Virginia Aviation
History Project Report

Norm Crabill

Lou Divone's final article concludes his series on aviation's "defining technology" and geo-politics by interpreting events leading up to and during the European Theatre of Operations during WWII. Then, a little about Lou's personal interest in aviation and some of the accolades he earned for his work with the US National Wind Energy Program.

"Steve" Stevens told Scott Gross and me about life at a different level of aviation technology at old *South Norfolk* airport and its legacy of people who worked and trained there.

Last time's Mystery Plane is identified, with no winner, and a new one offered, with a significant prize to the winner. This one is even harder than the last, so I feel safe in offering a prize that has real value ($100). Prove me wrong if you can. I bet nobody out there can!

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The Battle of Britain; the Bombing of Europe; and Some Things You May Not Have Known

by Lou Divone, VAHS

I am an inveterate reader and sometimes when you read a half dozen books on the same subject, some nuances come to light; discrepancies, disagreements, uncertainties and the subject becomes more interesting and fascinating.

You are all familiar with the Battle of Britain, but some things may have snuck by you. Some historians argue, I think correctly, that for all the battles and wars, only a couple of dozen really changed culture and civilization; most merely traded one set of dictators or kings for an equivalent set. Alexander at Arbela means we have a Greek civilization and not a Persian one. The Battle of Vienna means we have a Judeo-Christian and not a Muslim culture.

I think the Battle of Britain fits that criteria. If Britain folded, so would Russia; she nearly did anyway. No way we could have attacked from here. There would have been the Thousand Year Reich and democracy in Europe would be dead. And it was a close run thing. But to win, Germans had to defeat the RAF in order to invade.

The Brits were great strategists if poor tacticians. In the early 1920s they developed a great strategy. Everyone was prostrate with the results of the First World War and there were no threats. There was also little money for military purposes. So the Brits decided that they would have 3-5 years warning that some king or dictator was

getting out of hand and they would plan a rapid gear up in that time and they devoted their limited resources to that strategy.

They knew technology would change fast so they continued to develop new aircraft, but they never spent the money for many of them; prototypes and an occasional squadron. Instead they developed the rapid growth strategy. They set up the shadow factory concept where car companies, furniture builders, appliance manufacturers were already set up, when the bell rang, to start building components and even airframes to support the latest that the major aircraft companies had to offer.

They couldn't afford a large RAF, so for pilots, they developed several auxiliary and reserve air staff. They mainly funded college students that wanted, but didn't have the money, to learn to fly. It was cheap and you had a large number of pilots, admittedly with only a couple of hundred hours in Tiger Moths, but you weeded out the losers and had a crop that knew navigation, weather, and basic flying skills. Maybe with another 50-100 hours in higher powered aircraft and you had a cadre of fighter pilots.

Understand that while the young RAF pilots had huge dedication and morale, they were novices. Their German enemies, many of whom had fought in Spain, Poland and elsewhere had far more experience. Also British tactics were awful. They were taught to fight in tight 'Vics' where the wingman had no spacing to allow for scanning the skies. They did have one thing going for them. The Germans followed orders and if Goering said stick to the bombers they did. The near-teenage RAF pilots did their own thing and without orders started flying 'finger fours' imitating the Germans and throwing themselves over the sky.

Now the third arm of the British strategy, which was key, was the development of the early warning system. They had learned from the Gotha and Zeppelin raids of WWI that you couldn't keep standing patrols all over the south of England. They continued to develop a superb system throughout the mid-war years. The acoustic and observer corps was maintained and the unexpected arrival of radar was grabbed immediately. The Ministry of Posts and Telegraphs buried lines and control centers to prevent disruption of communications. Vickers Wellesleys and Wellingtons constantly crossed the North Sea in training exercises.

You are all familiar with the operations room with the WAAFS moving the little placards around the map board, but it is a far more sophisticated system than one first imagines; think about it. You get eight phone calls. Is it one raid reported 8 times or 2 raids reports 4 times each. The lower balcony was staffed with 'filters', experienced pilots too old for combat. Their job was to sort that out. If you notice, the clock on the rear wall has the five minute intervals in different colors, and so were the little placards. The filters knew from practice that by the time they made the call, the raider would be 3 minutes or 10 miles past the placard. They also knew that vectoring and scrambling the interceptors would require another 10 miles to place them in position. They also had to guess if the bombers would continue on course to Reading or turn right to the docks. They weren't right all the time, but statistically, it made all the difference. A good part of the time the fighters were at the right place at the right time.

The next major subject is the aircraft themselves and that is an even more fascinating story when you get into it. There are those that argue that while the Spitfire got the reputation, it was really the Hurricane that won the Battle; there were twice as many of them, they shot down twice as many Germans, and the ratio of kills versus downs was twice as good as the Spitfires. Those numbers are true, but they don't explain the real story.

Both R.J. Mitchell and Sidney Camm knew war was coming and they had to scrap biplanes and make a giant leap. Mitchell, with his Schneider Trophy experience, was of the view that you had to have the fastest, most

maneuverable, highest rate of climb that you could get and would brook no compromise. He took the biggest engine he could get, the new Merlin, and crammed it into the smallest fuselage he could make. I can barely get into a Spitfire and my head hits the domed canopy. He made it an all metal monocoque, fairing and streamlining everything. In particular his Schneider experience told him he wanted a thin wing. That's why the Spitfire has that gawky landing gear. The spar was too thin to take the landing loads if the gear was further out.

The one place Mitchell compromised was that aerodynamicists knew that an elliptical planform was the most efficient. But even Mitchell decided that was a bit much for manufacturing. If you look at the early sketches of the Spitfire, you will see he designed a straight taper looking like a Mooney wing.

Camm took a different approach. He had built most of the between the wars fighters and he knew that the production orders would come too late and he would have to build fast. So the Hurricane is not monocoque except of front. The rest is steel tube, wood formers and fabric covering. He also gave up on a thin wing. With a thicker wing, he could mount the gear farther out, giving a bit more anti-ground loop coverage for the poor low time pilots. So he gave up some top end performance for practicality. Recognize the Hurricane is 20 knots slower than a Me-109 which is 20 knots slower than a Spitfire.

This work was all done as private ventures. Finally, the Air Ministry came out with the request for bids, but there was a hooker in there. Some nerd had estimated that it would take 18 pounds of lead to stop a modern bomber, although how he came up with that is beyond me. Nevertheless, back calculating from bullet weight, rate of fire and statistics from training, they came out requiring 8 machine guns. Unheard of; four was the most that had been used. Camm shrugs his shoulders and puts two more guns aboard.

Mitchell is screwed. The wing is too narrow and thin out there. The gun breeches will stick out top and bottom and also interfere with the aileron hinge. But the thickness of a wing is proportional to the chord; a 12% thick wing on a bomber with a 30' chord is a lot thicker than a 12% wing on a trainer's 3' chord. So Mitchell can keep his thin wing by increasing the chord. Perhaps going to a Cessna planform with a straight chord inboard and tapered at the ailerons. But Mitchell says, hell, if I'm going to do that, I'll go back to the elliptical wing I wanted in the first place. So there is a nerd in the basement of the Air Ministry responsible for that beautiful elliptical wing and the fierce firepower of eight machine guns.

Some other lesser known points that made a difference at the last moment. The Spitfire I's and Hurricane I's came with fixed pitched propellers; not the kind of thing you want to bolt onto a Merlin, Rotol finally came out with a controllable pitch prop and banged them out around the clock. It wasn't until May during the Channel battles that they became available in quantity. Rotol engineers would drive their lorries right up to forward bases and here's a Hurricane down for a couple of hours of repair. Pull the prop and bang the new one on. By the Battle of Britain most had been converted.

Also, the gasoline being tankered across in the convoys was high octane. It was a secret American development, but Roosevelt said send it to them and that allowed Rolls to crank up the supercharger another bit.

Now we need to put these stories together to answer the original question as to which aircraft won the Battle. The numbers are correct. But remember the early warning system and strategy. The Hurricanes were vectored toward the poorer armed Heinkel 111s and Dornier 17s while the Spitfires were mixing it up with the far more deadly Me-109s. Again only statistically, but it explains the loss rates and kill rates.

But again, going back to the original question, if the Brits had selected just the Hurricane to build – and they nearly did, considering the Spitfire a primadonna – they would have had more Hurricanes than the combination of Hurricanes and Spitfires but with poorer performance would have lost through attrition. If they had picked just the Spitfire, it could hold its own, but would always be overwhelmed by numbers.

No, the irony is the wrong question is being asked. It took the combination of both aircraft to win; the Hurricane going after the bombers and the Spitfire mixing it up with the Me-109s. The Brits understand this and don't argue the point. Every display and gate guardians always show both of them, because it took both to win the Battle and it was a near run thing.

Unknown via Lou Divone

The Hurricane and the Spitfire
Their uniquely different characteristics were a major factor in winning the Battle of Britain in 1942.

The Bombing of Europe; and Some Surprising Decision-Making

There has been a long running battle between the proponents of massed bombing to destroy German industry and civilian morale. Many historians claim that the bombing of Europe was a classic waste of resources and did little to damage German industry or morale. They cite German records which show that German war production went up consistently from the late 1930s through mid-1944 before it leveled off and then went over the cliff in 1944 and 1945.

But that is easily explainable and irrelevant. When we and the Brits went to war, we pulled all the stops: factories running 24 hours a day. Everyone on overtime, ration oil and tires, turn in your aluminum pots. The German's didn't do that. They felt it would be a short war and didn't need to. Besides dictators like to keep their [non-dissenting] population happy. As Germany took over other countries that added to their industrial output; they had basically the European Community so of course their production went up.

Now it is irrelevant because the historians are measuring war production versus time, because they have the numbers. But the question is not the damage to war production relevant to time. It was with and without bombing and there is no data for that. You can't rerun the war with and without bombing. So it has to be done analytically with all the assumptions and biases that creep in and the argument goes on. Some say a lot, some say minimal, the real answer probably in the middle.

Now please read the following before losing your cool. You see the decision to start bombing in late 1942 and 1943 had little to do with destroying German industry or morale. With the exception of the fanatics, everyone knew that an unescorted daylight bomber would not get through without appalling losses no matter how many machine guns you stuffed into them. The daylight Blitz, the Wellingtons in France all proved that. Why not wait a year until the P-51s and P-38s show up and you have more bombers that can do some damage.

Churchill and Roosevelt have two main worries that could actually cause the loss of the war; remember, the good guys don't always win. One is the Battle of the Atlantic. If Britain starves out, Russia will fall. She nearly fell anyway. The Germans had Leningrad surrounded and were at the gates of Moscow. I have visited the monument to the point where the Russians stopped them. You pass it in the cab coming in from Sheremetyevo Airport; it's like it was in Reston or Tyson's. And to the south the Germans are far east of that meridian and are racing across the Ukraine heading for the Caucasus oil fields.

Second, Russia could fall on her own allowing Hitler to go back to Britain with the same results. The Thousand Year Reich would be real. Stalin is yelling for help. Another fear is that Stalin could sign an armistice – embarrassing, but the Soviet could survive. Don't forget the Russians had already signed three treaties with Germany. Remember also that until 1934, Hitler was a one-horse dictator. International Communism was the main threat. They are going to nationalize the factories and shoot the industrialists. The west did everything possible to thwart Stalin. There is no love lost.

One of Stalin's concerns is that the Allies have a "stall strategy". Let the Germans and the Russians beat themselves into pulp. Then the Allies can easily march through, set up another Weimar Republic and continue east to destroy Communism, get rid of Stalin and set up a puppet Czar to sell resources at bargain prices. Don't scoff. Both Roosevelt and Churchill had advisors recommending just that, but they didn't accept it. Not altruism; Churchill would have loved it. They just concluded that Stalin would figure it out and go the armistice route.

Now go back to February 1942. It is the first meeting of the higher-ups of the three countries to set the master strategy of the war. The first decision is simple if painful. Hitler is more of a threat than the Japanese and takes priority. The Navy and the Anzacs will have to suck hind tit and hang in there until there are enough reserves. Meanwhile, what is the strategy to take care of Hitler? Stalin is pleading for help; not just supplies, but he wants the Allies to attack western Europe in 1942 to take the pressure off. In 1942? Britain is still reeling from Dunkirk and the U.S. has the 16th largest Army in the world. OK, how about 1943? The Allies still hedge and even hedge on whether 1944 is possible. No one yet knew of the miracle of the U.S. industrial gear up.

Stalin is livid. He is beginning to think the stall strategy is in place. He argues, hey you guys. You Americans lost what, 3,000 at Pearl and 6,000 defending islands that aren't even yours. And you Brits lost 50,000 in France and another equivalent in the Blitz. I'm losing 50,000 people a week and much of my best land and industry.

Afraid of the armistice possibility, the Allies say look, we can't attack on the ground in the west. But we have something no one else has; the four engine strategic bomber. We'll go over the top and bomb the hell out of Germany. We'll level their cities; destroy their industry, bombing around the clock, the Brits at night and the Americans during the day. And it won't be the parents at home that get the note their son has been wounded at the front. He'll get the note saying his wife and family have been blown to smithereens. It was brutal and ungodly to those on the ground. Stalin knew the attrition rate the Americans would take and that convinced him we were for real and he agreed to stay in the war.

Initially, the Americans tried to target industrial targets, but as time went on and penetration went deeper, the limitations of even the Norden bombsite became recognized, it became more like area bombing. The Brits didn't care from the beginning. At night they just dumped their loads over some city with no difference between an industrial center and a hospital. All knew the price those on the ground were paying.

Now back to the original question of bombing damage done. The historians, academics as they are, don't continue the question. Just where is all this increased war production going? The .88 was arguably the best dual purpose artillery piece of the war; both anti-tank and anti-aircraft. But where were the new ones at the giant tank battles at Kursk and Privit Marshes? They're off surrounding Bremen and Hamburg and Berlin. And the new FW-109 which Germany got into production late. It's not fighting Yaks; it's trying to hold off the bombers. So the Schturmoviks and Petlyakovs start rolling up the German front against aging Me-109s.

But now the Germans are whipsawed. The P-51s and P-38s have arrived. The Germans don't want the Allies starting the second front, but at least they are civilized. The Russians will rape everything in sight. The Germans have to reverse their priorities and move stuff to the Eastern Front such that they had no air cover to speak of on D-Day. I know it is a convoluted and strange story, but I believe it is correct. Certainly the results bore it out. None of the above should take away one iota of the courage, dedication, and sacrifice of the air crews who bore the brunt of this story; most had no idea of the strategy. They were the ones that paid, but their sacrifice truly helped win the war.

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Via Jim Densmore,
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Lou Divone
1934 - 2004

Our colleague, Lou Divone, died May 9, 2004. Lou was an enthusiastic and contributing member of the Virginia Aeronautical Historical Society since March 1, 1984. He contributed many articles on aviation history