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PETER HANDLEY

Flying the single-seaters

by Rob Erdos



The community is a close-knit one and willing to share information that can lead to safer and more efficient operation of these valuable warbirds. Rob flies his hands around, demonstrating a technique to fellow VWC Spitfire pilot N. Kent Beckham and Lancaster pilot Andy Dobson of Canadian Warplane Heritage Museum.

ng Out

If you take a stroll through the Vintage Wings of Canada hangar you will notice the distinctive shape of the Westland Lysander, currently undergoing refurbishment. The crew is making excellent progress with the airframe and systems, and we anticipate first flight some time this summer. So, with the first flight of an invaluable historic aeroplane fast approaching, someone has to learn to fly it. It will be my responsibility and privilege to take that Lysander airborne for the first time in more than 60 years. How? Just how do Vintage Wings pilots prepare to conduct a safe first flight on an unfamiliar type? The question arises often when I walk the

hangar floor admiring the aeroplanes with another pilot. When the pilot's gaze falls upon these gorgeous machines, whether Spitfire, Hurricane, or the soon-to-fly Lizzie, I am invariably asked, "How do you get checked out to fly it?" In this article I shall attempt to answer this question, at least from my personal perspective, sharing a few of the techniques that I have developed in my "day job" as an experimental test pilot.

Typically there is no training course, no handbook or manual that will adequately describe the technique used to fly a historic aeroplane. Most likely the flight manual exists. During the war it was called pilot's notes, and it consisted of a thin pamphlet

of a few dozen pages that recommended some airspeeds and related the whereabouts of the important levers. Nevertheless, those quaint old-fashioned pilot's notes are not sufficient. They tell you, with scant detail, *how the aeroplane works*. What I need to know is how to work the aeroplane. Alone in the cockpit on that first flight, I must strap in prepared to behave appropriately to the demands made by the machine. I need to know about *technique*. Will the aeroplane veer sharply on takeoff? Will I be able to lift the tail? Should I? How much pressure will be required on the stick? Are the controls sensitive? The collected answers to these questions are typically called "skill" and are acquired from experience. I don't have any. What to do?

Personally, the first step in the process is to ask the aeroplane. Seriously. It is an axiom in flight testing that aircraft fly like they look—provided of course that one has learned how to look at them. A



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Last summer, Rob Erdos flew the Vintage Wings of Canada Hurricane IV to the Canadian Warplane Heritage Museum, a like-minded organization with lots of experience in warbird operation. It too has a fully restored Westland Lysander built nearby in Toronto at National Steel Car. This Lizzie has not yet flown either, but Rob was invited to do a little cockpit work and even taxi the aircraft. Here he climbed up to what may very well be the highest cockpit in the single-seat category (single pilot in this case) followed by one of CWHM's aero engineers.



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Rob learned the intricacies of the Lysander control panel and some tips on engine start from one of Canadian Warplane Heritage's highly experienced aero engineers.

careful walk-around can be very revealing: How large are the control surfaces? What is the geometry of the undercarriage? Where is the centre of gravity with regard to the undercarriage? In the case of the Lysander, for example, the wheels are mounted generously far ahead of the centre of gravity; an understandable configuration intended to minimize nose-over for an aeroplane designed for rough

airfields. It reminds me, however, that I should avoid wheel landings lest they produce an embarrassing bounce. The objective of this thorough engineer's-eye inspection of the aeroplane is to build a mental model of its flying characteristics; a model based upon the geometric properties of the machine in comparison to other better-known types. It is a process demanding experience, and that is why test pilots value the opportunity to fly as-

many different types as possible.

The inspection includes a careful look at the cockpit. At the initial stages I am mainly concerned with spotting the novel and unusual, making mental note of anything that will demand that I behave in a manner at odds with my previous training and habit patterns. It is wise to pay particular attention to systems that have been "improved" or modernized from the original configuration. In my experience, such intended improvements are often the "lumpy bits" that demand the most attention to operate.

Next it is time for homework, lots of homework. The self-checkout process involves accumulating everything that has been written on the subject of flying a particular machine. For now, I will set aside the glorious battle histories and tales of daring. I am looking specifically for descriptions by pilots of handling the beast. These can be found in wartime memoirs, contemporary pilot reports from the warbird community, or test pilot's reports from assessments of captured examples (always a good read).

Of course, I have struck gold if I can talk to a pilot with experience on type. Memory tarnishes with time, so most valuable is a pilot who is currently flying

the machine. In my experience, my colleagues in the warbird community have been exceptionally generous in sharing their knowledge, and a cockpit checkout from a qualified pilot is very confidence-inspiring. My Rolodex highlights the names of Dave Southwood (Empire Test Pilots' School), Andy Sephton (Shuttleworth Collection), and John Romaine (Aircraft Restoration Company) as invaluable references. When they talk, I listen. Between them they have flown in an amazing variety of aeroplanes, and most importantly they can articulate the process in a cogent and pragmatic manner.

This is not to imply that the experiences of the wartime pilots are any less valuable. I recall a conversation with the renowned World War II ace Oscar Boesch while I was preparing to check out on the Me-109. I called him at his home in Toronto to humbly ask if he might assist me. Oscar demurred that it had been more than half a century since he last flew an Me-109 and that "it had been on fire at the time"—and then he proceeded to give me an astonishing, almost photographic, description of its handling qualities. Rest assured, I listened carefully.

I listen carefully, but critically, when discussing the flying qualities of an aeroplane with other pilots. Opinions often vary widely about how to fly a particular machine; myth and folklore often colouring the boring technical facts. For example, there are, I believe, as many ways to start a Merlin engine as there are individual pilots. (Want to start an argument? Ask a room full of warbird pilots when they engage the magnetos during engine start.) I hear aeroplanes variously described as "squirrely," "loose," or "nervous." The truth is that where flying qualities are concerned, pilots may know how to successfully fly the machine, but they often can't describe the subtle touch and technique that they apply. It comes too naturally to them; that is what makes the really good pilots so good. Perhaps it's my nature as an engineer, but I don't just want to know what to do, I also need to understand *why*. It is my job to interpret each pilot's descriptions of his flying technique in the context of my own mental model of the aeroplane, and to fit his descriptions into my understanding. I call



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Rob starts the Bristol Mercury engine and does a little tarmac flying to get a feel for ground handling. The guys at CWHM have been generous with their expertise and time, allowing Vintage Wings to learn some valuable gen prior to our own engine start-up. The CWHM Lysander is scheduled to fly this summer, and Rob has been invited to conduct the first flight and post-restoration test-flight program. It is a good example of the cooperation and sharing of knowledge that exists between CWHM and VWC.

the process "forensic engineering."

If I'm successful I will eventually feel that I understand the unique character of the aeroplane and the elements of technique that will provide safe control. That's when the work really begins: I write it all down. This takes the form of a detailed "operations manual" for a particular aeroplane. The manual is not just for that type of aeroplane, but for a specific serial

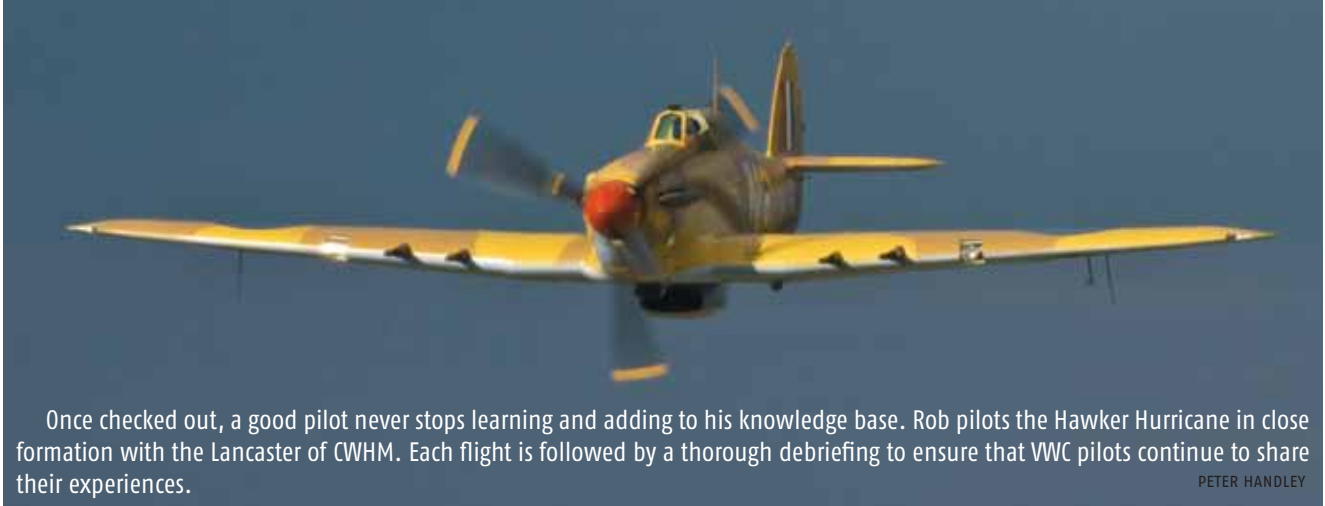


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Even when you've already checked out and had dozens of hours on type, the experiences of other pilots will only add to the body of information a pilot should collect and share. Here Rob chats with former Hurricane and Spitfire pilot Chris Preston back in 2007.

number, reflecting the exact configuration of parts that Vintage Wings is operating. The completed work is more like a modern flight manual than the original pilot's notes, including limitations, normal and emergency checklists, and detailed descriptions of all the systems. The necessity for rewriting the manual is justified by the fact that the original limitations often presumed that one was taking the aeroplane to war. Much more conservative limitations are relevant to demonstration flying in an invaluable historical treasure. We strive to fly the Vintage Wings aeroplanes such that another lucky pilot will have the same privilege a century from now.

The checkout process does not end with writing the manual. In fact, that's where it begins. Countless hours will subsequently be spent in the cockpit, rehearsing the procedures to ingrain the correct responses deep into muscle memory. If I have learned one thing as a test pilot, it is that I will become significantly dumber once the engine is started. It's best to plan on it. It must look silly, but I prepare to fly by sitting in the cockpit and acting out aloud numerous scenarios: normal landings, engine failures, blown tires, spin recoveries. The objective is to reinforce habit patterns, and this can only be done in a real cockpit. Reading



Once checked out, a good pilot never stops learning and adding to his knowledge base. Rob pilots the Hawker Hurricane in close formation with the Lancaster of CWHM. Each flight is followed by a thorough debriefing to ensure that VWC pilots continue to share their experiences.

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Rob taxis after another perfect landing at a Vintage Wings open house event. Rob's experience and skill at flying this historic airplane has allowed him to create tools, build checklists, and collect information that in turn can be shared with other Hurricane pilots-in-the-making. Recently, this experience helped get Dave Hewitt of the Canadian Harvard Aerobatic Team checked out on type.

a manual only stimulates the imagination. Rehearsal stimulates the muscles, the eyes, and the memory. The rehearsal continues until the tasks are consistently performed the same way each time.

All of this preparation presumes, of course, that the pilot has sufficient flying experience and proficiency for the aeroplane that awaits him. There is no substitute for recent flying experience, lots of it. In the days preceding a first flight, I try to fly as often as possible. (This implies that pilots aren't *always* trying to fly as often as possible. Okay, you caught me.) Flying training needs to be productive, including practise forced landings, aerobatics, and formation experience, ideally in an aeroplane as close as possible in performance and handling to the one awaiting testing. I keep a handbook that outlines a selection of what I term "loading tasks," simple manoeuvres that can be performed in any aeroplane and are

guaranteed to challenge the pilot. For example, I like to perform roll reversals, say from a left to right 45-degree bank, while precisely maintaining heading, altitude, and airspeed. Perfecting that manoeuvre is a terrific reminder about the proper use of the rudder pedals. The goal is to ensure that your brain can go at least as fast as the aeroplane that you're preparing to fly. You can't be too prepared.

Ultimately, the big day arrives and it is time to strap on the aeroplane and go flying. No amount of preparation can completely alleviate the anxiety associated with the first flight of an invaluable high-performance single-seater. Caution prevails. The objective of any first flight is simple: to insert the aeroplane into the middle of the flight envelope and bring it back again safely. Every task is oriented toward that goal. Subsequent flights will gradually expand the envelope, and every test flight follows a scripted plan.



PETER HANDLEY PHOTOS

World War II Spitfire pilot Louis Geffrion and present-day Spit man Rob Erdos talk about the flying qualities of this legendary airplane. It's in quiet moments like this that tiny bits of information are uncovered from someone who has been there, and those bits add to the knowledge base that Vintage Wings is committed to building and maintaining through people like Rob Erdos.

If there is one cardinal rule in flight testing it is to *plan the flight and fly the plan*. Flight testing can be very unforgiving of improvisation.

Sometime this summer the Vintage Wings' Westland Lysander will return to the sky for the first time in more than 60 years. That flight will be the culmination of an extensive effort that is ongoing right now in our hangar. It will be my job to repay the efforts of our volunteers and staff by conducting a safe first flight; a process that takes careful preparation. The Lysander deserves nothing less.

Rob Erdos, a former military pilot, is a senior test pilot with the National Research Council's Flight Research Laboratory in Ottawa. Rob will be giving a presentation in May 2009 at the Canada Aviation Museum about flying the principal Battle of Britain fighters: Spitfire, Hurricane, and Messerschmitt Bf-109. He is one of only a couple of people in the world qualified to do so. ✈