**The Diamond Anniversary Celebration of US Soaring**

**National Soaring Museum**

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**Remarks by Doug Jacobs**

It is my great pleasure to be part of this forum, if only in abstentia, and to share the program with the likes of George Moffat and Karl Striedieck. A Diamond Anniversary is certainly a milestone event, and it is well that we are prompted to look back on where we've been. My thanks to the Soaring Museum for making this gathering possible.

When I consider our assigned portion of the program – The Golden Era from the Sixties to Modern Times – I am much reminded of the day, now some ten years ago, that I got an AARP card in the mail. My reaction was utter horror, and I could not possibly imagine why this fine national organization would consider me a suitable candidate – I was much too young, wasn't I, for the retired set? A glance at the calendar argued otherwise, and though I dropped the application form like a hot rock, there was no arguing with Father Time – I was in my Fifties.

So it is with my topic today. I'm forced to reckon with the grim reality that many in soaring today may consider your panelists as historical figures, rather than the young energetic rascals who appear before you and who just know they have many great soaring days ahead of them. So be it, we've each been blessed with the thrill of many, many miles under our wings, have had a great deal of fun and have enjoyed enormous satisfaction from our soaring careers. If we can pass some of that excitement along to inspire the next generation of racing pilots, maybe being considered an old fart is not so bad after all.

However, I do want to point out my relative youth among this group. Not to cause my fellow participants angina (perish the thought, no longer a joking matter!), but to acknowledge the great debt I owe them in whatever soaring success I (and, no doubt, many others) have achieved. Without the careful guidance of Winning on the Wind, the inspiration of astounding world record flights, or the thrilling agony of watching them bury the competition, including me, in contest after contest, many in soaring would not have been motivated to explore the limits of the new generation equipment and technique that emerged following the introduction of composites to glider design. I got in to soaring in the mid-70's at a time when Moffat and Striedieck were household words; at least they were in soaring households, and certainly in ours. By the time of my first Nationals, at Elmira in 1981, George had won two World Championships, and Karl had multiple World Records, had garnered Silver on the World stage, and was well on his way to double digit National Championships. These two were (and still are) my heroes and much of the technique and style utilized by competition pilots in the 80's and 90's

originated with them. This was certainly true in my case. In many ways, I have to admit to the wisdom of Hal Latimore, who wryly observed to me one day on the launch line in Hobbs that "You guys are all a bunch of Moffat clones". I'm sure he meant it as a compliment.

How to summarize a decade or two (or three) of competition soaring in the United States? Well, my racing experience started in the early 80's, at a time when the second generation of glass ships was becoming available – the LS-4, Discus, Ventus, and ASW-20 came into wide use during that period. Compared with first generation models such as the LS-1, Standard Cirrus, Libelle and ASW-15, these were much improved airframes. While nothing like the performance break between wood/metal and glass, the capabilities of these new ships were markedly better than first generation glass in terms of airfoil design, drag, and all those other technical things I can't ever hope to understand about gliders.

What also markedly differed were their handling qualities. In particular, control balance was better tuned, and stall/ spin qualities were significantly tamed. They were more "honest" airplanes – willing to do what you wanted them to do with fewer nasty surprises in store for the unwary. In fact, the transition from Schweizer trainer to glass ship, so often the bane of pilots trying to work their way up the performance ladder, became far, far easier as glass ship handling improved. You could feel much more comfortable about putting a 1-26 pilot into an LS-4 than ever you could into a Standard Cirrus. Happily, this trend has continued through the 90's and into this century – the handling of the LS-8, Ventus B/C's or ASW-27's has become positively delightful, enabling the pilot to almost forget the basic mechanics of flying the glider in favor of concentrating on getting the most out of the soaring day. The new 18 Meter versions are even better, albeit not so easy on the wallet. And absolutely fantastic has been the emergence of highly capable two place gliders such as the Twin Grob, ASK-21 and later the Duo Discus and DG-1000, each of which has serious cross country performance. With these gliders it is now possible to show a pilot what cross country and racing is like, as we do in the US Team Racing Camps, one of which will be held here at Harris Hill in August, rather than just describe it.

The mechanics of the second generation of glass gliders were getting better as well. With few exceptions, they fell together easily at assembly, and control hookups were simplified and made more safe. (A subsequent improvement, the introduction of automatic hookups, has been a godsend and has undoubtedly saved many lives). Additionally, and with all due respect to the earlier generation of glider futzers/improvers, the factories were able to much improve the condition of as-delivered gliders, to the point where extra sanding, sealing, fillets, and other such distractions became less and less important to ship performance.

But how much did the raw performance of these second, and subsequently third generation glass ships improve? Increasingly less, I'm afraid. Walter Schneider once told me that the designers were working down a funnel. To the extent I understood his German, what I think he meant was that more and more effort was being made to tune designs which resulted in less and less improvement – the classic "diminishing returns" of Economics 101. New glider design saw heavier wing loadings through the introduction of bigger ballast tanks and thin airfoils better able to carry the weight, winglets to improve thermaling performance, but not a great deal of fundamental change in the design itself. Marketing and brochuremanship continued to tout the newest features of newest ships, but subtract out the effects of heavier wing loading or more span, and it's hard to see the claimed performance differences in the air.

I know, I know, I'll get lots of argument on this last point from my fellow pilots. Don't top competition pilots fly the latest, hottest ships? Don't they trade up routinely to the newer designs promising performance improvements? Isn't the chief topic at every SSA Convention the latest scoop on which is better than which? The answer to all of these questions is, of course, yes. There are differences in performance between similar generation gliders, but my point is that they are small, and getting smaller. A few percent, or even a fraction of one percent, can be significant in a race – I was one point out of 4th place this summer in Sweden, which my crew John Good calculated as a few seconds lost somewhere over two weeks of racing. Races have indeed been won and lost by tiny margins – Tommy Beltz's finger pointing loss of a World Championship at Hobbs in 1983 is probably the most famous (or infamous) example. So top competitors will always want to have that edge by seeking out gliders with even a sliver of better performance. However, during the 80's and 90's, and especially today, it emerged that the glider just ain't the primary determinant of competition success that it used to be, and new contest pilot wannabees really needed to appreciate that fact and direct their energies where they'd do the most good.

I think this has been a highly significant realization because it led to relatively less concentration on glider performance and relatively more, even much more on pilot technique as a means to winning competitions. We're all aware of pilots who obsess endlessly about whether theirs or their competitors' sailplane "goes better" or not, seeing and worrying about performance differences which at best are small. Much beloved by sailplane dealers is the low time pilot who equates stretching to buy the latest design with a sure ticket to the top of the score sheet. In fact, with the relative equality of performance introduced by second and subsequent generations of glass ship design, the pilot factor got much, much more important than the glider factor. Increasingly, differences in glide performance became so small that they could easily be drowned out by the pilot turning the wrong way when entering the next thermal. Over the course of an afternoon, small mistakes by the pilot, as enumerated so meticulously in Winning on the Wind, could add up to enormous differences between pilot scores.

Gone were the days when a Dick Schreder or a Dick Johnson could show up at the Nationals with a glider so superior that a win was inevitable. With the emergence of relative equality of performance between glider designs and the quality of the delivered finished product from the factory, gone also were the days of endless sanding, filling, filleting, sealing and so forth, unless, as one wag put it, the pilot found these activities good for the soul. It is significant that of the five team members at the 1985 Worlds in Rieti, Italy, only one pilot, Ray Gimmey, was flying a glider that was anything other than straight out of the box. (Ray was flying Dick Brandt's highly modified and extensively tuned Nimbus, complete with mercury filled in-flight adjustable CG mechanism). This was also true of pretty much the entire field of foreign competitors. It was mano a mano soaring, and has largely stayed that way since. Today it is very unusual (think Dick Butler) to see much in the way of pilot modifications to current racing designs when strolling down the launch line.

So what did all that mean for the development of competition during this era? Well, for one thing, I didn't have to learn how to sand wings. In fact, I still get the willies when approaching my glider with any sort of sharp or abrasive object. But more important, pilots came to recognize that they had to be students of technique, and to practice it relentlessly if they wanted to win. And the first step in doing so was to master the literature of soaring.

Now we're back to Winning on the Wind, but it indeed had ample antecedents. The Soaring Symposia, organized over four years from 1969-72 by Ed Byars and Bill Holbrook were visionary in scope, in that they concentrated as much on piloting as on ships (By the way, the complete Proceedings are still available online via Guy Byars site at http://www.betsybyars.com/guy/soaring_symposia/, and are well worth perusing some winter evening when one is in need of a soaring fix). The discussion on McCready theory conducted in one of them is still relevant today – Sam Zimmerman used it extensively in his presentation at the Perry XC/Racing Camp just concluded. Ed and Bill's effort was turned into one of the first comprehensive volumes on cross country soaring, entitled simply Cross Country Soaring. A quote from the Preface is telling:

"We have tried to make this a non-technical presentation which stresses philosophy and ideas about how to make more intelligent soaring decisions. You will not find detailed discussions on sailplane aerodynamics nor, for example, detailed explanation of such things as vortex theories of thermals, etc. We do hope, however, that after you have read this book, you will have gained appreciable confidence in your own ability to safely embark on either your first or additionally expanded cross country fights."

The pilot, not the ship, was the focus of their work. Following the appearance of Winning on the Wind came other fantastic aids for the pilot who wanted to learn, the most famous of which is Reichmann's Streckensegelflug, quickly (and mercifully) translated as Cross-Country Soaring. Helmut's work has become a touchstone for learning technique, and is required reading for any serious pilot who wants to compete. We list it as required pre-reading for the US Team Racing Camps, in fact. And there's a host of other works - a look at my bookshelf at home as I write reveals about three feet of other, similar efforts

by soaring pilots, not only to educate us in technique but also to inspire us – Welch and Irving, Piggot, Lincoln, Siebels, the list goes on and on. This body of work aimed at pilot performance continues to expand to the current day. The most recent example, done with absolutely gorgeous photography and an excruciating translation (perhaps from the Italian by way of Urdu through Farsi) is competing in Gliders by Brigliadori, pere et fils. Revealing is that there is virtually nothing in this World Championship caliber work about the glider. It's all about the pilot. To show how New Age soaring has become, there are even extensive sections on human factors, particularly nutrition (never far from the mind of a Continental with an educated palette), physical conditioning, mental processes and the like. Nothing on chanting in the cockpit, but can that be far behind?

I remember reading all this stuff voraciously as I learned to soar, fly cross-country, and compete. In fact, I still take down the most trusted volumes periodically, particularly before the soaring season starts, to review and tune up my aging brain again. I think that's also true of almost everyone I've raced with, and certainly was true of the successful Rieti team in 1985 and members of successive teams. You just had to master the literature as a starting point – you couldn't learn it completely on your own, even if you tried.

A further lesson was that pilots should get out of the shop or put down that brochure and go out and fly. Time in the air, whether in weak or strong conditions, with blue days or clouds, with fellow pilots in a pick-up race or alone, was a far more valuable contribution to winning races. In fact, the more difficult the soaring, the more valuable the practice time. George and Helmut said it repeatedly – soaring is hard work, the serious pilot must get out and fly, cross country if possible. Helmut even set out some 30 different "exercises" to practice on weak weather days around the airport. With a limited amount of time to devote to our sport – virtually all well known competition pilots of the era had jobs and only limited weekend and vacation time – it was and still is important to use it as productively as possible.

This became especially true because tasking became more challenging. In Rieti we flew only speed tasks, mostly triangles. That was the norm at the time – the old free distance task was no longer called. However, in search of greater challenge, and led by the United States, a variety of new pilot option tasks were introduced. These tasks basically give the pilot a certain amount of time to race and leave it up to him/her where to go next, either to another turn point or within a large area. The Cat's Cradle, POST task, PST task, and now the Turn Area Task (called Assigned Area Task internationally) are thus much more complicated to fly than speed tasks. For some, this has not been a welcome development – Walter Cawby was heard to complain, "Don't expect me to think and fly at the same time!" And indeed, these tasks require lots of in-flight thinking, so were resisted at first by many. Gradually, however, they have become the norm here in the US and, a bit more slowly, in the Worlds. I think the pilot community was a bit shocked in 1991 when Hannes Linke called a five hour

POST at Uvalde, but by the 2001 worlds in South Africa, we were flying into creatively shaped pie wedge areas sprinkled all over the place. Every worlds since has featured area tasks of some type.

It's also true that, much akin to George's observation that contests are won on the weak days, they are now won on the pilot option days, not the speed task days. Differences in pilots' thought processes, decision making, ability to change gears, and discipline while underway create much bigger point spreads on these days than speed task days when the course and turn points are a given. It's hard to know how to express this properly, but I think that pilots who emerged at the top of the score sheet during this period were particularly good at making decisions under these circumstances. Not necessarily smarter in any objective way, just quicker on their feet, so to speak

While we've been relieved of the burden of navigation by GPS (another lament is heard, this time from those who enjoyed all the "how I got lost" stories), the increasing complexity of tasking has made electronic help especially valuable. Over the 80's and 90's the first glide computers appeared, and since have become much more capable. Originally requiring pilot estimates of position, wind direction and strength and the like, they are now hooked into the GPS and able to compute just about anything required during a cross country contest flight. At the same time, if they are not thoroughly understood, they can distract to distraction and lose you the race. Here again, it is pilot capability that is key – glide computers require lots and lots of practice to add, rather than subtract from performance. .

With theory and practice as fundamental basis, what else changed? Well, in Rieti, we had a secret weapon. His name was Walter Neubert and he knew Rieti like the back of his hand. A highly technical mountain site like Rieti requires very extensive local knowledge of the best routes, the hot thermal spots, unique phenomena such as sea breezes, and the like. Walter had spent many hours there over lots of years. Uncoached in the pre-Worlds in 1984, Ray Gimmey and I had been nearly helpless. While competing in the warm-up competition gave us a good first-hand impression of the place, and while both of us had extensive big mountain backgrounds, Ray in the Sierras, me in the Alps, by the end of the contest we knew that we were just not going to learn fast enough. The rest of the team – Mike Opitz, John Seaborn, and Eric Mozer – would be in worse shape for not having been able to fly the pre-Worlds.

Enter Rudy Mozer, who has done so much in so many ways for the US Team effort over the years. Rudy knew Walter personally, and knew he was just the guy to help a rookie team from the States understand Rieti. Walter agreed to join the team in 1985, causing some consternation in his native Germany, but that didn't seem to bother him. Starting with the practice period when he flew with us in his big ASW-22, and throughout the contest while on the ground, Walter spent endless hours poring over a huge set

of relief maps of the contest area briefing us. He would patiently analyze the weather and the task, suggest in his gentle way the best routing through the mountains, the areas to avoid, the techniques to use to get around the course. As we gained knowledge and experience during the contest weeks, we provided feedback to him which he then cycled back to us for the next day's episode. And did it work! A gold medal for me, bronze for Eric, a near-miss 5th place for Mike, and good showings for Ray and John. My first impulse upon landing the last day (after a big hug from Martha, of course) was to find Walter and embrace him.

Coaching worked. Europeans were very quick to pick up on this lesson, if they hadn't already. The organization (and public funding) of the French teams is legendary. Their national site at St. Auban, stuffed with all the best gliders, is known for outstanding teaching of mountain soaring technique and guided flying through the French Alps. German and Italian racing teams have year around coaches who plan activities for pilots and are pivotal in pilot selection for their world teams. Probably the most outstanding example of the coaching movement, however, is Great Britain, particularly as it has focused on their Juniors. Led by top world competition pilot Justin Wills, the BGA has sponsored extensive training and camp programs aimed at educating pilots in cross country technique and getting them into one of the many competitions organized for low-timers in England. The BGA has even hired cross country instructors such as Gerald Dale, who was equipped with a capable two place glider and sent out to clubs around the country to do cross-country seminars each weekend. The results have been outstanding. Britain has been rolling up contest after contest on the world stage - the two pilots who were one-two in the Junior World Championship in 2005 for example were two-one in the FAI Worlds in Sweden this past summer in the Standard Class, and both are still in their twenties.

Sadly, we have not done as much of this here in the United States as we should have. True, we'd often have coaches for world teams – George coached the 1997 St. Auban team, for example, and Bill Malpas provided especially valuable local knowledge - but these have been episodic efforts for short periods of time at top competitions. What so often pays better is a long term development program sponsored in many locations by a strong national organization dedicated to expanding and improving the base of racing pilots. Our US Team Racing Camps effort is an early stage attempt to do this – we've held seven so far over the past four years, some aimed at Juniors, the rest open to everyone – but much, much more will have to be done to help close the gap between our teams and the best in the world.

And finally, no survey of the period would be complete without mentioning the very significant development of team flying. Banned by US racing rules, it is nonetheless become a highly developed and quite successful art utilized by international teams. We first saw it in Rieti among the French pilots, who flew virtually wingtip to wingtip for the whole contest. They've not abandoned it since, and have produced a plethora of imitators. The theory is that with two (or more) gliders working in tandem, a

wider swath of air is sampled, thermals are centered more quickly, and decision making is improved by the cross-check of two pilots communicating constantly by radio with one another. The disadvantage – what to do when one pilot gets behind, wait or go? – ends up being outweighed by the advantages, it seems. This is only really true however when the pilots involved practice together extensively, and have both committed psychologically to the notion that it doesn't matter which of the two win, only what the team result is. If this sounds vaguely sinister and definitely un-American to you, you went to the same soaring school I did. It has, however, produced spectacular results for its practitioners, the US not among them.

American participation in team flying has been very limited, first by its outright prohibition in our competitions but second on philosophical grounds. We are rugged individualists, at least we think we are, and flying a single seat glider around a cross country course does not seem intuitively to be a team sport. While the Worlds gives us an opportunity to exchange information on the radio, often very helpful, the long practice periods required for close coordination team flying have just not been available to us, nor have we by nature taken to the practice. It's hard to know how to handle this – allow team flying in US competition, completely changing the nature of how we race here, or ignore the issue and do the best we can when confronted with it in international competition? I don't know.

So, change and development goes on even now, as it has throughout the period. Ships are still important, but increasingly less so – pilots now recognize that overwhelmingly, what will win them competitions is better piloting, and go to work accordingly. Marvelous new tools have emerged to help the soaring pilot learn his craft – can anyone sit down with SeeYou, the popular GPS trace analysis software, and not be amazed at how thoroughly his or her every misstep during the afternoon can be scrutinized, and how much learning is generated thereby? The body of literature continues to grow, most recently thanks to the Brigliadori's. GPS has made tasking infinitely more complicated and, in my humble opinion, much more interesting and challenging. Pilots the world over recognize that soaring no longer has to reside in the same category as home study brain surgery – it can be taught in the classroom, can be shown in the front cockpit of a Duo, and can be coached by more experienced teachers. And the more of this we in the American soaring community can conspire to create, the better pilots we will produce.

Doug Jacobs

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