Rotors! Now That’s Flying
by Rick Gilley
Rotorcraft Editor

This month’s issue of Rotorcraft is my first in about two years and it is good to be back.

As always the transition from one editor to another has been slower and more difficult than we expected. By the time the next issue of Rotorcraft hits your inbox it should be all worked out.

I would like to thank former editor Paul Plack for working so hard for us to make this transition as painless as possible. Paul’s dedication to the PRA and our sport over the last few years has indeed been a benefit to us all.

In case you missed it this years PRA convention was the biggest and best we have seen in many years. As a result of that we have a backlog of great photos we will share with you over the next few issues.

Next years celebration of our 50th anniversary promises to be even better so start making plans now to make it our biggest ever!

Have Fun and Fly Safe
Rick
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Event Calendar

2012
Bensen Days (PRA) (R)
Apr 4-8, Wauchula, FL (Info)
Wauchula Municipal (KCHN)

CRA (PRA 38) Fly-In (R)
Meadow Lake Airport (KFLY)
May 19 (Info)

Rotors Over The Rockies (R)
UT Rotorcraft Assoc. (URA)
Jun 7-9, Brigham, UT (Info)

EAA AirVenture (G) (Info)
Wittman Regional (KOSH)
Oshkosh WI, Jul 23-29

PRA Annual Conv. (PRA) (R)
PRA Mentone Airport (C92)
Mentone, IN, Jul 31 - Aug 4

Members Showcase

In this months Members Showcase we have PRA’s official Chaplain Dewey Young. We first met Dewey several years ago when he was a Gyro “Wanna-Be” serving in Iraq. As you can see Dewey has come a long way since those days. The second photo is Dewey’s ever present sidekick and mentor Mr. Wayne Hubbs who appears to be “Flying to the Moon”
When I first met Paul, I was amazed. He would accomplish tasks that to most were impossible. Paul's skill level in his trade and experience in fabrication gave him the vision to make from scratch, any aircraft part he desired. A few of the many of his accomplishments include custom, flush rivet rotor blades with the coning angle built into the attachment blocks, rotor head, flexible cable pre-rotor, carb heat box, engine mount, instrument panel, frame attachment blocks, the list is endless.

Paul fabricated a B-7 gyrocopter from plans. (The B-7 is all round tube for your new folks.)

Not only could he build, Paul taught himself to fly using the completed gyro in towed flight and progressed to power flight with his custom-built VW engine. There were no flight instructors in the 1960's. He just did it!

I flew with Paul for years or should I say I flew far behind him. He would arrive at the next grass strip 10 minutes before me, come back to find me and show me new airports.

Paul's average cruise speed was 85-90 MPH - WOW! My 72 HP, B-80 wasn't even close in speed. It didn't matter, we just had fun and I learned al lot from being with him. Thank you, Paul!

A very good friend, mentor and just an all around great guy. I will miss his pleasant voice. I would say, "That can't be done". Paul would say, "Sure it can, watch".

by Michael McKiernan
PRA# 15232
Gyroplane CFIs
The following instructors are PRA members. This list is provided as a convenience for readers, and does not constitute an endorsement of any instructor, aircraft, syllabus or training enterprise by PRA. (Aircraft listed in parentheses are available for instruction.)

Arkansas
Ron Menzie (501) 766-6456
2715 S Main St
Searcy, AR 72143
(SparrowHawk, Parsons, RAF)

Arizona
Terry Brandt (602) 739-0554
11423 W Citrus Grove
Avondale, AZ 85392

Florida
Dofin Fritts (850) 587-2504
Brewton Muni Airport AL 12J
Pensacola, FL
(251) 867-9446

Robert Martian (772) 546-7335
8011 SE Helen Terrace
Hobe Sound, FL 33455
(Marchetti)

Glen Garrick (386) 479-4838
635 Forest Lane
Deland, FL 32724 (RAF)

Georgia
Steve McGowan (478) 461-1451
2725 Herbert Small Airport Rd
Macon, GA 31217
(SparrowHawk, Parsons)

Illinois
Don Randle (217) 414-0108
513 South 6th St.
Petersburg, IL 62675

Chuck Roberg (630) 983-7625
614 Bunker Hill Ct
Naperville, IL 60540

Indiana
Gary Goldsberry (317) 996-2487
1181 W SR 42
Mooresville, IN 46158
(Twinstarr)

Silas Smith (219) 374-4604
11709 W 117th St
Cedar Lake, IN 46303
(Marchetti)

John Snider (812) 890-8257
10000 S Horrall Rd
Vincennes, IN 47591 (RAF)

The Flying Pogos

There was considerable interest in vertical takeoff & landing (VTOL) aircraft following World War II, resulting in a staggering range of different designs, not all them inspiring much confidence. One of the more dubious approaches to VTOL in that era was the "pogo" or "tailsitter", an aircraft that would take off and land standing on its tail. Following up on unbuilt concepts proposed by the Germans during the war, both the Americans and French built pogo demonstrators, with both deciding it wasn't a good idea. This document provides a short history of the flying pogos.

The idea of the "flying pogo" -- an aircraft that took off and landed standing vertically on its tail -- goes back to World War II at least. As the war tilted ever more painfully against the Nazis, the Germans found the skies over the Reich increasingly dominated by Allied air power,
with airfields bombed and shot up on a regular basis. Obviously, it might be nice to have combat aircraft that could take off and land anywhere.

In late 1944, Heinkel engineers working in Vienna drew up a design for the "Wespe (Wasp)", a pogo interceptor with a length of 6.2 meters (20 feet 4 inches), a tripod tail arrangement with wheels on the tips of the fins, and a "annular" (ring) wing with small auxiliary flat wing stubs and the prop rotating inside the wing. The Wespe was to be powered by the Heinkel S021 turboprop, a derivative of the Heinkel S011 turbojet, and was to be armed with twin MK 108 30 millimeter cannon. Top speed was estimated at almost 800 KPH (500 MPH).

The Wespe was a lost cause from the outset: the He S011 turbojet never reached production, and as it would be learned later, getting turboprops to work was not as easy as jet engine pioneers assumed early on. In early 1945, work moved on to a new design, the "Lerche (Skylark)", which had the same armament and general configuration as the Wespe but was instead powered by twin Daimler-Benz DB605D water-cooled inline vee engines mounted in tandem in the fuselage and driving contra-rotating props inside the annular wing.

Another difference from the Wespe was that the pilot lay prone in the Lerche instead of sitting in a seat -- which meant the pilot stood straight up when taking off or landing, allowing him to look down and around more easily. The Lerche was also somewhat bigger, with a length of 9.4 meters (30 feet 10 inches) but could still attain 800 KPH (500 MPH), at least on paper. The design of the Lerche reached the point where a prototype could have been built, but given the desperation of the German Reich’s circumstances in the spring of 1945, there was no way it could have happened.

The Wespe and Lerche were imaginative, but they were still not quite in the same league as another pogo concept developed by the Focke-Wulf company, the "Triebfluegel (Powered Wing)". The Triebfluegel featured three straight wings mounted on a rotating ring in the aircraft's midsection, Continued
with each wing tipped by a Pabst ramjet; various booster schemes were considered to get the rotating wing up to speed so the ramjets would start. The pilot could rotate the wings so that the ramjets were pointed almost level to the plane of rotation of the wings, in principle allowing the aircraft to hover, or pivot the ramjets forward to provide thrust for forward flight.

Focke-Wulf began development of the Triebflügel in September 1944. Projected speed was 1,000 KPH (620 MPH), with a rate of climb of 7,620 meters (25,000 feet) per minute, and the aircraft was to have been armed with two MG 151 20 millimeter cannon and two MK 103 30 millimeter cannon. A wind tunnel model and the ramjets were tested, but no Triebflügel prototype was ever completed. It is something of a pity that it was never built, not because it seems to have been a bright idea -- it more suggests the inclination of German engineering to be too clever for its own good -- but because it leaves the question unanswered as to whether it could have ever actually been made to work.

The Germans never had a chance to prove the pogo concept, but in the postwar period, work continued on the idea. The US Navy became interested in the concept of operating aircraft off of small vessels instead of aircraft carriers, and in 1950 the service began a competition to obtain VTOL demonstrators to evaluate the concept. Convair, Goodyear, Lockheed, Martin, and Northrop all submitted designs; two finalists were selected to build prototypes, with Lockheed to provide the "XFV-1", and Convair to provide the "XFY-1".

The Lockheed XFV-1 was the first to take to the air. It was a cigar-shaped aircraft with straight, tapered wings, plus an "X" arrangement tail, the four tailfins being at 45 degree
angles relative to the wings, with small wheels on each of the four tailfins. It was powered by an Allison T40 turboprop, which was a "twinpack" engine consisting of two T38 turboprop engines coupled together to drive a Curtiss Electric contra-rotating propeller system, featuring three paddle blades on each of the two prop stages. The pilot sat on an ejection seat that could tilt forward to provide a better view in vertical takeoffs and landings. Control in vertical flight was by the control surfaces on the tailfin; the 45-degree configuration was to prevent the tailfins from being aerodynamically masked by the wings. The aircraft was nicknamed the "Salmon" after Lockheed test pilot Herman Salmon.

The demonstrator was not armed; planned armament consisted of a pod on each wingtip with twin 20 millimeter cannon, for a total of four cannon. It appears the unusual wingtip armament scheme was driven by the impracticality of developing synchronizing gear to allow the cannon to fire through the contra-rotating prop assembly. Wingtip pods carrying a total of 48 unguided rockets were also considered as alternate armament. A special trolley was developed to allow the Salmon to be carted around on the ground. The trolley could set the aircraft to the vertical position for a takeoff and then, mission complete, tilt it back on the level again.

However, for test flights the XFV-1 was fitted with fixed landing gear for conventional horizontal takeoffs, since nobody thought it wise to try to take off and land vertically until the aircraft had been thoroughly evaluated. Besides, the aircraft's XT40-A-6 engine, which provided 4,365 kW (5,850 SHP) takeoff power, didn't provide enough power to support the weight of the XFV-1 in straight-up flight. The intent was to later update the aircraft to the XT40-A-16 variant, with 5,090 kW (6,825 SHP), for full flight tests.

Initial flight was in March 1954, with a total of 27 flights performed in that year.

Continued
By the fall of 1954, the Salmon was performing horizontal-to-vertical transitions in flight and the reverse at altitudes above about 300 meters (1,000 feet). The transitions could be performed, but once the XFV-1 was flying vertically it was almost impossible to control, tending to stagger around drunkenly while the pilot barely knew if he was rising or falling; a radar altimeter could have helped determine altitude, but it was difficult to make one of sufficient accuracy and light weight. The reliability of the T-40 engine system and the electrically-actuated contraprop system also left something to be desired.

Lockheed's Clarence "Kelly" Johnson had been enthusiastic about the pogo concept at first, but gradually came to see it as a bad notion, calling it "the only airplane we ever built which we were afraid to fly ourselves in the final tests." More engine power would have done little to address the controllability issues, and the thought of landing such an aircraft on a ship on the open seas was clearly absurd. Nobody ever tried to take off or land vertically in the XFV-1.

The Convair XFY-1 was also powered by the XT40-A-16 twinnpack engine and had a contrarotating prop with three blades on each stage. It had a distinctly different configuration, with delta wings and both dorsal and ventral tailfins, with small caster wheels sticking out from the ends. As in the XFV-1, the Convair's pilot seat could tilt forward, and armament was to be four 20 millimeter cannon or 48 unguided rockets in wingtip pods.

A special trolley was built to haul the XFY-1 around. The ventral tailfin was trimmed at the tip, apparently to ease ground handling; it could also in principle be jettisoned to permit a belly landing. However, the ventral fin meant that the XFY-1 couldn't take off horizontally as a normal practice, and so the test flights had to feature vertical takeoffs and landings from the beginning. That was seen as risky, so initial test flights were performed on a tether winched from the roof of the huge blimp hangar at Moffett Field in the San Francisco Bay Area. These initial tethered flights, performed by test pilot
James F. "Skeets" Coleman, began in April 1954. The blimp shed was far from an optimum trials environment, since the confined downwash created turbulence and kicked up dust and debris; noise levels were deafening as well. If Coleman became insecure, he could cut the engine and tell the winch operator: "Catch me!"

Happily, Coleman didn't kill himself, and he made the first free flight -- a hop up and back down again -- on 1 August 1954. After extending the envelope, on 2 November 1954 Coleman performed what has been described as the first VTOL flight in history, taking off vertically, flying around horizontally, and then landing vertically. Nitpickers may argue over whether it was really was the first, but it was enough to win Coleman the Harmon Trophy.

Landing vertically was of course an extreme challenge, with Coleman assisted by ground observers watching his progress and reporting his altitude. Coleman actually thought it would be relatively straightforward if he were given prone accommodations -- landing while standing up and looking down, not over his shoulder -- but the final judgement was that it wouldn't be worth the bother to try it out. Another test pilot, Johnny Knebel, also took a shot at flying the XFY-1, relying on a briefing from Coleman and not bothering with tethered flights; apparently Knebel's flight was interesting if hair-raising to watch, demonstrating that it wasn't a good idea to skip the tethered flights after all.

It didn't take long to realize that as it stood, the naval pogo fighter concept was a bust. Even if the takeoff/landing scheme had been workable, the brute-force approach demanded a big engine in a minimally light airframe, and the result was poor payload and low fuel capacity. The XFY-1 effort was canceled along with the XFV-1 in 1955. Apparently the program had envisioned multiple prototypes of both aircraft, but only one was built of each; both survive as museum displays.

Incidentally, sketches survive of the unbuilt Northrop submission to the competition, the "N-63"; it looked a bit like the Lockheed XFV-1, but with straight wings in a shallow "vee' configuration, set well back and featuring wingtip pods; a small dorsal tailfin; and a large ventral tailfin with a tee tailplane.

The Navy also initiated work on a jet pogo, the Ryan "X-13". The Navy got this bright idea in 1946, and awarded a contract to Ryan for two prototypes of the "Model 38", as the company designated the design, in 1947. Ryan began by developing a ground test rig, built around an Allison J33 turbojet engine and operated under remote control, which then evolved into a tethered test rig that had a cockpit for a pilot, provided by a modified Boeing B-47 external tank.

The next step was a free-flying prototype. The Navy backed out of the effort in 1953, but the Air Force picked up the program, which by that time had been given the company designation of "Model 69" and service designation of "X-13".

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Gyros For Sale


RAF 2000, 2002 model with carbureted Subaru engine. 70% complete, latest blades still in box. Bright yellow, horiz. stabilizers which have not been installed. Medical issues have forced this offering. Jeffersonville, IN. $24,500. (812) 282-8832 or cell (502) 299-8832.


DOMINATOR - 2007, N514RK. 175 TTSN, new engine has 50 hrs, SPFI, Delta cam, milled heads, stainless valves and springs, stainless steel straight pipes w/ mufflers, 90-100 hp and very easy to maintain. 26' Dragon Wings. FAA#. $19,500. Robert, (252) 342-0535 or robertkel58@centurylink.net.

BENSEN STYLE GYRO- $6,900. Drop-keel, refurbished. Knight Hawke 22' alum. blades in good shape. Subaru EA-81, Warp Drive three-blade prop. Prerotator is electric, main wheels are 12" with good brakes. Will be sold as parts. (Not registered and no Nnumber.) Partial assembly, liability release required. Contact Michael V. Perdue, Marion, VA. (276) 782-7889.

Two prototypes were built, powered by a non-afterburning Rolls-Royce Avon RA.28 turbojet providing 44.5 kN (4,535 kgp / 10,000 lbf) thrust. The X-13 was a stubby aircraft, with a high-mounted delta wing, finlets on the wingtips, and a very tall tailfin. It was much smaller than the Lockheed and Convair pogos, with only half the empty weight, there being no thought of using it as an operational system. The exhaust was moveable to provide vertical pitch and yaw control, while engine bleed jets in the wingtips provided roll control. The seat tilted forward to provide a better view in vertical flight.

Initial flight of the first prototype was on 10 December 1955, with Ryan test pilot Pete Girard at the controls. The X-13 took off and landed horizontally using an improvised external frame fitted with landing gear. Test flights in this configuration gradually extended to transitions to vertical and back to horizontal. The prototype was then fitted with a wheeled tail fixture called the "roller skate" for vertical takeoff and landing hops. The first vertical test hop was on 28 May 1956, again with Girard at the controls. The second prototype also went into flight tests at that time, once again initially with fixed landing gear. The second prototype had a slightly modified canopy to provide a better field of view.

The "definitive" takeoff and landing scheme of the X-13 featured the aircraft fitted with a nose hook and carried on a special trailer. A truck took the trailer to the launch area; the pilot got in, and then the trailer bed was hydraulically jacked up to the vertical position, with a cab where a ground crewman could monitor the takeoff and landing. The hook on the X-13 engaged a trapeze that swung out from the top of the erected trailer bed. The first complete flight using this scheme, from vertical takeoff to horizontal flight to vertical landing, was on 11 April 1957.

The X-13 program was well managed and went fairly smoothly. Test pilots actually seem to have become fairly comfortable with vertical takeoffs and landings, and several demonstration flights were performed through the year, including flights in Washington DC. However, on closer inspection the X-13 suffered from the same problems as the other pogos: the vertical takeoff / landing scheme was operationally impractical, and the payload-range capability was poor.

Continued
Gyros For Sale

Bensen gyrocopter clone project. Includes complete frame, joystick, control rods and hub that will accept pre rotator. Calumet Air seat tank and pre rotator. Newly rebuilt Great Plains Aviation VW type 1 1899cc 69hp, Deitz conv. Kit. Empi hi-perf. heads, Mikuni 2bb carb. 0 hours on top end, turned by hand only. Many extras. Prefer to sell complete. Will consider any reas. offer. Will send dig. pics on request Scott 314-495-4311.

Parts For Sale

AUTOFLIGHT PSRU 2.6:1 less than one hour operation $2550. Mufflers 2 independent cans w/black powder coating $495. Crankshaft pulley aluminum by Tech Welding $100. External mount oil filter/hose and fittings includes oil pan with boss for oil lines $80. ECM and wiring harness by Outfront motor sports (no O2 sensor needed) $1395. Engine cradle, aluminum, circular, RAF design $300. Pics available. Greg Bradley gyros2009@yahoo.com, (816) 651-8828 cell.


The program was killed off in 1958, with both prototypes surviving as museum displays.

The French Societe Nationale d’Etude et Construction de Moteurs d’Aviation (SNECMA) worked on a jet pogo fighter in parallel with American efforts. The idea was to develop an interceptor with an annular wing that could take off vertically to engage intruders on a quick-response basis; it was conceptually along the lines of a recoverable surface-to-air missile.

SNECMA began by building a pulsejet-powered model about the size of a trashbin that performed indoor tethered tests in 1955 and 1956. A pulsejet is a simple tube with a shutter in front in which fuel is ignited on a pulsed basis, with the shutter slamming shut in response. It’s much like a ramjet, but unlike a ramjet can generate static thrust. A pulsejet lacks rotating parts and so has no gyroscopic action as does a turbojet, a feature that was seen as providing better controllability. A pulsejet is of course on the noisy side and pictures of the model in flight show the audience holding hands firmly on the ears.

The next step was a full-size demonstration machine, built around the SNECMA Atar turbojet. The "C400 P1 Atar Volant (Flying Atar)" was nothing but an Atar in a cylinder with four-point, caster-tipped landing gear on the base of the cylinder. It was "flown" by remote control on a tether under a tall girder A-frame; it had a "vectored thrust" exhaust using deflector vanes to allow it to maintain flight control under the care of an autostabilization system. Flight tests of the C400 P1 began in 1955 and were completed in early 1957.

The C400 P1 never made any free flights. It was followed by the "C400 P2", which was much the same, but had an ejection seat and a control panel for a pilot mounted at the top. Test pilot Auguste Morel performed the first free flight on the C400 P2 on 14 May 1957. It was one of the most frightening-looking flying machines ever built, and it remains something of a surprise that anybody was willing to fly it. It did have an autostabilization system, however, and wasn’t so hard to handle, partly because it couldn’t be used for forward flight.

The C400 P2 was to be followed by "C400 P3" that added a real cockpit, but though one was built it never flew, being used for ground tests. Efforts moved on to a much more sophisticated prototype, the "C405 Coleoptere" -- the word translating generally as "beetle". It had a jet-fighter-type fuselage with an Atar engine in the rear, fed by side-mounted intakes, with windows added to the sides and bottom of the cockpit along with the canopy on top to improve the view of the pilot.

One of the amazing things about the 1950s pogo aircraft experiments was the fact that these machines had no automated flight systems, being controlled by sheer pilot skill, and so it is surprising that there were so few accidents.

Greg Goebel
Mentone 2011 Showcase
Come Join Us Next Year!