

Turn & Bank



OFFICIAL NEWSLETTER OF RAAC CHAPTER 85

January/February 2001

Diamonds **In the Desert** *Mark Munzel Visits* *the USAF's Boneyard*



Plus:
Climb Testing Tips
-Old Frank and Thinking Young



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CMF's Waco. Above: Technicians apply spraylat to an F-14 in preparation for storage. Mark Munzel Photos

The TURN AND BANK is the monthly publication of RAAC Chapter 85 and is intended to keep members informed as to the club's activities, and to promote safety and technical excellence in the field of sport aviation. No responsibility or liability is assumed, expressed or implied as to the content of articles contained in the Turn and Bank: the intention is to provide a forum for discussion and exchange of ideas.

Newsletter contributions should be mailed to George Gregory, 19470-88th Avenue, Surrey, B.C. V4N 3G5 no later than the 12th of each month. Business Fax is (604)-469-3495. Please remember to indicate "attention George Gregory" on your fax.

Enquiries to the Membership Chairman should be mailed to Rob Prior, #204-130 E.11th St., North Vancouver, B.C. V7L-4R3

For inspections of Amateur Built Aircraft Projects contact the MDRA Inspection Services , ph. 1-877-419-2111 fax 1-519-457-0980 email: mdrainsp@on.aibn.com

Regular Meetings are held on the first Tues. of each month at 20:00 in the clubhouse:

Delta Airpark, 4103-104th Street Delta, B.C. Clubhouse phone: 596-3644

Mailing Address: Chapter 85, RAAC

c/o Delta Heritage Airpark, 4103-104th St., RR#3, Delta, B.C. V4K-3N3
 Executive meetings are on the third Tues. of each month at 19:30 in the clubhouse.

Chapter aircraft pilots, mail cheques (Payable to RAAC Chapter 85) to:
 Brad Short, 8052-122a Street.Surrey. B.C. V3W-7R4

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 RAA Chapter 85 Homepage: http://home.istar.ca/~airframe/raa_85
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Technical Guy

Tips from the Western Canada RVator

Climb Testing Tips

Kevin Horton

Van's Airforce Ontario Wing

You need smooth stable air to get good data in your climb tests. Often it is worthwhile to get up really, really early to start work right after sunrise. Just before sunset can be a good time too, but not as good as often as early morning. If the air isn't perfect, don't force it. Try a different location, a higher altitude, or just give up and do some loops and rolls instead. Either way you win.

General Tips

You have to have to have very good airspeed control. You should be able to fly within plus or minus one mph with practice, in the right conditions. Get the airspeed nailed before the planned start altitude, and use small pitch attitude corrections to control the airspeed. If you need to use big pitch attitude changes the run is no good. Throw it away and start over.

The wind will be changing as you climb, even on the best days. If you are climbing into or with the wind, the wind speed changes will cause airspeed changes, and you will have to raise or lower the nose to get back on the correct speed. This will affect the rate of climb, and you will have bad data. You want the wind at about 90 degrees to your heading, so the wind speed changes don't have as much effect on the airspeed. Also, do two runs at headings 180 degrees apart, and average the rates of climb for the two runs. A wind change with altitude that gives a speed increase on one run will give a speed decrease on the next run, and the average will be pretty good. You need reasonably good heading control to make the most of this technique.

The amount of sideslip will also affect the drag, so make sure the ball is in the same place on all the runs.

If you are leaning during the climb, use a consistent technique.

If the local terrain has big hills, you need light winds, or you can get small waves being formed, giving very smooth but rising and falling air. If the airspeed keeps changing in level flight that is a bad sign.

Take several sets of data at each condition, preferable on different days. If you have enough data sets, you will be able to pick out the ones with strange results (either too high a rate of climb, or too low) and throw them out.

You need to be very, very patient and meticulous to get good performance data.

Wind Effects

Aircraft in flight have both potential and kinetic energy. Potential energy is the energy due to height and kinetic energy is the energy due to speed. You can trade those types of energy against each other by raising or lowering the nose. In level cruise, you can pull back on the stick and go into a steep zoom climb. Your potential energy (height) increases and your kinetic energy (speed) decreases. You can do the reverse with a steep dive.

In a climb at constant airspeed, we are trying to increase the potential energy. The rate of climb is determined by how quickly we can increase the potential energy, which is governed by how much horsepower we are using, how efficiently the prop uses the horsepower, the drag of the aircraft, the aircraft weight, etc. The kinetic energy stays the same (ignoring the fact that the difference between IAS and TAS changes as we climb - this will have the same effect on all the cases we are examining, so we can ignore it to simplify this discussion).

Now, let's picture a few different cases so we can examine the effect of wind.

1. In an ideal world, with absolutely still air (no wind), we could do a dozen climb

tests at the same conditions, and get exactly the same results. Another way to look at it is to look at the change in kinetic energy during a climb. If we climb at a constant airspeed in still air, we have the same kinetic energy at the top of climb as we had at

the bottom, but our potential energy is higher.

2. Now let's say that we have 50 kts of wind at all altitudes. The aircraft doesn't know the wind is there, and we get exactly the same climb rate as case 1. Once again, we have the same kinetic energy at the top as we had at the bottom.

3. Now let's look at a situation with calm air at the start of our climb, and a 50 kt wind shear in the middle of the climb. Our climb rate at the start of the climb is exactly the same as cases 1 and 2. But when we hit this sudden wind shear, we instantly gain 50 kt of airspeed. We pull back on the stick to get back to our target climb speed, and that gives us a zoom climb for a moment, with a higher than normal rate of climb. Once we get back on our target airspeed we lower the nose, and have the same rate of climb we had before. But, if we timed how long it took to do the whole climb, we would see that the time was less than it was for cases 1 and 2, and we would calculate a higher average rate of climb, all because of this wind shear. If we look at the kinetic energy, we see that we have 50 kt less ground speed at the top of climb as we had at the bottom, so we have less kinetic energy. This energy didn't simply disappear, it got converted to potential energy when we zoomed to get rid of that extra 50 kt of airspeed.

4. Now, let's picture instead that we have five 10 kt wind shears during this climb. Our airspeed will suddenly increase 10 kt and we will have to raise the nose to get back on speed. This will happen five times, and our calculated rate of climb will be higher than it would for cases 1 and 2. The ground speed at the top of climb is 50 kt less than it was at the bottom, so we must have changed that energy into potential energy during those five small zooms.

5. Now, let's say we have fifty 1 kt shears. We will still be getting a higher calculated rate of climb, but we won't be able to detect these wind shears from the cockpit. The ground speed at the top of climb is 50 kt less than it was at the bottom. We have less kinetic energy at the top than at the bottom, so we must have changed that energy into potential energy during the climb.

Bottom line - changing headwind component will affect the apparent rate of climb. This is a different problem than the classical argument on downwind turns, because a constant altitude turn all happens in the same air mass, moving at the same speed. In a climb we see a continually changing wind speed.

T&B

AIRFrame



Aircraft Portraits

Rob Prior

home.istar.ca/~airframe

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BULLETIN BOARD

If you have questions or problems with your aircraft construction, we have members who have developed some expertise in various fields who have volunteered to advise you on methods, procedures and pitfalls in the capacity of **Builders' Counselors** something along the lines of the former designee programme. Please respect the fact that these are volunteers who may not appreciate late calls, and will not return long-distance calls on their answering machines. Also, none are inspectors, and although experienced in

their various fields, cannot be held responsible. It is and remains **YOUR** project. Their names and numbers are on page two and will be a regular feature of our contents page.

Last I heard, Norm Helmer is looking for someone to help with his **Paradyne** project. The Paradyne is a cutting edge new concept in STOL aircraft that shows promise. If you're interested give him a call at 943-7887.

Dan Lawler would like you to send your email addresses to him at:

dan.lawler@kvaerner.com

He will create a database so he can send announcements about meeting programs, etc. Currently he has a list of about 20 e-mail addresses, and would like to expand it and keep it up to date.

Want to learn more about aircraft construction? Get involved in the J-5 project! Also, we are looking for help from someone knowledgeable in fabric work. Talk to a member of the executive and they'll put you in contact with the right people.

Minutes by Jim Hunter

Minutes of the General Meeting, 2 January, 2001

Call to order: 8:00 pm by President Tim Nicholas.

Prior 2/Herman: that the Minutes of the General Meeting of 7 November, 2000 be adopted as printed in the *Turn and Bank*. Discussion Carried.

Committee Reports:

Treasury: as of 19 December, 2000, as phoned in by Tim Novak; in savings account, \$7,847.15, in chequing account, \$2,974.13. Tim in process of passing the job to Don Souter who is the new Treasurer.

Buildings: Dan Weinkam: Tie-down and hangar tenants of Chapter facilities, please make your 2001 payments to Dan ASAP. No response to the lottery to secure a spot in the hangar so Dan will try again next month.

Membership: Rob Prior: We have about a dozen re-ups for 2001/ Recollect that you only get the cheap rate until the February meeting.

Aircraft Committee: Tedd McHenry not present but we understand that the Turbi's engine is at Langley and is being worked

upon. On the J-5 Project: Gaetan says that work will recommence toward the end of January and that an expert (even if only self proclaimed) on fabric work is wanted for the project. A more modest but experienced fabric doer would work even better. Talk to Gaetan. On the J-5's engine; Lou Kennedy and Tom Boulanger who put it together, say that they will have another look, particularly inside. It's been a few years and the agony of corrosion might have crept in.

Vice President: Emily Clemens: Annual Bash most likely in April and very likely at the same place as last year as they did very well for us. Emily still collecting names for accomplishments, infamies and other award winning events.

Newsletter: George Gregory: going fine. George's usual threats about what will happen if he doesn't receive articles.

DHAPCOM: Terry Wilshire: No problems. Field has remained amazingly dry so far this Winter. Apparently the super vibrating roller really did the trick. A couple of additional sumps will be added though.

RAAC: Rob Prior perhaps: Nothing new from Brampton.

Program: Excellent talk by Mr. Dave Fitzpatrick who is an Aviation Insurance Broker. Almost like us real folk; has an Owner Maintenance category Piper Clipper (Pacer? - Ed.) so is well informed on the insurance aspects of Amateur Builts, Ultras, Advanced Ultras, OM's and 13 passenger (!) Beavers.

Old Business:

1) per Terry Wilshire: Chapter has received a cheque for \$6254 from the City of Vancouver Remembrance Day Committee. This is a contribution in recognition of the Chap-

ter's Remembrance Day Fly-Past of November 11.

New Business:

1) From Bruce Prior: advocating that Chapter 85 develop a Major Fly-In for Spring/Early Summer of 2001. Perhaps involve other DHAP groups. In answer to a question as to whether he is recommending a big or a small event, Bruce says why not whole hawg. Obviously, a lot of bods required to make it work so a sign up list is making the rounds.

2) And from Terry Wilshire: A proposal for a celebration in the year 2003 of the One Hundredth Anniversary of Powered Flight. This is offered as a DHAPCOM/GVRD initiative rather than one of the Chapter's. Wilshire/Munzer/ that we adjourn and we did, too.

Jim Hunter, Secretary.

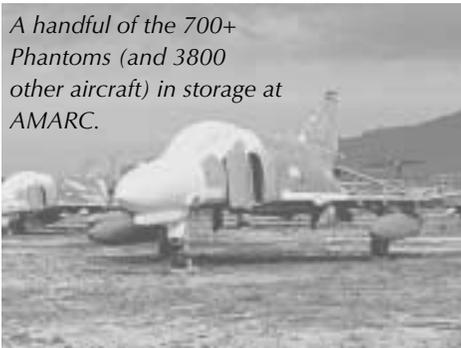
Re-enlisting?
Don't Forget:
The February
General
Meeting
is your last
chance for the
Cheap Rate

diamonds *In the Desert*

Four years later ... an AMARC employee removes baked-on Spraylat - with a putty knife!



A handful of the 700+ Phantoms (and 3800 other aircraft) in storage at AMARC.



This row of F-14s demonstrates that many AMARC residents aren't very old.



Surplus B-52s await their demise in accordance with arms treaties.



Text and Photos by Mark Munzel

Everybody's heard of it. In the Arizona desert, there's a place where old airplanes go to die. "The Boneyard" holds thousands of retired US military aircraft, in endless rows. Fighters and bombers, transports and trainers, all rendered unnecessary by age or defence cuts, stretch to the horizon. Eventually, they will be cut into smelter-sized pieces and recycled.

Everybody knows about it, but people seem to have trouble naming the exact location. That's where a newsletter writer comes in. It's the Aerospace Maintenance and Regeneration Center (AMARC), at Davis-Monthan Air Force Base near Tucson, Arizona.

AMARC calls itself the "Diamond in the Desert," in hopes of presenting a brighter image than the label "boneyard" would paint. And in fairness, most aircraft at AMARC are not corpses awaiting disposal. The Center's main role is to store planes in useable condition. Modern types are stored as attrition replacements. Retired aircraft are held against possible need for them in the future, or in anticipation of sales to other countries. There are more contemporary aircraft at AMARC than you might expect, and fewer old ones.

Several factors make AMARC an ideal place to store aircraft. The dry Arizona climate does not promote corrosion. The desert soil is hard enough to park a plane on - no concrete pads required. And the US government owns enough land to hold many, many airplanes. At last count, 4519 jets, props, and helicopters were parked on 2600 acres. That's 2 1/2 Stanley Parks with aircraft instead of trees.

When a plane flies to AMARC for storage, it is first inspected to make sure it is complete and undamaged. (Squadrons sometimes rob an aircraft of oft-needed parts before sending it to Arizona.)

Weapons, ejection seat charges, and classified items are removed. Lightweight oil is run through the engines and fuel systems to coat them. The aircraft is washed on the outside and sprayed with corrosion inhibitor on the inside. The canopy and all major openings are covered with paper and masking tape.

The definitive step in preservation, the one that brands the aircraft as a resident of AMARC, is the application of Spraylat. This paint-like latex coating is sprayed over the paper and any composite panels on the airframe. A first coat in black creates a dust- and moisture-proof seal. The second coat in white acts as a reflector, helping to keep the temperature inside the aircraft within 15°F of that outside. Once protected from the elements, the aircraft is towed into the desert - and left there. Reprieve from the elements comes once every four years, when the aircraft is stripped of its Spraylat covering, inspected, and re-preserved. Other than faded paint, damage and decay are rare. Storage continues until the plane is regenerated (see below), or until it is no longer needed by the military.

*The Center's main
role is to store planes
in useable condition*

AMARC's secondary role is to supply parts for flying US aircraft, by reclaiming them from the planes in storage. If a 40-year old tanker based in North Dakota, England, or Okinawa needs a fuel pump, a replacement may no longer be sitting in a warehouse. The item will most likely be removed from a retired aircraft at AMARC and shipped where needed. Airframes are not pillaged at random; instead, a few of each model are designated for reclamation. The pieces removed can be as small as fuses or as large as tail assemblies. Frequently, a parts bird will be reduced to little more than a wing box before it is stricken from inventory.

A third role of AMARC is to regenerate aircraft that are returning to service. This role reaffirms that the Center stores live airplanes, not dead ones. On average between 1980 and 1998, AMARC accepted 387 aircraft a year into storage, but sent 82 away - by air, under their own power.

Before an aircraft leaves, it is inspected, repaired, and overhauled as necessary by AMARC's technical personnel.

AMARC shines like a diamond in an accountant's eyes. In a typical year, AMARC supplies the US military with over a billion dollars in reclaimed parts and regenerated aircraft. In 1999, this worked out to \$22 saved (compared to buying new planes and parts) for every dollar spent to run the facility. Millions more are saved because the government does not have to

Even the numbers are hard to grasp. Try 722 of one aircraft type, 369 of another....

pay rent at a civilian storage facility.

Some of AMARC's duties do involve the demise of airplanes. The Center is responsible for chopping up retired nuclear bombers, in compliance with international arms treaties. Hundreds of B-52s have



End of the line - Trackers in a scrapyard outside the AMARC fence.

been cut into pieces in recent years, leaving only a few dozen in storage. Each dismembered aircraft is left in a pile so that spy satellites can verify its demise.

By now you may wonder, "If AMARC only stores aircraft, who scraps them?" After all, the number of planes at AMARC has stayed roughly constant for decades, even though arrivals at the Center outnumber departures. Scrapping - or rather, recycling - is the purview of that most important military fixture, the civilian contractor.

Once the US decides an aircraft type is no longer required for its defence, or once airframes have been parted to the bone, AMARC sells them to the highest bidder. Civilian scrapyards line the Center's perimeter fence. Scrappers usually remove everything of value from the airplane - engines, wires, cables, and anything made of exotic metals - and smelt the rest. The death of an aircraft becomes the birth of a pop can.

What does AMARC look like in person? Until you've been, you

cannot imagine so many aircraft. Once you're there, you cannot comprehend it. The sight of 4500 airplanes cannot be expressed in words.

Even the numbers are hard to grasp. Try 722 of one aircraft type, 369 of another.... Or imagine the number of pilots who flew all these planes. The number of maintainers who supported them. The number of workers who built them. The number of dollars spent to buy them. Viewed this way, AMARC defines the term "military-industrial complex." Not to mention "superpower" - what other country has so many aircraft that it isn't using right now?

Rather than try to describe AMARC further, I'll close with some ideas on how to view the spectacle yourself. On the Internet, visit the following sites:

* www.dm.af.mil/amarc/default.htm - the official AMARC web site

* terraserver.microsoft.com/image.asp?S=12&T=1&X=644&Y=4446&Z=12&W=2 - a bird's eye view of the Center. Be sure to pan and zoom a bit!

* www.f4aviation.co.uk/hangar/boneyard.boneyard.htm - a report from another AMARC visitor

In print, a good recent book on AMARC and other storage sites is "Military Aircraft Boneyards" by Veronico, Grantham, and Thompson (ISBN 0-7603-0820-9).

If you find yourself in Tucson, you can board a bus tour of AMARC at the Pima Air and Space Museum - phone (520) 618-4806 or visit www.pimaair.org. Several FBOs at Tucson airport offer charter flights over the facility. Or you can drive the roads around the base and peer through the fence. **T&B**

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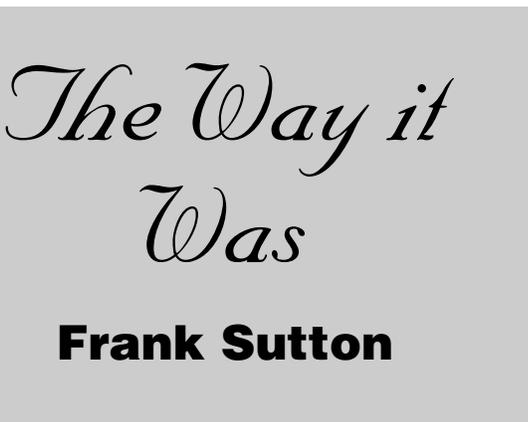
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Paul Trudel 532-8570

SOMETIMES THE BEST WAY TO KEEP FROM GETTING OLD is to think young, it sure helps if old timers can be a mite flexible and mix and do things with young people, sometimes real young people. Like the time a young fella ask me if in I'd take him fishin. The kid's smart, he doesn't say will ya take me fishin, he says do you like fishin. I say yeh I like fishin, he say's ever fished Red Creek. I says nope, haven't got around to that yet. Then he turns the afterburners up a little bit an says I'll bet there's some good sized trout in that creek, an I'll bet we could dig some worms down by the old barn in the pasture. I'll dig em for ya. Well since I'm on holidays an it looks like a nice day tomorrow, I says maybe I'll give er a try first thing in the mornin. The lad say's thats great, can I go with ya.

Next morning me an him is sittin on the bank of that creek bobber fishin in a little pool jest below a little rapids. An the currant is takin our bobbars in a circuit around the pool, but there ain't much activity, after awhile the fella looks me square in the face (as only a little fella can) an says your gettin kind of old aren't ya. I sorta nodded my head. Were you a fighter pilot in the war, nope ever fly in some of those big bombers, yeh, which one, will ya tell me about it.

Well how can ya explain somethin like that to a young fella. So I says lay your



head back against the tree an close your eyes an I'll tell ya like it was.

Ya see me an my friends were stationed in Halifax, an one day we went across the harbour to Dartmouth where

“after awhile the fella looks me square in the face (as only a little fella can) an says your gettin kind of old aren't ya.”

the Air Force was. We went to the tower and ask for a ride. The man said there is a Liberator on training duty, I'll tell them to

pick ya up on the way by.

Soon we could hear a big plane coming and it was. Maybe the biggest bomber there was at that time, all painted sorta greyish brown, with twin gun turrets in the nose an tail and one on its back an one on its belly. It had twin rudders, it had long tapered wings, with 2 big engines on each wing. When it stopped we got in and the pilot went to the end of the runway for take off. I watched the big wheels as the aircraft rolled into position.

Then the pilot opened the engines up to a great speed all at the same time. He was about to sink-croww-nize the engines (it isnt good for aircraft engines to be out of sink). There was so much power in those big props that the fuselage started to fidget and fuss about an the wing tips were fluttering.

The pilots let the brakes go an we started to lumber down the runway, soon we were going so fast the runway was a blur. Then we were flying over the sea. Moments later the aircraft turned, we saw a most beautiful sight unfold before our eyes. A convoy of ships had just left Halifax, all ships were in position and the bow and prop wakes looked so pretty, as the white water exploded form the sea then trailed off in the distance and were absorbed by the sea. When we landed and thanked the air crew, we were satisfied to go back to our side of the harbour, we had a very rewarding afternoon. **T&B**