ambush” of Robert Melnick and the festivities that followed. Both Fox 31 weatherman and GA pilot, Chris Dunn, and Channel 9 weatherman and GA pilot, Nick Carter, joined in the fun. All the hoopla provided wonderful media exposure for the CPA. The CPAers

who turned-out were given the sincere thanks of President Boyer, the entire AOPA staff, and the almost 11,000 AOPA members who call Colorado home.

Prior to the event, the CPAers were treated to a breakfast brunch

courtesy of AOPA. The Denver Jet Center did a masterful job hosting the event and putting the Commander in “secret” storage a few days before Super Bowl Sunday. But the secret was almost blown when a Virginia-based AOPA member tracked the give-a-way Commander’s tail number, N112WN, to Denver via an Internet flight-tracking service. Fortunately, the trail went cold and the story died out.

Later on Super Bowl Sunday, Steve Ells, who oversaw the Commander project, took Melnick and his daughter around the pattern. They flew the Commander again the following day. Winning the Commander renewed Alexandra’s yearning to fly. “I can’t think of a better way to spend a weekend than to win an airplane,” she said. So, maybe Super Bowl Sunday morning had something to do with Project Pilot after all.

Story by CPA member, Bill Hamilton, AOPA Central Region Representative for CO, ND,

4 *NE, SD and WY.*

Looking for Abandoned WWII Airfields

by Peggy Long

Flying on a sunny weekend in Colorado is always a treat. However, flying “the pattern” or another ILS approach or another hold over Skipi or Casse or Gill VOR just doesn’t have the bragging rights

that we enjoy when there is an interesting place to see from the air.

That “\$100 hamburger” or breakfast (*Greeley again?*) is always a good excuse to commit aviation but when my instructor, Brown Cabell (a true history buff), suggested looking for abandoned WWII airfields, I was ready, GPS and camera in hand (*along with the credit card for the hamburger*).

During past flights to historical places: Las Vegas, New Mexico to see Fort Union, a cavalry post on the Old Santa Fe Trail. Wagon ruts and Signature Rock on the Oregon Trail can be accessed from Guernsey, Wyoming. Bents Old Fort, a fur-trappers’ trading site is outside of La Junta, Colorado. All are sites visited during our training, historical looksee missions. Of special significance to my instructor is an Army cemetery near Sturgis, South Dakota where he located the grave of his great grandfather’s first wife. His



Runway close-up: Grass that won’t grow in your front yard has invaded the runway to the point the weeds / grass are more than 2’ tall.

great-grandfather was a West Point Academy grad and a classmate of Gen. George “Blackjack” Pershing (*who led the US cavalry fighting Pancho Villa in 1915 and later commanded the American Expeditionary Force in France during WWI*). Finding old posts was the focus of more than one of our historical treks (*aka training missions*).

We had visited the museum at the Pueblo Airport several years ago (*ILS practice*). Pueblo had been a center for B-24 bomber training during WWII and today has a fine museum with many military aircraft on touchable display. La Junta was another site we used for instrument training where the remains of that typical runway configuration – three runways forming a triangle – is clearly visible.

Having found a website describing abandoned and little-known airfields, Brown suggested we use the lat/long

Looking continued on page 6



Triangle field: Numerous airfields were built in the classic triangle pattern. The contrast has been increased in this photo to emphasize the shadow of the runway which continues to be visible from the air.

numbers from the website, plot a course and see if we could find three historic airfields in the La Junta area.

The first field on our tour was the Arlington Auxiliary Army Air Field (AAF) #4. The lat/long coordinates were not exact (*according to our GPS*) but the airfield was quickly spotted a few miles east of where we expected. According to the website this was one of 3 auxiliary airfields used during WWII by the Advanced Flying School at La Junta which conducted multi-engine training in B-25s, AT-17s and UC-78s. In 1944 the Army / Navy Directory of Airfields reported that the Arlington Aux #4 had a 7,000' hard surface runway. It was apparently abandoned by the military after WWII and it is unknown if it was ever used for

civilian aviation after the war.

On a 1944 Denver Sectional the airfield is labeled No.4 LF, east/southeast of the town of Arlington. A 1971 Wichita Sectional depicts it as abandoned, and it is no longer on current sectionals. It is located north of County Highway E, 3 miles from the town of Arlington.

Our second target was the Las Animas Auxiliary AAF #2. The site was depicted on a 1936 sectional and was probably a civil airfield in 1934. The field is still visible from the air approximately 10 NM south of first Arlington Aux #4.

While flying past the La Junta Airport, and noting that same airfield design, we asked UNICOM for a little assistance with finding (*If in the area, be sure to drop in*

say hello and purchase a few gallons of fuel!) the last airfield, Rocky Ford Auxiliary AAF #1.

This airfield was built by the government during WWII and did not exit as a prewar airfield. The area consisted of 1,560 acres and is much larger than the typical WWII training airfield. It was used for the training of heavy bombers. Each of the three asphalt / concrete runways were 6,300 feet long. There was also a control building and a maintenance shed, although remains can't be seen from the air.

Having completed our mission we set a heading for COS with that hamburger in mind. Parking at the Jet Center we walked a few blocks to a restaurant built around an old KC-97. And *THAT* is another story. www.members.tripod.com/airfields_freeman is the website listing abandoned airfields by state (*there is an underscore between 'airfields' and 'freeman'*). Select COLORADO and then Eastern Colorado. There are 4 airfields listed. We were looking for the WWII vintage fields where crews trained before flying off to war.

Peggy

March 2006 Factoid Question:

Igor Sikorsky is commonly viewed as the father of rotary wing flight. From his efforts in 1941 there has been continuous development, with ever more sophisticated craft employed in an ever-expanding scope of uses. Indeed, his contribution was so important that many consider him the inventor of the helicopter — but that is not quite true.

Like most brilliant minds, Sikorsky built on the work and ideas of others before him. What are some of the early developments in rotary wing flight? When and where did they occur?

To find the answer see Page14.

“Concerning Learning”

FREE LUNCH and possible **FREE 1 YEAR MEMBERSHIP**

Do you have a flying story with a lesson?

Tell it to interviewer Dean Jaros over lunch or a late afternoon drink. (Dean picks up the tab)

If the story is accepted for publication in *CPA Flight Lines*, your membership in CPA will be extended and free for one year.

E-mail Dean at jarosd@digis.net or call him 970 686-1233

Expect the Unexpected © 2005 Dean Jaros

Concerning Learning by George Meshko as told to Dean Jaros

Flying in the early 1950s was very different from today. At Frontier Airlines (the old, original Frontier), we operated DC-3s, while anxiously waiting for delivery of the huge, ultra-modern Convair 340s. Many of our trips were very “local” — for example, some flights from Denver to Grand Junction stopped at Colorado Springs, Pueblo, Gunnison, and Montrose.

We flew low on the short Colorado Springs-Pueblo leg, we would rarely exceed 1,000 ft. AGL. Crossing the continental divide on a warm day with a full load, we would top-out with even less clearance of terrain.

The DC-3 was not very sophisticated either mechanically or in terms of avionics. But it was a tough old bird and could keep flying in almost any conditions and in spite of any imaginable problem.

But what it took to be a safe pilot then is similar to what it takes to be a safe pilot today. The necessary skills, attitudes, and instincts — all honed by experience — are the same. Perhaps the single best timeless cockpit principle is “Expect the unexpected.”

One fine morning we were returning to Denver from Grand Junction, climbing east of the Black Canyon near Cerro Summit. As we flew low across a ridge-line, we heard a loud “clang” from the aluminum floor-

boards. As the flight attendant often whacked plastic bags of ice on the floor to separate the partially fused cubes, we were not concerned. But as we turned, we saw that she was at the back of the cabin serving coffee. No ice in sight. We no longer had an explanation for the noise. We immediately went on “red alert.”

By now it was downhill to Denver. With every neuron at maximum sensitivity, we continued, expecting an emergency at any moment. No emergency developed and we taxied to the gate without incident. My co-pilot and I, with some anxiety, walked around the plane. We saw nothing unusual. Apparently there was no reason for concern. But we nonetheless turned the plane over to the A&Ps along with our report.

Later, I was called back to the maintenance hangar where I found an anxious group of company executives, CAA (pre-FAA) personnel, local cops, and FBI agents. They pointed-out a little, inconspicuous hole in the fuselage right below the pilot’s seat. The floor-board between the seats had a distinct upward dent. But exhibit “A” was a spent 30-06 rifle bullet. Someone on that ridge near Cerro Summit had shot at us! The bullet had actually grazed the elevator control cable and it had missed the fuel tank selector valve by less than an inch.

Although the flight had ended safely, I was really glad that we had gone on “red alert.” The story of this case is that you can’t get much closer to an emergency without actually having one. It is always better to expect an emergency that doesn’t happen than to have an emergency that one doesn’t expect. We had come within an ace of really needing that readiness. The shooter was never identified.

Not long after this adventure, I had a night flight Denver to Lincoln NE with a stop at Sterling CO. I did my usual pre-flight walk around; the DC-3, just out of regular inspection, looked perfect. On take-off, however, I sensed something was wrong. I could not easily describe my concern; it was more of a feeling that comes with long experience in a particular type of plane. The landing at Sterling was perfectly normal, but I had a sense of tail-heaviness and a little sluggishness in roll. It had been a full flight — maybe there had been a slight mistake in weight and balance. But our calculations looked right. Several passengers had deplaned, so we were much lighter out of Sterling. But my feelings that something was not right persisted.

At Lincoln, maintenance could find nothing wrong. At my insistence, they did some fairly exotic (for the day) tests, including attaching

temporary turbulence strips to the ailerons. I test-flew the old bird several times, but I still knew that something was wrong.

Eventually, we received a very concerned telephone call from Denver maintenance. For the last several months, whenever a DC-3 was in for regular inspection, A&Ps installed a new type of wing-root fairing. The original large, swooping, fillet was replaced with a style that was fastened much closer to both the wing and the fuselage. An aileron-to-wing gap cover was also attached. These reduced drag and improved performance. Maintenance, it now seemed, had an extra new fairing in the hangar. Perhaps it should be on my plane. Would I be so kind as to go and look?

One thing is sure: on the right side, I had a new fairing; on the left, I had the original fairing. The airplane was asymmetrical! On my pre-flight walk-around, I had failed to see this. The left side had looked normal; the right side looked normal. And in fact taken one at a time, they were normal. But taken together, they were not. One does not expect to be handed an asymmetrical airplane, especially fresh out of maintenance. But I had failed to expect the unexpected. Fortunately, nothing bad happened, but my embarrassment helped drive home an important lesson.

Dean

This Part of WWII Aviation History Is Not Well Known

by Vern Foster

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When Pearl Harbor was bombed Dec. 7, 1941 the number of U.S. military pilots totaled only about 1,000. President Franklin Roosevelt and the military brass estimated the need to be at or near 500,000 pilots.

What to do and do it quickly?

Some 65 aviation people in the business at the time or associated with it in some way were assembled each to set up a civilian primary flight school for beginning cadets. Most of the capable people were financially challenged. Thus the Government acquired land; and airports with runways & hangars grew out of the ground overnight. There were approximately 60 - 65 of these operations beginning in Georgia and swinging around the south thru Texas, Ark, OK, AZ, CA Oregon, Washington and others.

The civilian operators then hired all civilians for mechanics, fuelers, flight instructors etc. Each training base would have about 120 aircraft and 90 - 100 flight instructors and check pilots. A military commanding officer and 2 or 3 military check pilots rounded out the flight people.

The flight instructor group was widely diverse from young guys with 200 - 250 total hours — I was one of those — older men corporate pilots, old barnstormers and crop dusters from the southern states — the whole list. Everyone had to go thru standardization training before starting to instruct.

Air Transport Command

A similar situation was at hand. The military contracted with various airlines to furnish the flight crews and mechanics while Uncle Sam furnished the airplanes, fuel, parts, etc. Most planes were new Douglas C-54, long range four engine transports. United operated 25 airplanes on the Trans Pacific Route with 150 pilots — all volunteers. TWA and American had similar contracts across the Atlantic in 1944. I was a new UAL co-pilot flying DC-3s out of Chicago to Denver, New York and Boston. In November I put my name in the box as a volunteer for 12 months, and was selected. Thus the rest of the story is told in the last few “Flying In The Real World” articles provided in future issues of CPA *Flight Lines*.

Vern



I just bought my second plane since January of 1990 a Cessna 185 - Skywagon.

Almost every pilot wants to be an aircraft owner but only a few get the opportunity. Is the time right for you? The timing could be right because there are lots of planes on the market — I’ve even heard it’s called a buyers market!

A word of caution is once you get into the buying mode you need to have patience and slow down.

There will be a lot of planes on the market to review, are these the ones you are really looking for? Then there are those aircraft owners who are thinking of selling their “Baby” after many satisfying years of ownership — how do you find these planes? Remember, patience will be your asset as you sort through a lot of junk out there that someone wants to get away from. These are the ones you need to probably stay away from.

Here is my story on how I found my second “Baby”.

I had a plane to sell and I will tell you about selling in a follow on article. Financially I needed to sell before buying, but I didn’t want to miss the good one if it was out there and available to buy! So I started doing my homework on my requirements: style, range, capacity, equipment, condition,

How to Find Your Baby!

by Ed Huber

and so on. Then I started eliminating most planes and really settled down to two different models to meet my flying requirements for the next several years. I kept reminding myself that I wanted to buy the right plane the first time — minimize the mistakes and be able to look back and say that I wouldn’t do it differently. Don’t forget insurance early in your buying process. Make sure you can get reasonable insurance for the plane you want to buy. Ask owners with the same model of plane who they are insured with? Warning: once you go with one insurance broker, they will shop the market and another broker will not work with you. However, there is one exception, AVEMCO does not use brokers and will deal directly with you. So get two quotes for comparison: a broker and AVEMCO.

I started looking at the market (magazines but especially websites) to determine the price ranges — I did this for almost a year. Remember, all sellers are very proud of their planes and avionics depreciate quickly so don’t pay their asking price. After watching the market you will soon get the feel for the asking prices even though they are inflated and you will never know the actual selling price. There are two evaluation websites that I used to help with determining the cost of planes. However, these can

Finding continued on page 12

only be used as guides and not what you should pay for the plane. I used these evaluation services for comparisons between the planes of the same model and year, but with different equipment. AOPA:

<http://www.aopa.org/members/vref/default.cfm>

TAP: <http://www.trade-a-plane.com/protected/static/naaa.html>

To find the plane you are looking for; perform a search on the Internet: aircraft for sale, Cessna for sale, C-182 for sale, Piper for sale, Cub for sale and so on – you get the idea. I bought a subscription for Trade-A-Plane (TAP) during one of their specials – two-years for \$24.95. I received one paper copy of TAP each month but usually never opened it. However, this subscription gave me a login and password to use their website which I was on almost every day. Each aircraft for sale has a short summary: year, price, times, location, and brief description. For those real serious sellers, they pay an additional fee and have a more detailed listing: photos and expanded description. Many listing have an e-mail address to make it easier to communicate with the seller. Additionally, here are some websites I found useful.

- Tradeaplane.com (you need to be a subscriber and highly recommended for serious buyers)
- Controller.com
- Barnstormers.com
- AOPA.org (aviation classified page)
- Aviatorsales.com

Also there are clubs for specific aircraft models that have websites with classified ads. Usually clubs will have private owners trying to sell their planes. I ended up being able to use a club discussion group to send the following message: I just sold my plane, have cash and ready to buy. I received six responses in 2-hours – two I had already seen advertised on the market, two were junk (lots of airframe and engine time, and damage history), and two were interesting. I ended up buying one of the two interesting ones.

Now that I found my “Baby”, I needed to test fly it for engine performance and flight characteristic to include slow flight, stalls and landings. Next I wanted to develop a checklist to reduce the possibility of disputes or disagreement over purchasing the plane between the seller and myself. My previous homework had me looking for any publication/article on selling/buying. If you are not a member of AOPA then you should be because they have an excellent website. Go to their home page AOPA.org, then go to the Members Section and find the Information Resources list on the right side of the page, and click on Aircraft and Equipment Reviews. Here you will find articles on particular aircraft and equipment to help you in your decision-making. You will also find: Aircraft Ownership, Tips on Buying Used Aircraft and many other useful articles.

I bought my first plane on a handshake but times have changed. Use some form of sales contract (AOPA has one on their website that you can modify to your needs) and put a deposit down to hold the plane. List the requirement required for the sale to be complete. For example: satisfactory pre-buy inspection (anything found would be fixed at the owner’s expense, satisfactory logbooks, and title search. One additional item to consider is that your pre-buy inspection will cover about 60% of the annual. So if the next annual inspection is only a few months away and you already have the plane opened up, then ask the owner to accomplish the rest of the annual (anything found in the annual is fixed at the owner’s expense).

Pre-buy inspection: Have a thorough pre-buy inspection done by a competent mechanic — very familiar with the model. That way he will know what to look for. The mechanic should have NEVER worked on this particular N-number. Don’t do a pre-buy unless you are really excited about the plane – because you are going to spend some money. Most inspections will cost \$500-\$1000 – don’t cut corners to save money here. Get a written report of the findings – good and bad. Some items to have on the pre-buy checklist:

- Hours: airframe and since last inspection
- Look for corrosion
- Engine condition: total and overhaul

time to include accessories, hoses, clamps, and compression

- Engine appearance: oil leaks, cleanliness, and cowl condition
- Prop: total and overhaul times, condition of surface and finish, bulletin compliance

Check logbook: AD compliance, last annual, IFR check, ELT battery, repairs especially those resulting from accidents, modifications and supporting STC and 337

Exterior: look for damage/repairs, paint condition, open all inspection panels, loose rivets, missing fasteners, cracks, working condition of all cabin and storage doors, glass condition
Interior: appearance/condition, seat rails, flight manual, airworthiness certificate, W&B, equipment list,

- Instrument, Comm and Nav equipment: Flight check to make sure they all work
- Additional items: ask an owner of the same model what additional items to check

Obtain a title search from the FAA, or pay \$99 for AOPA to do a title search (present registered owner), mortgage holder or lien holder, and request all the FAA records and 337s).

Don’t forget a final flight check before you hand over the money. I can guarantee that if you do your homework, you will find your “BABY” and during the flight home you will have a big smile of happiness on your face. Good luck and happy flying!

Ed

March 2006 Factoid Answer:

While it was the idea of a flapping wing that underlay the first dreams of human flight, the notion of rotary lift was not far behind. Indeed, both ancient myth and early scientific speculation focused on how to imitate birds. The classical Greek story of Icarus and Leonardo da Vinci's 15th century drawing of an ornithopter are good examples.

Paper Model Kit of Leonardo Da Vinci's Aerial Screw Model and Kit Design by Ed Schulman

This one of the most accurate paper scale model kits of the **Leonardo Da Vinci Aerial Screw** available in the world today. Of course "most accurate" is a relative term that may have little meaning in this case. First, this series of kits, produced for **The Light In Winter Festival 2005**, is the only paper model kit of the Aerial Screw known to exist. Secondly, Da Vinci's Aerial Screw was never actually built and its essence resides in a single rough sketch accompanied by a set of notes that would make a minimalist proud.

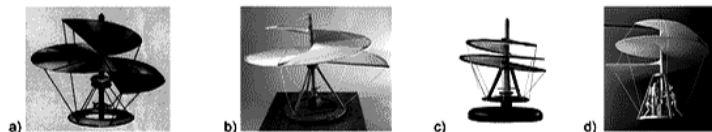
So what is an Aerial Screw? In short, the Aerial Screw is a flying machine designed in 1483! People power is used to turn a capstan, which turns a mast, which turns a spiral shaped cloth propeller, which in turn, enables the whole thing to screw itself into the sky.



"...I have discovered that a screw-shaped device such as this, if it is wellmade from starched linen, will rise in the air if turned quickly..."
Leonardo Da Vinci - Codice Atlantico

Leonardo Da Vinci's sketch at the National Museum of Science and Technology in Milan, Italy
(<http://www.museoscienza.org/english/leonardo/vite.html>)

Given the above, any implementation of the Aerial Screw must be a designer's interpretation of what Da Vinci may have had in mind. During my research, I have found four images on the World Wide Web of, what I believe to be, significant interpretive models of the Aerial Screw, see photos below. Although all are similar in color(monochromatic) and obviously originating from Da Vinci's sketch, each one is different in its overall look, its level of detail, its propulsion technique, its screw configuration, and its method of supporting the screw material.



- a) Helicopter History Site (<http://www.helis.com/pioneers/>)
- b) Unknown source
- c) The Imagination Factory (<http://www.davincistore.com/screw.html>) -An excellent wood and cloth kit
- d) IBM Museum Archive Exhibits (<http://www-03.ibm.com/ibm/history/exhibits/attic3/images/174.jpg>)

In my interpretation, I have included three methods of propulsion: the direct capstan drive, the capstan winding a spring (hidden), and a cable coil to be rapidly unwound by persons on the ground (like a string-started spinning top). Oh yes, I have also added COLOR!

The Da Vinci Aerial Screw sketch shows why he is known as a great inventor, artist, and genius. It is just one of his series of invento-studies examining the mechanics of flight (as (un)known in 1483). Da Vinci's research and the creative fusing of his knowledge of man and technology (bird in this case), are at the root of the modern day implementations of the parachute, hang glider, and the helicopter. Aeronautical experts agree that the Aerial Screw, if ever built, would never fly. I am sure that Da Vinci realized that people pushing a capstan to turn the cloth screw while they were actually on the "aircraft" itself would either not be powerful enough, or, its spinning would fling them off the platform. This assumption is backed by a reference in his notes that mentions that winding a spring mechanism may be more appropriate. Ironically, he also suggests building a paper model to try out the idea. His genius is in developing the concept, not the implementation - the Aerial Screw's air compression theory (to obtain lift via a spinning screw shape), and even its looks, establish it as the forerunner of today's helicopter.

1/28/06
Ed Schulman
ed@edshulman.com
© 2006 www.aercreations.net-designers.com

Leonardo da Vinci's original drawing of an "Aerial Screw," c. 1490. Image Museo Nazionale della Scienze e della Tecnologia, Milano.

But it is also true that the spiral action of seeds falling from trees (e.g., sycamore or maple) inspired those who dreamed of flight eons ago.

In fourth century AD China, for example, there were toys with rotating blades. Not surprisingly, fables about human rotary flight developed in the same place at the same time. Moreover, Leonardo's second great flying machine idea was an "aerial screw" design. Though by no means a practical helicopter, the idea behind the "screw" was rotary lift.

While operational whirling toys have been widely available for the last 1600 years, practical applications were slow to develop. Sir George Cayley, the British aeronautical pioneer, dabbled in moving as well as fixed wings and a model of one of his rotary designs reportedly flew in 1843.

Early in the 20th century there were a number of actual attempts at person-carrying rotary flight. In 1907 the Breguet brothers' helicopter may have risen about two inches above French soil. Paul Cornu, another Frenchman, may have achieved a rotary flight of about 20 seconds at about the same time. During World War I, there was some interest in helicopters as potential replacements for observation balloons. Although there may have been some short helicopter flights in England, Germany and Hungary, development was minimal and all projects were cancelled with the end of the war.

In the interwar period, rotary wing interest shifted to the autogyro. This type of airplane, the brain-child of Juan de la Cierva, first achieved controlled flight in 1923. Cierva had been Spain's most successful designer of conventional fixed-wing aircraft, but after witnessing a stall-spin crash, he began a quest for better low-speed capability. Inspired by a rubber powered whirling toy (shades of 4th. Century China!) he hit on the idea of the autogyro.

Cierva's craft featured a large rotor. But unlike a helicopter, the rotor was not powered. Rotation was caused by the forward motion of the autogyro, which in turn was supplied by a nose-mounted aircraft engine driving a conventional propeller. In general, Cierva achieved his goals. The autogyro could fly very slowly and it could land in a much shorter distance than comparable fixed wing airplanes. Moreover, the autogyro would not stall. In a low-speed, high angle of attack configuration, it would descend relatively slowly in autorotation.

Perhaps Cierva's most brilliant engineering accomplishment was the equalization of rotary wing lift. At any point during flight, some of the rotor blades will be "advancing," that is traveling in the same direction as the aircraft is moving. At the same time, other blades will be "retreating," moving rearward

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with respect to the airframe. Everything else being equal, advancing and retreating blades will produce different quantities of lift. To defeat this asymmetry, Cierva “hinged” the rotor blades so that advancing and retreating blades could assume different angles of attack. This equalized the lift and for the first time made stable rotary wing flight possible. This invention was



Pitcairn autogyro, c. 1931. Photo Melissa D. Scruggs collection.

crucial not only to the 1920s invention of the autogyro, but also to the production of practical helicopters in the decades to come.

Development of the autogyro, funded almost entirely by Cierva himself, proceeded slowly. There were a number of inherent problems. For example, in order to avoid a long

take-off run, it was necessary to “spin up” the rotor while the autogyro was still stationary. This was initially accomplished by an auxiliary ground power unit, an awkward arrangement at best. In 1931, American Harold Pitcairn, who held US licenses for Cierva’s inventions, devised a clutch and shaft mechanism to use the autogyro’s own engine for spin-up. Eventually, self-powered spin-ups led to near vertical take offs and by 1932 the autogyro was from a technical standpoint quite practical.

The market for autogyros, however, was limited. The Cierva C 30 was the most successful production model with some 180 copies made during the 1930s. Some 51 Pitcairn PA 18s were built in the US along with about 20 Pitcairn-Cierva PCA 2 models. Autogyros enjoyed some popularity as personal airplanes. Also, several newspapers used them as photo platforms and otherwise as the precursors of the news copters of today. Some operated from “airports” atop newspaper office buildings.

There was some hope that autogyros would be used in military observation roles and as anti-submarine patrol craft. But in these as well as other potential uses, the autogyro was ultimately trumped by the helicopter. Development of the copter was not that far behind. The first sustained flight of a copter, the Breguet-Dorand 314, occurred in 1934. The hugely successful Sikorsky program was just a few years away. Helicopters had many advantages, the most obvious the ability to hover and to land out of a true vertical descent.

Sikorsky’s brilliant innovations in helicopter design sealed the fate of the autogyro. The potential military uses of the copter were obvious by 1941, and the US Army wisely sent development funds to Sikorsky’s company. The historical trend has not changed since.

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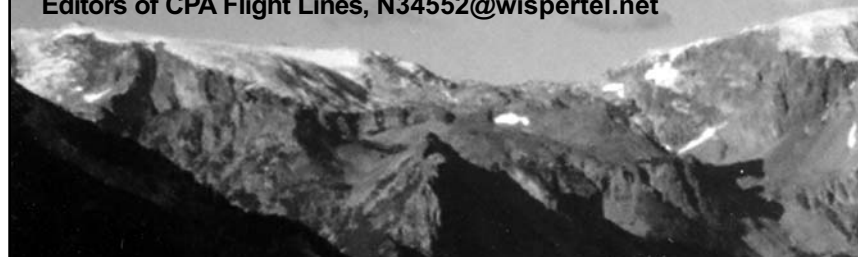
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