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THE ACRONAUT

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Northern California Aerobatic Club

CHAPTER 38

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Cory Lovell and his new Sukhoi down in Arizona

In This Issue

Do not spin this aircraft. If the aircraft does enter a spin it will return to earth without further attention on the part of the aeronaut.

— first handbook issued with the Curtis-Wright flyer

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Article or Pictures?

Send them in!

editor@iac38.org

Share your aviation experiences with the rest of the club.

President's Post

Darren Pleasance

Happy New Year IAC 38!

I hope everyone had a great holiday and managed to find a few hours of flying in between storms. I didn't get any acro in myself since I was focused on getting my twin-Cessna recurrency check ride done, plus flying the family up to Sunriver, Oregon for a few days of skiing and relaxing. I'll be back by the time you read this though and will hopefully get out in the Laser for a quick acro adventure before I head back to work on the 7th.

On the IAC front though, there's a bunch of stuff we should catch up on including:

1) Jessy Panzer's presentation last month
2) January's Chapter meeting on 1/13
3) Aerobatic Safety Seminar
4) Calendar for 2008
5) Holiday Party

Jessy Panzer's Presentation

For those of you who were unable to attend last month's Chapter meeting, you missed a terrific presentation from Jessy on her flying adventures over the past decade or so. Jessy started flying when she was 18 and in roughly a ten year period, she's had the chance to fly a P-51, cassut racer, Pitts, King Air, Sabre Liner, Gulfstream, and many other planes. She also got her helicopter CFI rating and was a member of the Stars of Tomorrow aerobatic flight team sponsored and supported by Sean Tucker, Mike Goulian, Bill Stein and other key aerobatic luminaries. I found her presentation quite inspirational and we'll be sure to have her back later this year to provide more of you an opportunity to hear about her exciting adventures in aviation.

January Chapter Meeting

Based on Howard Kirker's unrivaled performance in Intermediate last year, he was asked to write an article regarding "How to Fly the Intermediate Known" for Sport Aerobatics. Howard has since gone out and flown the sequence many times and developed a point of view on how to fly it as well as possible. With this experience, he's agreed to share his perspectives with us on January 13th at our next Chapter meeting. Even if you're not planning to fly Intermediate this year, our next Chapter meeting should provide a great opportunity to get some tips and tricks on flying many of the common maneuvers that are found in virtually all of the categories. I hope you can all join us for what will undoubtedly be a fun session.

Aerobatic Safety Seminar

The Southwest Airshow Network (SWAN) has approached us about taking over the annual Aerobatic Safety Seminar. This is an event that started at least 20 years ago with Frank Christensen hosting it at his ranch in Hollister and it then migrated to Vern Dahlman and then more recently to SWAN. The event has been hosted in Marysville for the past several years, and with SWAN's sponsorship has included a combination of aerobatic safety as well as airshow logistics and education information. SWAN has now relocated to So.Cal. and is going to focus purely on the airshow aspects of their program. As such, there's a need for someone to take on the aerobatic safety aspect of what they were doing. I, personally, would love to see us do this. I think it serves a very useful purpose in terms of advocating safety in aerobatics, plus serves as a great community building event for all aerobatic enthusiasts on the West Coast. Don Gutridge has offered to take the lead in looking into this to see if a) we'd like to do it at all and, b) if we should shoot for doing it this Spring, or perhaps wait a year to make sure we can pull it off in a very high quality way. We'll talk about this at the next Chapter meeting so come and share your views.

Calendar for 2008

We have an exciting year ahead of us. Andrew Connolly, as our new VP, has already taken a stab at a full-year calendar which includes a number of critique sessions, fly-outs, and exciting Chapter meetings. This year, I'd like to see more programs like we had in December with members providing profiles of their aerobatic experiences. I'd also like to see us revisit the "aerobatic aircraft maintenance" topic, as well as a discussion on aerobatic physiology plus a good ol' session on designing a Free using the OLAN program. A Judges school

would also be great this year so if anyone would like to volunteer to help coordinate this, that would be terrific. All-in-all, I think we have a great program for this coming year that should be terrific fun for everyone, regardless of your level of experience.

Holiday Party

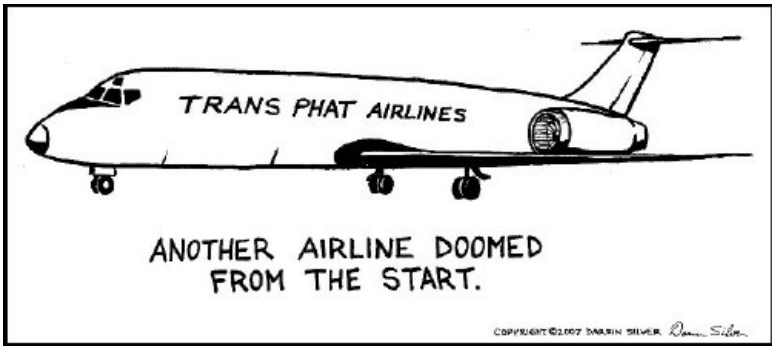
Since we forewent the holiday party in December to alleviate conflicts with other holiday festivities, we're planning to host the first-ever January Holiday Party on Sunday, January 20th at 5:30 at my house in San Mateo. I've sent out an invitation by email already, but will also send an Evite to make it easier to RSVP. These parties have always been a ton of fun in the past so I hope to see you all there. We'll have food, entertainment, a silly gift exchange and some good swapping of flying stories and the like. Mark you calendars and feel free to bring kids if you'd like. Ours will be there so bring yours along too if you don't want to deal with baby sitters.

Overall, I'm excited about the year ahead and the upcoming flying season. I'd love to see us bring some more new members into the Chapter, plus up our game in terms of our collective contributions to fostering and growing the sport of aerobatics. I think our Chapter meetings and newsletter serve as an important means for us to do this, and I think the Safety Seminar could be a powerful addition to our "offerings" to members and non-members alike.

Our next chapter meeting is **Sunday, January 13th at 4:00 in Livermore.** Howard will be taking us through the Intermediate sequence with his own tips and tricks for flying it well so it should be an interesting discussion. I hope to see you all there.

Blue Skies...

- Darren



From the Editor

Now Co-Editor

This February will mark two years of being the newsletter editor. It has been a good run and I'd like to thank all those who took the time to send in contributions. The news is, I am still going to be an editor, but am going to share the editor duties with Peter Jensen. As many of you know, Peter was the editor prior to me. We will be alternating months. Submissions will be done the same way, send an e-mail to editor@iac38.org.

We welcome any input from the group.

In this month newsletter I took the liberty of assuming that my perspectives on C-130 flying would worth writing. I hope you like it. Also, Dave Watson tells us the rest of the story in terms of his experience with an engine wrist pin failure.

On another note, I put the following quote on the front page of last month's newsletter :

"When once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return."

— Famous aviation quote, source unverified

I received an e-mail stating that it was from Leonardo da Vince. It is true that this quote has been attributed to Leonardo, but it has not been verified by Dave English, my reference for the information - and he has checked with "National Geographic" and other sources. So that is the debate, I accidentally deleted the e-mail so thank to whomever sent it in.

Most of the quotes that I have put in this newsletter have been complied by Dave English, and can be found either in his book, Slipping the Surly Bonds: Great Quotations of Flight, or on his website, skygod.com.

Happy New Year!

The most dangerous thing about flying is the risk of starving to death.

— Dick Depew

Epilogue

Dave Watson

Last month, Dave wrote about the near catastrophic failure of his Lycoming engine due to piston wrist pin failure. He submitted the article to Sport Aerobatics and has also received some information for Lycoming. Here is more of the story...

Prior to submitting my article to Sport Aerobatics on my wrist pin failure, I sent it exactly as printed in the Chapter 38 December Newsletter to Lycoming for their comment to ensure I wasn't misrepresenting their Service Instructions. Within two hours, I received a call back from their Manager of Product Support who requested I send my cylinder to him for evaluation.

Without asking for my recent usage history of this engine, they speculated that because of the low-time use on this engine (1150 hours in 12 years) there must have been surface rust on the cylinder wall that started the cascade of abrasion of the wrist pin plug. [Note: no other issues were cited by Lycoming with the article, so I feel comfortable submitting it to Sport Aerobatics and AOPPA as is.] I explained that the cylinder had been cleaned for the photos and had since been in my hanger exposed without protection and is now highly rusted. He assured me that his detection methods could differentiate the new surface rust from the other rust and he would certainly find *the rust* that led to this problem!

He had no other explanation for the possible premature failure and noted that "manufacturers" do from time-to-time make improvements to their products and told me that the newer design wrist pin plugs are fabricated from a different alloy than the suspect ones that failed in my engine. Subsequently, I checked my logs and this engine was used according to the chart below.

Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
10	14	7.5	2	2	3	5	4	14	20

Engine usage per month leading up to failure

Note that these hours are generally spread out evenly throughout the months listed, and that in early February the annual was done which detected the elevated aluminum in the oil but that there was no metal noted in the screens. So if surface rust is the only explanation for my premature failure proposed by Lycoming, I am even more concerned for the many engines out there that are running with the P/N LW-11775 plugs and covered by the Service Instruction. Assuming there was no major damage at my annual, the surface rust must have occurred over the two month period between December 06 and Jan 07, when my usage dropped from about 10 hours (which has been my average for years) to just a few hours per month (also note that the plane is hangered), that led to this failure.

Scouring marks found from wrist pin contact

I have subsequently also speculated that any forensics that does or doesn't find rust in the affected area is likely suspect anyway. Considering that the majority of the area affected by the damage is within the area traversed by the rings (which were fine) and that the damage extended approximately .005 inch into the wall of the cylinder, what surface rust that may or may not have been there to start the problem could possibly be left?

I do commend Lycoming for making incremental improvements in their product, but why hide them behind innocuous Service Instructions when they know the older design can lead to premature failure? My intent here is not to damn Lycoming but to simply try to get the word out. There was a boogie-man in my engine and I didn't know about! So I guess the bottom line is that if you use your engine less than ten hours per month and have the suspect wrist pin plugs, you may be heading for a total meltdown similar to what I had! I'm also a little dismayed in the response from Lycoming. Back in July when this issue reared its ugly head, both my mechanic and I had several conversations with various contacts in Lycoming and all we ever got was reference to the Service Instructions and certainly nobody ever called to investigate or showed interest in solving *"my problem"*. Faced with a potential publication about this, however got a response from them within a few hours. Read into this as you wish and let your financial situation and risk assessment decide what you should do if you have these deficient wrist pin plugs and low usage: replace them at your next annual for a thousand bucks (or so) or roll the dice and risk a relatively sudden catastrophic failure.

Blue Skies,

Dave Watson

C-130 Flying

Che Barnes

Background

The C-130 has been a staple to many military missions since the 1950s. The U.S. Coast Guard operates a little over 20 of them or so. I transitioned into these about 10 months ago and wanted to share the experience with IAC 38 members. There are 4 here at Air Station Sacramento – one of five Coast Guard Air Stations that operate this aircraft.

The C-130 suits the maritime patrol and logistics needs of the Coast Guard. Our primary mission is search and rescue as well as homeland security. While we post a 24/7 search and rescue guard for the entire west coast (in fact, I am on duty New Years Eve as I write – feel safer?), most of our hours are spent conducting fishery enforcement and counter-narcotics patrols. Logistics missions ("trash hauling") are thrown into the mix as well. Usual search and rescue calls involve large searches of vessels reported missing, flying "cover" for helicopters venturing beyond radio line of site range from the coast, or responding to a case beyond the range of a helicopter. The aircraft has a dewatering pump and life rafts that can be dropped using a parachute system to anyone in distress on the water.

Hamilton Standard Prop is turned by an engine that puts out up to 4,300 shaft horsepower. The lower scoop is for oil cooling.

The Aircraft

The largest difficulty in terms of flying the C-130 has been learning the various systems. Prior to getting a whack at flying the thing, hours are spent in the classroom studying the fuel systems (8 tanks), engine oil, bleed air system, anti-ice/deice, transmission oil, hydraulic system, propeller, pressurization, and landing gear/brakes, and more. This is followed by a week or so of daily simulator "rides," then you get to fly in the right seat.

The right seat is a bit of challenge to get used to because the throttles are situated on the left side of the center console. Hence, one has to reach his or her left hand all the way across while moving the yoke with the right hand. Combine this with a healthy stomp on the brakes, and you are pretty stretched out. There are dual controls with the exception of the nose wheel steering wheel which can only be reached by the pilot in the left seat – the rudder peddles have no affect on the nose wheel.

The primary job of the right seat pilot is to read the checklist. Yep, they really trust you a lot starting out! The first engine is started with bleed air supplied from an onboard auxiliary power system. Once it is brought up to 100%, bleed air and electrical load is shifted to that engine prior starting the other three.

While a C-130 is small compared to a C-17 or 747, it is pretty big compared to a Pitts! To me, the props seem huge. Yet, when the starter cranks, they spool right up. When looking at them, it is hard to imagine enough power just to turn them, much less the power generated for the engines to take a 155,000 pound aircraft to 20,000 feet. Add the fact that pallets of equipment, or say, a small tractor or spare engines could be sitting in the aircraft – and it gives a perspective on how much power the engines produce.

When initially started, an engine spools up to Low Speed Ground Idle, or about 70% of their normal RPM. The flight engineer then increases the engine up to 100% to get the generator online, checking that it is making the proper volts and frequencies prior to plugging it into the bus. At 100%, the prop is at 1021RPM and the engine is at 13,820 RPM. The flight engineer – usually an experienced enlisted flight mechanic, is in charge of many of the onboard systems. The electrical system switches, fuel transfer and dumping, pressurization, anti-skid test, and more are out of reach of the pilots. There is also a navigator, radioman, loadmaster, and a basic aircrew person onboard most flights as well. Hence, the C-130 is more of a crew aircraft than I have experienced. It is flight by committee.

View form the flight engineer's seat. Throttles on the left, condition levers on the right.

Once all four engines are started the left seat pilot taxis. Usually, only two symmetrical engines are brought to 100% during most of the taxi. While in ground range, the props are in a controllable pitch mode – the blade angle and fuel control setting depends on the throttle position. The blade angle can be adjusted to a negative angle (beta) for reverse thrust. With the cargo door in the back opened up and a crew member talking to the pilot via ICS, it is possible to back the aircraft up. This kind of engine control is highly useful on icy surfaces. Some of the pilots I have flown with have done tours out of Kodiak, Alaska, and have taxied aircraft by essential skating them over ice patches that render the brakes and nose wheel steering marginally effective. When the blades are producing reverse thrust, the cooling air through the engine stops, and oil temperature starts its way up. When the engines are in ground idle, the engines produce more than enough thrust for taxiing, and pilots balances thrust reversal and brakes to slow down. Any excess in either results in an overheated engine or overheated brakes. Taxiing around with feet inadvertently on the brakes will burn them out. In large aircraft, brakes are a real concern, as then can be heated up enough to catch the wheels on fire. Aircraft wheels are made with plugs on the sides, so in the event of brakes overheating the tire will blow out to the side. So keep that in mind the next time you approach as aircraft with smoking tires.

The Flying

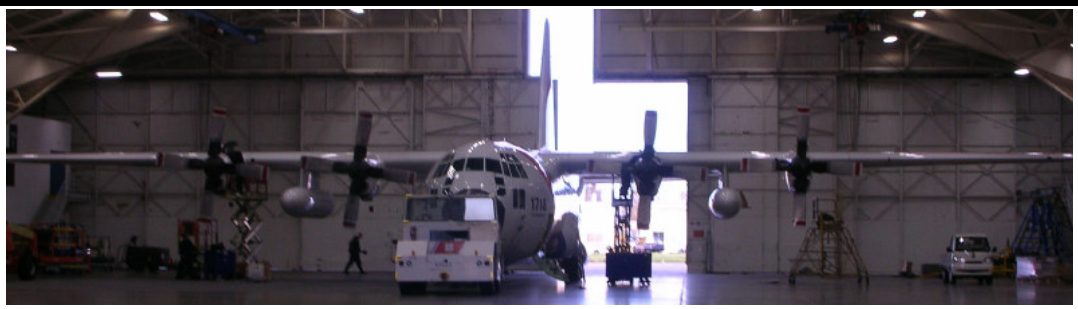
Finally, the aircraft is taxied into position on the runway. This is when the controls are transferred to the co-pilot if it is going to be a right seat takeoff. When the throttles are moved forward into the flight range, the prop goes into constant speed governing mode. For the first flight of the day, the brakes are held, and engines are brought up to a static takeoff setting to ensure power generation. In the simulator, this is a relatively simple process. In reality, it was harder because the entire aircraft shakes, making it more difficult to read the torque gauges. All this in combination of holding the brakes (you have to press hard to keep it from rolling forward!) and stretching your left hand out makes is a very physical experience. The power is set below the maximum torque setting (19,600 in-lbs is max as long as it is cold enough – high temps can create a turbine temp limiting conditions). When the brakes are released the aircraft lurches forward and you can feel weight in your seatback. As the airspeed increases the non-flying calls out 70 kts, this is the point when it is expected that the rudder will have enough authority for the pilot to take his hand off the nose wheel steering. Rotation is usually at 108 knots or so and requires a heavy pull on the yoke. As the speed increases, the engines produce more power due to the ram-air effect or increasing airspeed. The acceleration is constant, by the time you get the gear up you are passing 120 knots. Flaps come up at 150 and a normal climb out is at 180 knots.

Normal cruise works out to be anywhere from FL180 to FL240. The highest of this range is sometimes hard to achieve when near max gross weight. These altitudes are above most GA traffic and below jet traffic. It also is not high enough to avoid most weather systems, unlike the 300

flight levels. The ground speed usually ends up at around 280 knots with a fuel burn of a little under 5000 lbs per hour. At 6.8 lbs per gallon, that is 735 gallons per hour – or a dismal 0.38 miles per gallon! This sounds like a huge burn rate, but when you have 60,000 lbs of fuel you can fly for a long time.

Landing involves getting used to the sight picture and knowing when to flare. A coordination of flare and pulling off the power results in a good touchdown. You have to work the rudder a bit, as the power changes on the engines create a bit of yaw. Also, you have to anticipate differently based on the weight of the aircraft. A heavy plane needs more power on touchdown. It is a big plane, but it can withstand some pretty hard landings—trust me.

The C-130 takes a larger amount of control force than small aircraft, but it does have hydraulically boosted controls. There is a 1-3 second delay between input and results. The control surfaces produce plenty of force, it just takes longer to move such a large aircraft. Usually the yoke is moving around sig-



nificantly to get the aircraft to do what you want. On final in windy conditions, 40%+ deflections to counter gusts is not unusual. Final is usually around 130 knots at 50% flaps, and when landing is assured, flaps are set to 100% and speed is slowed to 125 or so, touchdown is around 110. These speed are weight dependant – the flight engineer works up a card with speeds prior to every landing. This constant slowing on final is a little unusual compared to the constant airspeed stabilized approach of jets, but it is the way the C-130 folks do it. The reason for the flap delay is to reduce the possibility of a go-around with the flaps at 100%.

Overall, it is an easy to fly airplane. It acts just like any other. Air work drills are pretty simple. Part of the training it to conduct approach to stalls, in which the aircraft is recovered at either the indicated stall speed or any type of buffeting. The CG does not like to practice full stalls.

With most multi-engine aircraft, mastering engine out scenarios is where pilots make their money. The C-130 has a huge vertical stabilizer for a reason – it takes a lot to counter act asymmetric thrust resulting from a lost engine. Having 4 engines does have its advantages, as the lose of one engine is not a 50% power loss situation. In fact, you can usually reduce power on the opposite symmetrical engine to reduce asymmetric yaw. When two engines are shut down on the same side (in training, they are brought to idle), the amount of rudder pressure on the pedal required will cause your leg on the side of the good engines to end up doing a sewing machine motion if you are not careful. Add a go-around and you will probably feel sore the next day unless copious amounts of rudder trim is used.

The large rudder and engine situation leaves the potential for a huge amount of yaw force if it is not managed correctly. There is well know C-130 accident in the Air Force in which a student was practicing a 3 engine go-around – a case when the three operating engines where at max power and rudder is used to counteract the asymmetrical yaw. However, the student mistakenly applied full rudder on the same side as the simulated inoperative engine. The resulting yaw was enough to cause the aircraft to depart controlled flight and crash. It is also possible to enter "fin-stall," or stall the vertical stabilizer in the relative wind due to too much yaw. As with all multi-engine aircraft, stepping on the correct rudder pedal is essential.

Intentionally shutting down an engine is done when warranted. In-flight engine shutdowns or failures in a turboprop are a little different than a jet, as you still have a huge prop to deal with. Also, prop malfunction can be a worse situation than an engine failure. For example, if the prop inadvertently went into the beta range in flight, the yaw would so tremendous it would render the aircraft uncontrollable (at least that is what they tell me). If the prop's pitch angle decreases enough, the slip stream can over speed it enough to cause catastrophe. There are various safety mechanism in the prop to prevent this, such a pitch locking, decoupling of the prop from the engine, and the ability to feather. Unlike many turboprop engines, the Allison T-56 engine is physically connected to the drive train. So, when the prop is feathered and the prop stops moving, the engine stops. Because of this, the aircraft does not have any type of auto-feather function and, like small twins, power failure on takeoff involves an expedient feathering of the prop to eliminate drag from the free-wheeling propeller.

After all these technical details of flying, the reality is that most of the flying is long. When I say a patrol, I mean a *patrol*. For one of my first operational flights, we went up the coast all the way to the Canadian border and back. To me, 45 min in a Pitts or 2.5 hours in helicopter is long time. After my first "long" flight, I expressed my amazement to the veteran crew, "Wow, we just flew 6 hours!" The crew looked at me quizzically and the pilot said, "You ain't seen nothing." Since then, my longest flight has been 10 hours. I have heard stories of 12 hour plus flights. These involve intentionally shutting down one of the 4 engines to save fuel and increase loiter time for the sake of someone in trouble below.

So, if you fly to Hawaii from California in a single engine and your oil pressure goes to zero half way there—get a good position report and MAYDAY out—chances are a C-130 is going to come look for you!

-Che

IAC Chapter 38 Membership Application/Renewal Form

Name: _____ **Spouse:** _____

Address: _____

_____

City: _____ **State:** _____ **Zip:** _____

Home Phone: _____ **Work Phone:** _____

E-mail 1: _____ **E-mail 2:** _____

IAC #: _____ **EAA #:** _____

Certificate #: _____ **EAA Expiration Date:** _____

Judge: ☐ Regional ☐ National

Competition: ☐ None ☐ Basic ☐ Sportsman ☐ Intermediate ☐ Advanced ☐ Unlimited

Aircraft: _____ **N #:** _____

Referred By: _____

Dues: ☐ Single Membership ($25/year) ☐ Family Membership ($30/year)

Send with check, made payable to "**International Aerobatic Club Chapter 38**", to:
Howard Kirker, IAC38 Treasurer - 2279 Ocaso Camino - Fremont, CA 94539

Next Meeting

Sunday, January 13th, 2008
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CHAPTER 38

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