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## Introduction:

*The following is a collection of data formulated during late 1997 and early 1998 to assist a Scale Modeler understand the development, history, and what it is like to “care-for” and fly one of the most pivotal of sailplane designs in the history of Soaring. It is one persons’ current knowledge, and it can not be expected to cover all aspects of the DIAMANT. Additional information or corrections to the manuscript on the design type is welcome! New information received will be added, and contributors will be noted if so desired. This paper is not perfect, but it probably is the best “single source” document on the DIAMANT, therefore it can/should be copied, in full, and distributed providing the author is given appropriate credit.*

Hi Don,

As promised, I am attempting to put together some info on the DIAMANT. First it must be understood that I am not a writer, storyteller, journalist or anything that even comes close to being one, therefore there will be plenty of typing mistakes, and run on sentences, etc. in this letter. Also, as I am only one person, and not directly involved with the development of this sailplane, I speak of my personal experiences, and from what other “DD’s” (DIAMANT Drivers) and the surviving designers’ chose to relay to me. (As with many things in life, some of what is passed on here may or may not be 100% true and accurate, and some of it is based on interpretations from what the designers (Swiss) were trying to communicate. (As I speak no Swiss, nor write German, (the official Swiss written language) there are bound to be errors, along the way!!)

I will try to keep things in some reasonable order, however, since I’ve never attempted anything like this, your request is challenging. Also you had asked for additional info regarding my experiences in “Soaring”. Again, in trying to pass on info about the DIAMANT, it will be difficult to keep from adding my “personal” experiences! (Keep what you like and toss the rest!)

To start with, I feel I must open with a prelude on my personal “love affair” with the DIAMANT. It started in March of 1970, while attending a regular meeting of the local CIVIL AIR PATROL unit, I had joined that year, was taken under the wing of one of the many flight instructors, who was very active in Soaring. It seems he took a real liking to me, and we went soaring almost any time our schedules meshed! After about two months of this, he gave me many of his back issues of ‘Soaring’ Magazine (A few of which I still have!). On one of them, the September of 1967 issue (still have it!), featured George Moffat flying his brand new DIAMANT. At that time, I new it was over, I made the statement to myself, “that if I was ever going to own a Sailplane it was going to be a DIAMANT!” I built Sterling’s “Die Crunched” free-flight version of this sailplane, drew it from any angle I could imagine, scratch built a few “static” models of it, it just would not leave my mind!

As with everything, time passed. A nasty little event was going on halfway around the world, I learned to fly O-1E’s, T-34’s and a few other “powered aircraft”, started on a career, got married, a house, some kids, my flying trickled off and eventually, pretty much, dropped from the picture (except for the models, which resurfaced my addiction to soaring. And is another story entirely!) Then it happened, a Soaring club got kicked out of their home airport, and moved to an airport that was only about 35 miles from my home! (Happy days are here again!) I got current, and soon decided that standing in line, waiting to fly the club’s 2:33’s and 1:26 was only so much fun, and I pretty much had all the fun that I could stand! I needed my own ship, what would it be? After much hanger flying with the club’s chief instructor, I still had not decided on what type of ship to obtain. Then it hit me, the DIAMANT,

but where would I find one, what shape would it be in, what price was fair, what about its' reputation, was it safe? Where could I find information out on this Sailplane?

About a year and a half after half-heartedly, chasing down a few leads, I came across a classified add in "Soaring" (Magazine), from a gentleman out in the LA area, with one for sale! (Hell, there's only 2,700 miles of land between the eastern edge of PA and LA, what do I have to lose?? Again another story!!) After many long distance phone calls, we (my wife, two children (at that time, now one is in college, and the other in high school) and my father (better known as "financial advisor") loaded up the car, and headed west! (By the way, I must now enter a unsolicited plug for Pontiac here. At the time I was driving a 1990, Transport SE, when I pulled out of my front driveway, I had 106,000 miles on it, today I drive that same car, use it to pull the DIAMANT, the family and on my regular daily junkets to/from work. It now has over 285,000 miles on it and runs like the day I pulled it off the lot with 27 miles on it!!) Now, somewhere along one of my many calls to the coast, I was informed that the DIAMANT, I was looking into was the very ship George Moffat flew in the '67 Nationals. You want to talk about an instant time trip?!! (Reread the paragraph, which is two above this!) It was meant to be, I can't say anything else! (Twenty-three years after I seen its photograph in "Soaring", I was about to become the proud, temporary care-taker, of the ship to my dreams.) Here I am now, all but five years later, having not once crawled into or out of the cockpit, without saying "WOW!" (However, rigging and de-rig is a time when the ship shows that she is indeed feminine! (To be discussed later!))

In your E-mail to me, you had mentioned that among the current modeling community, the DIAMANT is viewed as the cut-off between Vintage and Modern Sailplanes, and that its lines were (are) like no other glass ship out there. The same is pretty much true in full-scale soaring also, with one little exception; that being, the "Vintage Ships" are considered to end with the "Woodies", then you get into the "Classics" (first and second generation Composites) and then the "Modern". As for the lines, every time the DIAMANT is assembled and on the field it seems to draw a larger gathering then the "High-Priced, new-fangled, Ridge Rockets! (You'll never get one of these ships' owners to admit it publicly, but watch the look of jealousy come into their eyes, when the crowds form around 35 year old technology, instead of the current \$60,000 and up modern technology!) So much for my babbling about myself, let's move onto the actual aircraft.

The following is extracted from discussions at the "30th Anniversary Festival for the DIAMANT" with two of the three designers of the aircraft. *Also included are updates (in "Italics"), from discussions with Dan Peirson (the undisputed DIAMANT Guru) during Heli-Expo 98, on the evening of 16 February and the morning of 17 February, 1998. During this meeting, I had the extreme pleasure of spending about seven hours with Dan, in my motel room, in which he updated, corrected and modified my original manuscript! Not to mention, added a few elements which make it (the history) even more interesting and confusing to follow and understand. What follows' is probably the most complete recorded history of the first fully composite, flight certified, aircraft to be put into production. It also puts additional twists on the historical accounting which I developed in October of '97". You may also be wondering how it is that two "Glider-Guiders", from opposite ends of the Country, happen to meet at a World-Wide Helicopter Convention? This is a whole other story and I've already taken much of your time with this story!*

## **The Good:**

The design started as a college experiment, in 1960, at the Swiss Federal Institute of Technology in Zurich, to determine if the (at that time) new composite materials could be safely used in the construction of a modern, competitive, high-performance sailplane. Several attempts had been made already to incorporate the use of composites, but none had used composite material for the entire structure! (They had always sandwiched Balsa, Plywood or other woods between the layers of FRP.) The names of the students (actual designer's) and the professor which the students were taking direction from, which were responsible for what was to become the DIAMANT are as follows:

- Professor Rauscher - (Lead Responsible Engineer {made sure students did not kill themselves during the development}- I do not know his first name)
- Thomas Bircher - (Driving Student {Research and Coordinated efforts of the team})

- Jurg von Voornveld - (Student {responsible for design of the fuse. and tailplane})
- *Wolfgang Hutter* - *Original Wing Designer* (See "Historical Developments below) *Not associated with the institute team.*
- *Other students were involved with the construction efforts, however their names remain lost to this writer.*

*It is important to remember that this was a college experiment, the students involved in the project were students! They were 20 to 23 year old kids, out to have a good time, and learn what they could! But not to set the world on fire with a new standard for the manufacture of "High Performance Racing Sailplanes!" As an example of this, after FFA (Flug und Farzeugwerke, A.G.) took over the project, the students had no to little further design contact or input with their creation!*

*In fact, until the first "30<sup>th</sup> Anniversary Festival", in Europe, they had not sat in or seen a DIAMANT in many years! They were extremely surprised that so many were still in existence, and so many owners still believed in their design! It should also be noted, that the designers', however proud of the DIAMANT they may have been, had nothing to do with the organization the any of the three, "30<sup>th</sup> Anniversary Festivals", held Worldwide!*

Historical developments:

The work and final results of this project had some humble beginnings and can trace heritage back to a Schleicher product, Designed by Rudolph Kaiser, the infamous Ka-6. That is, something had to be first, the design started by taking the club's stock Ka-6, and replacing the *Horizontal Stab*, with one the students designed and constructed from composite (*foam/fiberglass*) materials. *This new stab was of the same planform and airfoil as the existing stab. The actual elevator remained unchanged (wood and fabric)! (Remember I mentioned that these were just students having fun? Well, in Switzerland there is no such thing as an "Experimental" category, how did they accomplish flight tests, using a certified airframe which was majorly modified from the configuration it was manufactured in, and certified under? Also, why did Professor Rauschler, allow for this to occur? Mysteries which are lost to time!)* However, flight trials of the composite tailed Ka-6, proved successful.

The team next proceeded on fuselage design. A few of the more unique (non-standard) design features included here were, the use of a side mounted control stick (similar to that found on F-16's), a full flying stab (Again found on contemporary fighters) and a "T" tail. (It is important to understand, while T-tails are common on sailplanes today, and the aerodynamic reasons for their use are hard to argue with, the T-tail design, at that time, was something *recently added* in the game! On the DIAMANT the T-tail was chosen to prevent crop damage during off-field landings, not for any special aerodynamic reasons!) Now that the group had a *stabilizor* and fuselage, *what wing would they use? During the design of the fuselage, Professor Rauscher refused to assist the students with the design of a composite set of wings! He encouraged the group into looking for "German assistance"!* (After all, the first Glass ship flew in Germany in 1958!) Von Voornveld decided to use the proven technology of the Ka-6. As a result, the "bolt-on" wings from the club's Ka-6 were mated to the prototype fuselage! (Stop and think for a minute of what this has done to the legality, of the certification on the Club's Ka-6! Having pieces/parts sorted out and flown on or as part of another aircraft. The students literally ended the legal use of the club's Ka-6!). The results became the Ka-Bi-Vo (Pronounced "KayBeeVo", and identified the design team of Kaiser-Bircher-von Voornveld), which is currently in the United States and is listed as an *Experimental design* under a "Home-Built" category, and was still in flying condition, as of the Festival!. *Rumor has it, that it was imported as an uncompleted, Home-built sailplane, and sat in it's trailer, in a hanger away from the light of day for many, many years! It is currently identified as the PS-1 White Knight.* Side note - Jurg von Voornveld was the first person to fly the Ka-Bi-Vo in 1963, he was again offered to fly the craft (at the festival) after 30 years had passed, and losing all track of his prototype. The expressions and look on his face both before and after the flight are impossible to describe! Again proof! It's not just me! The coincidences are too many! There is something mystical about this sailplane.) Back to the design efforts. *(It is becoming very clear to see why the developmental history of the DIAMANT is sooo difficult to trace! With the legal aspects associated with the truth, being buried so deep!)*

While all the work on the fuselage, tail feathers, and flight testing of Ka-Bi-Vo was going on, *the students came across a talented and long time German designer named Wolfgang Huetter. It seems that Huetter had designed a set of wings for the H 30 and H 30-TS jet powered sailplane, (yep, you read right,.. "Jet Powered") for which orders failed to materialize. Huetter was not associated with Eugen Hanle, and the manufacturing firm of Glasflugel, did not exist at this time! Huetter indicated that he would be willing to sell these wings and the associated tooling, to the Swiss students! These wings mated to the fuselage in a similar manner to those of Ka-Bi-Vo, however they were not of the same dimensions! This meant that Ka-Bi-Vo could not use the new wing, and the existing molds would have to be reworked to accommodate the new arrangement! Molds were modified, resin poured and glass laid. This second prototype, used the exact same wing from the H 30-TS, and became known as Hu-Bi-Vo. (Pronounced "WhoBeeVo", also identifying the team of Huetter-Bircher-von Voornveld) This was later shortened to HBV and became the prototype of the series. (It is interesting to note that the H-301 Libelle, did not exist at this time, even on paper!) When the Prototype H-301 was rolled-out, it also had "Bolt-on" wings, not the familiar tongue and fork, which became the trademark of the series. It is important to understand, while it often stated that the "DIAMANT" uses "Libelle" wings, the opposite is more correct. However, neither is 100% true, as both were derived from the H30, and to make matters more confusing only the prototype HBV had the H 30-TS wing, while the first 10 factory HBV's had the H30 wing, as modified by Hanle! (More on this later!) As a result of the flight testing of Ka-Bi-Vo and Hu-Bi-Vo, several fuselage refinements were incorporated and two further pre-production units were manufactured. (Known as the V-2 and V-3 machines!) Those modifications included;*

- The rounding of the nose and forward fuselage
- The gentle curve of the fuselage (similar to a Lockheed Constellation)
- The *lengthening of the fuselage*
- The strengthened and widened fin-fuselage juncture
- *The incorporation of a small dorsal fillet, at the base of the fin as an attempt to further reduce drag.*

Now would probably be a good time to explain that there were three main models of the "DIAMANT", during its production run! *Variations' between the types was so great, that the only component remaining interchangeable was the horizontal stab!* The first type being the "HBV" (The initials of the three designers last names.), the 16.5 meter version, and the 18 meter version (The only version not certified under "Standard Airworthiness Conditions", in the U.S.). It is also, important to note that the production run started with the "HBV", went into the 16.5, through the 18, back to the 16.5, returned and closed in the 18, at a final count of 80 units, *with requests for additional units being rejected.* There is also a significant subgroup of the 16.5 contingent, which have the 18's wing tips graphed in place, *and/or "manufactured" in this configuration from the factory.* Not to mention several "one-off" modifications including, at least two examples being stretched to 19 meters, an "open cockpit" or "topless" modification, a "Clipped" (15 meter) version, a "V"-tailed version and a self launching jet propelled article! More on these later! (The above proving that modelers aren't the only ones that change their "toys" around from the way they were originally designed!)

## **The Confusing:**

The prototype "HBV" flight tests were conducted in late 1964, and early 1965, with very positive results. (Here's where the story continues to become additionally muddled, *as if it already isn't!*) It seems that an offer was made to put this "College Experiment" into production, but where would a sponsor be found, and how could the students accomplish this? To the rescue comes the Swiss industrial giant, "Flug und Farzeugwerke, A.G." (FFA) (Flight and Rail, or Cable Trolley Company, Inc., rough translation.), however the DIAMANT was to be its' first and only, attempt in the production of high performance sailplanes! (Ed. note- FFA's first association with aircraft production came during WWII, as they assisted Dornier in some production efforts! At the time (1964) they had major sub-contracts with Lear on certain pieces/parts of their "Biz-Jet".) All seems to be going well for the group. A decision is made, in order to facilitate start-up tooling and production, *the first HBV wing is to be manufactured, by Huetter, in Germany, while production on the fuselage and stab, remained in Switzerland!* (Hey I didn't make this part of the history, I'm only passing

down what was told to me!) FFA and their team set up production, in *Altenrhien, Switzerland, and completed the sub-components for the first Factory HBV DIAMANT sailplane.*

*At this point, our heroes traveled to Germany, to retrieve the first production set of wings, along with the molds. Here is where the trouble starts! It seems that in typical arrogant, Arian style the German custom agent would not let the completed wings, and the molds leave the country without the crew paying an exorbitant duty! (It seems the customs office, felt that proprietary information and manufactured items were leaving the country of origin, and they felt that their "Fatherland" was not receiving appropriate duty! Trying desperately to convince the authorities that all of the paperwork was in order, but failing at every turn, they finally accepted the fact that they would have to come up with the money to satisfy the "Gestapo"!*

*Between them, they could come up with funding for either the wings or the molds, but not both. A decision had to be made! The group chose to bring the wings into Switzerland, and bring the molds across on the second trip. The molds were returned to Hanle, at Glasflugel, with an immediate order placed for an additional set of wings! This second set of wings (S/N 002), was fabricated in Germany, for HBV (S/N 002), on order by a German pilot. The final mating of the wings to the Fuselage would take place in Germany, and the completed fuselage would be sent when completed. (Remember it was mentioned earlier that the students were not business oriented, here again inexperience surfaces!) The wings were completed in relatively short order. The Manufacture of the fuselage for 002 was taking longer than the customer thought necessary, and our (beloved) German wanted his sailplane now! It seems he (the German owner) managed to talk Huetter into designing a new fuselage for his set of wings! This design was called the H-301 and was completed and flown before the first Factory HBV was flown! (It seems the students could only work part time while in school, and in typical Swiss fashion, they just would not be rushed!)*

*In an effort to expedite the manufacture of this new design, Huetter joined forces with Hanle, and formed the Glasflugel Company. At this time the H 30 wing was redesigned, by Hanle and incorporated the now famous tongue and fork spar. A standing order for 10 sets of this new wing was placed by FFA. These would be used on the Factory HBV's. Meantime back in Altenrhien, FFA decided to modify the fuselage by making it longer, and narrower. New molds were cut, and the gentle curve of the belly was gone!*

Through 1966 and into 1967 the first 10 "Factory" HBV's were built test flown, sold and shipped, with very little problems surfacing. Communications and teamwork between the two entities flowed as if they were working next to each other. (Keep in mind, this beats Lockheed, Boeing and Rutan by thirty years, in the total use of Composites in a Flight rated structure, no-one, was before them, and they broke new ground every step of the way!)

*A second batch of 10 wings was ordered by the students; by now the new firm of "Glasflugel" had orders coming in for the "Libelle" at an unforeseen rate, and was having problems meeting their own production requirements. They refused the Swiss order for additional wings! With this problem, and the fact that the students were still in school, "being students", they left the project, and would not be involved with the project for the remainder of the production run! (As a closing note of thanks to the students, FFA built a special DIAMANT for Bircher at or near the end of the production run. It was at this time, that Bircher, again began to evolve the DIAMANT into "Prometheus" (A self launching, jet-propelled version of the sailplane!))*

Back in Altenrhien, FFA, now having a complete sailplane, sans wings, with orders coming in daily, was in the proverbial "barrel". Enter from the good ole U.S.of A., the Calvary to the rescue. This saving grace was to be in the form of financial backing from soaring enthusiast Rene Compte. With this "new lease on life", a new wing was designed. One which was to become the trademark (forward swept, constant chord through the flaps, then double tapered to the tip) and much controversy for the DIAMANT.

*Again, some confusion needs to be added to the history lesson! From my notes at the 30<sup>th</sup> Anniversary get-together, I understood one story from interviewing Bircher. When I asked Dan Pierson to co-aborate the story, a significant difference to the history was observed! I include both versions here and allow the reader to make the final decision!*

### **“Wing Version A”**

When the new wing was originally designed, it was to be an 18 meter wing. (Now you ask, if this is true how come you had mentioned earlier that the 16.5 meter version was produced first?) After the molds (18 meter) were cut, a survey was issued to those pilots having placed orders as well as potential customers, what they thought of a sailplane with 18 meters of wing. According to FFA, the results indicated that the general consensus would not buy an 18 meter sailplane! (Again this was after the 18 meter wing molds were cut!!) Could this be “Strike 2” for FFA?

Through some quick thinking efforts of the design team, a decision was made to insert plugs in the molds (both at the tip and at the root) to reduce the span to something more palatable (16.5 meters) to the marketplace.

### **“Wing Version B”**

*The first design of the new wing was to be for a 16.5 meter version. New molds were cut, and into production the DIAMANT 16.5 went! The design of these “new wings” included many features of the original Huetter/Hanle design. Eg. The tongue and fork spar connection, automatic interconnect of the flaps and spoilers, and Shimp-Hirth style Airbrakes, which provided the DIAMANT, the capability to meet the JAR restriction of not exceeding V.N.E. speed in a dive.*

### **Continuation of the Story:**

Other design changes included at this time, originated from feedback indicating that the “side-mounted control column” was not all it was meant to be. A redesign back to a conventional center-stick, was incorporated starting with S/N 011. In the meantime the ‘67 US Nationals were rapidly approaching. A concerted effort was made that if the DIAMANT was successfully flown in this contest, it could be expected that orders would literally “pour in” from all over the globe! (Thereby eliminating any possibility of a 3rd Strike!) It came to pass that three weeks before the Nationals four brand new 16.5’s arrived in the States. S/N 011, going to Rene Compte, while the second S/N 012, being offered to George Moffat. (An interesting side-note, the issue of “SOARING” magazine, I had mentioned earlier, with Moffat flying the DIAMANT on the cover, also identifies the results of the contest, and..... a classified advertisement for Moffat putting the ship up for sale!) The results of the contest are now history, but the results allowed for the DIAMANT to remain in production through 1970!

Starting with S/N 026, and responding to the (at that time) current trend in the soaring movement, FFA elected to offer and produce the all out 18 meter version.

### **“Wing Version A”**

The “plugs” were pulled from the molds.

### **“Wing Version B”**

*Two new extensions were fabricated for the original 16.5 molds; the first to extend each wing tip length by approximately 0.35 meters, (in essence bringing the ailerons inboard, thereby reducing adverse yaw, while improving the climb rate). The second mold extension, increased the root (center section) span of each wing, (and related flap section) by approximately 0.4 meters.*

### **Continuation of the Story:**

A new, larger, rudder design was incorporated! (A design improvement that was not necessary as the DIAMANT was/is so over-ruddered, that most 18 drivers want to rid themselves of this rudder and replace it with the 16.5’s rudder!) *This is not true with a least one “18 meter driver”, as he feels that in certain conditions the rudder is blanketed out, by the fin and the wing, and becomes totally useless! (Personal Opinion- In a steeply banked condition, (greater than 45 degrees, either left or right) I find it necessary to start to level the wings with the ailerons first, before adding in any amount of rudder. If I fail to do this, and push opposite rudder first, it feels like a ton of weight is on the pedals, and absolutely nothing is happening with the roll condition, or position of the sailplane! The yaw string, and the sensors in the stomach tell you that something is definitely, not right.)*

## **The Bad and the Ugly:**

Here comes the “BAD and the UGLY” I spoke of in our second E-mail! It seems that during certain portions of the flight tests, the phenomenon of “high-speed, control surface flutter” arose. On one test flight it was reported (and recorded on film) the wing (from tip to tip) actually formed a “Sign-Wave”! While on another test flight, the pilot report that he was flying along one minute with the aircraft performing flawlessly, then all of a sudden he was in mid-air with no DIAMANT attached to him! (Pretty scary stuff, especially right after the showing at the Nationals!) Out came the “Service Bulletins”, followed immediately by the “Airworthiness Directives” (A.D.’s). A fix had to be found and soon! The team tackled one problem at a time, with the first fix being that of the rudder. A hydraulic damper was installed on the rudder push-rod, positioned in the wheel well, and fastened to the fuselage side. Problem one solved, with a weight gain on only about two pounds! The remaining control surface requiring attention would become the more difficult, and also the demise of the DIAMANT with many current and future owners, that being the flaps! On the original design the flaps have only one drive point and that is at the root. (Not bad on a 15 meter ship, but with larger spans the uncontrolled outboard portion tends to “hunt”. The original solution was to put forty (yes 40), pounds of lead in the leading edge of each flap for mass balance! (That means that wings that were already large (single panel) and heavy (approx. 160-175 pounds each), suddenly became heavier (200-210 pounds each)! It became real hard to keep a ground crew happy, and/or find other pilots at the gliderport willing to help rig and derig after this modification! Later S/N’s had this problem solved, through the redesign of drive mechanism, not only were the flaps driven from the root, but a secondary drive was incorporated out the span of the flap. (Although this fix did not add the 40 pounds, the previous fix did, it still added weight, to the wings, and the damage to the reputation of the DIAMANT was already done!)

Fixes found, A.D.’s incorporated, the DIAMANT was up and running again! Here comes the next hammer! It seems that in a certain country north of the boarder, all things are typically not taken so seriously as they are down here. One winter day, a certain DIAMANT Driver decided to commit some “random acts of aviation”, in his favorite steed, and have that “favorite steed” proceed to become “unglued” at high speed! (Now, it is rumored that this individual had a reputation of being somewhat of a showman! or perhaps some water from previous flights had leaked from the bags, and froze into the spar, expanded and cracked the joint, or maybe it was a manufacture defect? Whatever, the case was settled, without ever being 100% certain of the actual happenings.) But the result was several additional Service Bulletins, and accompanying A.D.’s. It seems that upon investigation of the crash, it was determined that the right wing spar had failed at, and /or near the root, and voids (gaps) were found along the length of the joint between the spar cap and the shear webbing! The Fix, strengthen the spar stub by adding two steel plate weldments, and wrapping it with additional layers of glassfiber cloth. The second portion of the problem involved forming a hooked probe, and as there are no wing ribs in the DIAMANT, inserting this probe through the root and check this juncture for voids. The position of any voids noted (marked on the outside), holes drilled through the skin and a mixture of resin and floc poured in to fill the voids. (What this meant, to DIAMANT owners at the time, and even today, was/is a mandatory compliance to an A.D. which added more weight to their wings, and costs anywhere from two to five thousand U.S. dollars. This total dollar value, is one quarter to half of the value of what a brand new DIAMANT sold for, (the original bill of sale, from 1967, for S/N 012 indicates a price of \$8,000 U.S.) and that the manufacturer (FFA) would not stand by!)

The last of the major Service Bulletins’ and A.D.’s relates back to the rudder. On the DIAMANT, the rudder is held in place at the top of the fin, by a pin that is approximately 5/8ths to 3/4s of an inch long, and about 3/16ths inch in diameter. While at the base it is attached (off-center) by a single A/N bolt, castle nut and safety pin. (now, the gap or clear space between the top of the fin, and the top of the rudder is controlled by the amount of washers (spacers) inserted at the base of the rudder) It is also articulated, by the push-rod on the same plane where it is attached. On one of the ships, during a day’s flight, it (the rudder) decided that it did not have enough of this pin to hold it securely in place. Therefore, not feeling needed, it no longer wanted to remain as part and the airframe, and proceeded to depart company! (Remember, earlier I stated that the DIAMANT was over-ruddered!) Well, the pilot got it back on the ground without too much trouble, but the incident led to more negative publicity, of which the sailplane had enough of

already! The FAA (not to be confused with FFA) issued another A.D. requiring that the gap, at the top of the rudder, may not be greater than 1/16th inch, and that it must be checked prior to each flight.

Summed up, an airframe design that was five to ten years ahead of its time, suddenly became a “White Elephant” due to weight gains, bad publicity and..... a new change in the contest rules, allowing for a separation of classes, according to wingspan! These weight gains effectively reduced the maximum legal pilot weight to all but the same between the minimum pilot weight, (to stay within the weight and balance limitations on the airframe) and the maximum all up gross weight of the airframe! (Example: (on the average 16.5) to stay in front of the rearmost CG limits, the minimum pilot weight is approximately 188 pounds, while to stay at or under the overall gross weight of the airframe the pilot and chute can be no more than approximately 210 pounds!--That’s only a twenty pound spread!) This also means that “water” is legally a thing of the past, which of course lowers “high end speed”! Which in turn killed its contest career, and relegated it to a “sport/pleasure” use. Today, in 1997, this is quite all right, as most Drivers are content in the knowledge that they own the “First”, and the rest of the glass ships are just followers on the “time line”. (After all, do we remember the second person who crossed the Atlantic Ocean, solo?) While we don’t have 60 to 1 glides, nor are we redlined at 180 to 200 mph, we can still outclimb a good majority of our contemporaries, and ... we didn’t mortgage our house, careers, and kids to fly what we have.

This concludes the “BAD and the ULGY” part of the DIAMANT history lesson! (I’ll bet your glad! So do you still think the DIAMANT is such a great sailplane?? At least we ain’t got bugs growing in our wings! And we can get the “damn thing” on the ground (When we have to), not like some of its German contemporaries, that were designed without spoilers!) The more one looks, the more “closet horror “ stories one finds, it doesn’t matter which type of sailplane your looking into! Keep in mind these planes were built for out and out racing! The designers’ freely admit that, they (the sailplanes) were not expected to last more than ten years! And all (the designers’) will also say how surprised they are to see so many (all types) still actively flying today, some 30 to 40 years after their manufacture.

Now that one has a basic understanding of the “teething problems” associated, when new ground is broken, let’s examine the production run of the DIAMANT.

The following is a complete type listing of the DIAMANT production run:

The following notes apply-

1. “Type” as identified, is as manufactured, without any later modifications
2. “Registration” is last known registration no. (?? indicates Not Known)
3. “Country” is last known country of registration, or if registration is unknown, the country of delivery is identified.
4. An “(X)” after the serial no (S/N) indicates the sailplane has crashed and is deemed “not repairable”.

<b>S/N</b>	<b>Type</b>	<b>Registration</b>	<b>Country</b>	<b>S/N</b>	<b>Type</b>	<b>Registration</b>	<b>Country</b>
Ka-Bi-Vo	Prototype	N15PF	USA	041	16.5	N4085	USA
V-1	Test	HB-743	AUSTRIA	042	16.5	N7165	USA
V-2 (X)	Test	HB-761	SWISS	043 (X)	16.5	??	SWISS
V-3	Test	HB-752	SWISS	044	16.5	N1764	USA
				045	16.5	N2245	CANADA
001 (X)	HBV	D-0843	GERMANY	046	16.5	C-GBVN	N. ZEALAND
002	HBV	??	AUSTRIA	047 (X)	16.5	ZK-G6C	USA
003 (X)	HBV	N292D	USA	048	16.5	N13GC	USA
004	HBV	N611DE	USA	049	16.5	N37AC	USA
005	HBV	N315D	USA	050	16.5	N11TX	USA

S/N	Type	Registration	Country	S/N	Type	Registration	Country
006	HBV	??	ITALY	051	16.5	N11TW	USA
007	HBV	??	AUSTRIA				
008	HBV	??	GERMANY	052	18	??	SWEDEN
009	HBV	N11HS	USA	053	18	??	ENGLAND
010	HBV	N193D	USA	054	18	N1111H	USA
				055	18	BGA-1537	ENGLAND
011	16.5	N2068	USA	056	18	N146G	USA
012	16.5	N1193	USA	057	18	D-4415	GERMANY
013	16.5	N11LE	USA				
014	16.5	N1851	USA	058	16.5	N254G	USA
015 (X)	16.5	HB-869	SWISS	059	16.5	N363P	USA
016 (X)	16.5	CF-SYL	CANADA	060	16.5	HB-940	SWISS
017	16.5	HB-893	SWISS	061	16.5	N2762	USA
018	16.5	VH-GUV	AUSTRALIA	062	16.5	N2481	USA
019	16.5	N2250	USA	063	16.5	C-GOBG	CANADA
020	16.5	N1144G	USA	064	16.5	??	RHODESIA
021	16.5	N1810	USA	065	16.5	??	SWISS
022 (X)	16.5	N146G	USA	066	16.5	??	AUSTRIA
023	16.5	VHGEC	AUSTRALIA	067	16.5	??	GERMANY
024	16.5	N891V	USA	068	16.5	??	GERMANY
025	16.5	N1795	USA				
				069	18	??	S. AFRICA
026 (X)	18	HB-914	SWISS	070	18	??	FRANCE
027	18	N12MG	USA	071 (X)	18	N115N	USA
028 (X)	18	HB-915	SWISS	072	18	N14PS	USA
029	18	??	ENGLAND	073	18	N8968	USA
030	18	HB-916	SWISS	074	18	VH-GVR	AUSTRALIA
031	18	N77NV	USA	075	18	??	BELGIUM
032	18	??	ENGLAND	076	18	D-6903	GERMANY
033	18	??	ENGLAND	077	18	D-7703	GERMANY
034	18	??	GERMANY	078	18	??	AUSTRIA
035	18	??	ENGLAND	079	18	??	AUSTRIA
036	16.5	??	SWISS	080	18	??	GERMANY
037 (X)	16.5	N808VV	USA				
038	16.5	N354SR	USA				
039	16.5	??	BELGIUM				
040	16.5	??	SWISS				

Where do I go from here? How about some performance Specs. What follows are the published specifications for the three major variations of the DIAMANT:

**HBV:**

Span: 15.0 meters (49.2ft.)  
Area: 9.0 sq. m. (105 sq. ft.)  
Aspect ratio: 23.8  
Airfoil: Hutter

Empty Weight: 171 kg. (375 lbs.)  
Payload: 89 kg. (200 lbs.)  
Gross Weight: 260 kg. dry / 290 kg. wet (575 lbs. dry / 640 lbs. wet)  
Wing Loading: 26.9 kg./sq. m. dry / 30.8 kg./sq. m. wet (5.5 lbs./sq. ft. dry / 6.3 lbs./sq. ft. wet)  
L/D MAX: 39 @ 47 kt / 87 kph / 54 mph  
Min. Sink: 1.9 fps / 1.13 kt. / 0.58 m/s @ 41 kt / 47 mph / 76 kph

### **16.5 (m):**

Span: 16.5 meters (54.2 ft.)  
Area: 13.2 sq. m. (143 sq. ft.)  
Aspect ratio: 20.5  
Airfoil: Wortman FX-62-Z-153  
Empty Weight: \*1 304 kg (670 lbs.)  
Payload: \*1 104 kg (230 lbs.)  
Gross Weight: 408 kg. (900 lbs.)  
Wing Loading: 30.8 kg./sq. m. (6.29 lbs./sq. ft.)  
L/D MAX: 42 @ 54 kt / 100 kph / 62 mph  
Min. Sink: 1.80 fps / 1.07kt. / 0.55 m/s @ 40 kt / 46 mph / 74 kph

### **18 (m):**

Span: 18.0 meters (59.0 ft.)  
Area: 14.28 sq. m. (153 sq. ft.)  
Aspect ratio: 22.7  
Airfoil: Wortman FX-62-Z-153  
Empty Weight: \*2 280 kg (617 lbs.)  
Payload: \*2 160 kg (353 lbs.)  
Gross Weight: 440 kg. (970 lbs.)  
Wing Loading: 30.91 kg./sq. m. (6.34 lbs./sq. ft.)  
L/D MAX: 45 @ 54 kt / 100 kph / 62 mph  
Min. Sink: 1.71 fps/1.01kt. / 0.52 m/s @39 kt / 45 mph / 72 kph

#### Notes:

\*1 Weights after mass balance of flaps, as required by A.D.

\*2 Weights as delivered at manufacture

How about some actual, impressions on seeing a “full scale” DIAMANT for the very first time, be inserted here? (If not, you’re going to get them here anyway!) Note, these are my impressions only, and I certainly can not speak for on any other Driver’s feelings, one must also be careful to understand that my “love affair” with DIAMANT, goes back 21 years before I actually seen one! (Hey Don, I just thought of something else which could be inserted around this point. -- That is, when we returned from our trip, to bring the DIAMANT home, my father wrote up an article (story) about how I became the “current care-taker”, its all pretty simple stuff about the trip, and things like that, would you like a copy of this also?? I need a response to this! )

### **The First Impressions:**

It was early on a Monday morning, in late August, that we pulled into “Inter-City Soaring” (Unfortunately, now out of existence!) in Compton, Calif., Dan Pierson (a.k.a. “World DIAMANT Guru”) was just opening shop for the day. Through pre-arranged telephone communications he would meet us (my family and myself) give a short tour of his facility, and show me two of his three DIAMANTS, and was willing to spent the morning with us, passing on information about the DIAMANT to this perspective owner! (if you think I know alot about this sailplane, let me tell you I know nothing, as compared to him! He probably forgot more

history (on the DIAMANT), then anyone else will ever know! ) He was able to answer all of my 10,000 questions, without even a second's hesitation! I will always be grateful to him for this encounter, and several later encounters, as his skill and experience with this "type" put many of my "Post-Acquisition" fears to rest!

Inside his shop, is where I saw my first DIAMANT, or I should be more accurate and say, the "remains of a DIAMANT". It seems he recently acquired a DIAMANT which had suffered a *Elevator push-rod failure while on aerotow, shortly after breaking ground. Causing the aircraft to kite, as if on a winch tow, stall, and make inadvertent contact with the ground!* He (Dan) was planning to rebuild it, into a two-seat version of the DIAMANT. (As of March, 98 this project is on hold and awaits' the need to resurface!)

In addition to this ship, he also owns (at that time) a "Stock" HBV and a beautifully kept 18m, which was highly modified at the nose, the wing root, the incorporation of ventilation ducts on the wheel doors. Additionally, the wing tips have been stretched to 19 meters, and it has a special fairing developed which allowed him to fly it conventionally (with a canopy in place), or "Topless" (without a canopy)! The HBV was kept at a local gliderport, while his 19 meter ship was in a trailer just outside. Could you imagine my pleasure when he offered to pull the DIAMANT fuselage out, and let me "Try it on for size"? He also explained that there was not enough time or room to justify putting the wings on it. However, he then slid the wings out of the trailer and shown me each of the modifications, much as a proud father shows show's off his first born son!

But hey, wait a minute! He said, "Try it on for size", just what exactly did this mean? After all I've been flying sailplanes for some twenty plus years, and although I'm big (6'-1") and somewhat heavy (235# at that time) I still fit within any sailplanes weight and balance specs, I've been around to that time! He went on to explain, that although George Moffat was slightly taller then me (6'-3") he was not quite as "solid" as I was (at that time)! He sized up the situation, and as gently as possible, broke the news to me that this may not be the right sailplane for me due to my size. Additionally, he pointed out the fact of a second weight, (what is called the "Non-Lifting" max. weight) restricting the payload to 224 pounds! Now put a chute on me and the pilot weight jumps to around 250 pounds! "Well let's just see", he calmed me. After all, I just drove across the continent in two and a half days, with my family in tow, and in approximately 18 hours, I was going to be the owner of one (DIAMANT) regardless if I could fit into it or not!

Dan slid the canopy forward, repositioned the belts, and explained the cockpit entrance procedures. In I went. One of the first things you notice that the seat (or lack thereof) is in reality the inside shell of the fuselage skin! If you wanted padding, or shock support it came from a chute or from pillows, not from the design of the seat pan! I didn't even notice the size restriction for the first 15 minutes. What instantly took me for a major shock was the position that one is expected to fly in/from! WOW! I've heard of semi-reclining positions, but this is going to be wild!! You are actually more laying in the cockpit, then reclining, with your butt being about four to six inches lower then your feet! (About this time the thought of doing a "Gear-up" landing flashed through my brain, with an instant mental "N.F.W." response!) He then proceeded to explain where all the controls were, and how the design of each fell within easy reach of operation, and that the cockpit control layout was "one of harmony between man and machine". He indicated that stirrups were also available to hold ones' feet in place on the rudder bars, during those turbulent flights.

Next reviewed was the instrument panel, explaining, that as manufactured there were two different styles of instrument panels. The standard being a "mushroom" style, with later DIAMANTS having a simple "tower" style panel installed. After this, the canopy was slid closed, with me inside. Dan moved to the rear of the fuselage, and proceeded to lift the tail to what he identified was the normal landing attitude! And this was at an approach speed of 57 MPH! (For a second time those thoughts of gear up landings flashed through my brain!) Now, some rationale thoughts started to make their way in. As an example of these thoughts, I volunteer the following. Here I am, sitting six inches off the ground, moving at a minimum of 57MPH, with only about a quarter of an inch of 30 year old poly-foam, sandwiched between a few layers of (equally as old) fiberglass, landing this 900 pound, all but 60' sailplane on a single 4" diameter wheel! (Could I do this? Without turning the sailplane into a waste of beautifully sculptured, hand-laid FRP? Did I even want to try to do this? And if I did try to do this and failed, what kind of condition would I be in?)

After baking in the hot, California sun for another 15 minutes or so, Dan opened up the canopy, and questioned my thoughts. I want to tell you, my twenty-year plus, love affair was stronger than ever! I can not remember a time when a larger smile was on my face, and I felt so proud and important! (I'm sorry, but this includes the wife, {here I must note that I have an extremely wonderful, and very, very understanding wife} my first solo, or anything else one can imagine! Note, at this time, I personally think this may change, when my first son graduates from college! Time will tell!) Dan finally asked about the "Fit"! You know I didn't even think about it! I responded. After some good-natured joking around, we both agreed that it was tight, but if I would manage to lose a few (pounds), it would indeed be workable! Herein lies the birth of the now famous (at least on the "East Coast"),... "DIAMANT DIET", (move over Weight Watchers, Genny Cray, Hanoi Jane, etc...)

With this, we (my family) shot about two rolls of film of Dan, his shop, his 19 m DIAMANT, and also the DIAMANT inside his shop, which was no longer flyable! We packed up his trailer, and spent the rest of the morning collecting any data that this man offered! About a half hour before we had to part company, he informed me about the existence of a loose "Brotherhood", of DIAMANT owners, throughout the world, and that this "Brotherhood" did not, and does not exist within/among the owners of any other type of sailplane! (*With the notable exception of the 1:26 Association!*) He then proceeded to take the cover from a poster board, identifying by picture (photograph) and serial number each DIAMANT manufactured, along with its current owner! He added, that he had started this several years ago, and through it, any problems that surfaced on the DIAMANT can be quickly identified and passed to the current owners! For my benefit, he explained several incidents of how the network has been utilized in the past. He also indicated, that he was tiring of keeping this "Brotherhood" together, and it was soon time to pass on the torch! – (As of this writing, I am not aware of this happening!)

### **First Contact with S/N 012:**

My first encounter with S/N 012, would come later that day. After settling into a "Holiday Inn", I phoned Larry, the (at that time) current "Care-Taker", and made arrangements to see the ship, later that evening. Larry explained how he acquired the ship. As its 7th "Care-Taker", he related some of the ship's history, as passed to him. He also was quick to include some additional stories of his own! We went around the side of his house, and encountered the "Ghetto Trailer", for the first time! (It seems a previous owner rolled the original, factory, trailer on the way home from a contest. Larry took it upon himself to build a trailer on his own. It was functional, (it got me and the DIAMANT back to PA, without any problems!) but it sure didn't look good! (more on the trailer later!) Larry asked me if I had ever seen, or sat in a DIAMANT before, I hesitantly replied yes, but desperately wanted to see and sit in this one, and I wanted this right now! Out the fuselage came, instantly I noticed that this was not the DIAMANT, I had seen earlier in the day, nor for that matter the one I seen of Moffat, flying the ship! In front of me sat the poor shell, of what once was a record-breaking machine! The first notable discrepancy came in the canopy! Larry explained that when the trailer was rolled, the original canopy was smashed! In place of the flowing curves of the original shape, there was this distorted, HP-14 (flat, bent, flat) look alike substitution! Instead of the pristine interior, was this well-worn, and faded "hole"! The instrument panel looked as if it was left over from World War II. The gelcoat was faded and chalky! It was very clear that this sailplane was in desperate need of mass quantities of "TLC". So there I was, miles from home, with several thousand dollars invested to date, (travel expenses, food, trinkets for the family, non-refundable down payments, etc.) time to make a decision, Do I cut bait and run? Or do I finish what I started? I decided to just sit in it, for a while and see if this DIAMANT would talk to me. Tomorrow's flight demonstrations should tell the story!

We met Larry, and drove the hour and a half north to Cal City Soaring, it was now about 10:00 a.m. and about 93 degrees F. Time for me to put a DIAMANT together for the first time! Instructions on getting the plane out of the trailer, and rigging the beast were reviewed. With Larry's assistance and my sons' help, I struggled to get the wings on! (Yes they are long, bulky, and heavy!) The Right one went in place without too much difficulty, however the alignment required on the left wing, proved challenging! After about 40 minutes of wiggling, bouncing, and the use of some choice adjectives, all under the watchful eye of my wife and financial advisor (father), the wing was finally positioned and pinned in place. The remainder of the assembly went pretty uneventful. In spite of some "family debate", this tired sailplane was starting to grow

on me. We gave it a quick bath, one final “pre-flight”, and Larry mounted up! The radio was checked against a hand held, and was found not to work! Larry assured me that it was “only a fuse”, however he did not happen to have a spare. (This “trust”, would later cost me 470 dollars, as the complete installation had to be rewired before the next annual -- What’s that saying in Latin? Something about, the “buyer beware!”)

The flight was very impressive, and the buried graceful lines of this ship, really started to come alive! After a short flight, the pattern, approach and landing sold the ship! (Even though the roll-out seemed exceptionally looong! During the subsequent annual, at home, the reason for this was soon found, in being the brake cable was not connected! – Again, I defer to that previously mentioned Latin saying!)

Yes, there were many problems, but in front of me was one of the most “historic, classic” sailplanes, that I would probably ever come across! Did I want to commit now, or run away? As I am writing this paper, you already know the answer! That was all of five years ago, would I do the same today? Probably!! If not definitely!! By the way the trip home went perfectly! (Here, I’ll defer the story, to my father’s words, if you’re interested?)

### **Additional Challenges Surface at Home:**

I don’t believe I had mentioned this earlier, so I want to make a few comments for the benefit of any individual contemplating, taking on the responsibilities of sailplane ownership. There are two age-old sayings that are very appropriate in life. These sayings, also apply in the world of soaring, the first being; “It can not be stressed enough, that one should know exactly what one is getting into, prior to doing it!”, and the other, “Love is blind!” How do these apply here you ask? (By the way, it needs to be said, by me, at this time, with all the “Challenges” identified in the previous section, along with those I am about to identify, I in no way, shape, or form feel as if, “I was taken to the cleaners” by the previous owner. I am however, listing these “Challenges” to identify what may be some potential areas of concern (on other sailplanes, as these concerns have been completely corrected on my DIAMANT!), to some future owner, somewhere down the line!)

Part of the condition of sale on this sailplane was a current “Annual Inspection”, a “Standard Airworthiness Certificate”, and if insurance did not allow for me to fly the DIAMANT, I witness a test flight in which all controls and equipment were satisfactory tested. (I already reviewed the results of the flight test, noting the first challenges.) Now that I am home, the following issues come to light, by my local “AI”:

- As the wings had been stretched, by adding the tips from the 18 m version, I was informed that this aircraft was no longer legal to fly under the existing “Standard Airworthiness Certificate”. It didn’t matter that this sailplane was flying since 1968, under a “Standard Certificate”, or had seven owners prior to me, all that mattered was, it wasn’t LEGAL NOW!
- The brake cable had to be attached, before legal flight.
- The controls were stiff. (Lack of proper lubrication, plus generous amounts of Calif. sand tend to have this affect!)
- There was no accurate, current “weight and balance” report.
- There was no proper sign-off’s in the log book for any of the A.D.’s (Each would now have to be individually verified for compliance, and signed off.

As the “AI” was making his list, I could see the dollar signs mounting, all the time thinking that this sailplane went through an annual inspection, less than a month ago, in Calif. by the previous owner, by an equivalent “AI”! I also had just seen it safely fly! To make matters worse, the AI who was pointing these things out to me, was the first (and so far the only) person to fly the ship at home, and didn’t he just finish telling me that it handled beautifully! Now he’s telling me that, “I could not legally fly it!” What was going on here?? I certainly did not understand the legalities and the politics going on!!

My "Al", ended on a positive note, indicating that although the problems were numerous and combined they presented some major effort, none taken individually were substantial, and that he would work with me to correct each and every one, and bring this ship up to legal operating status!

He explained his comments very thoroughly and methodically, point by point, and all seemed to make sense! (Not just any sense, but very logical and safe sense!) I am very grateful for his assistance, and feel that I am much ahead of the game because of it! (No matter how much I may have been upset with him, and his advise, at the time!)

We worked through each problem slowly, with various components (fuselage, wings or stab) spending most of that winter in the family room! (Much to the joy of my wife!) We cleaned and lubed fittings, corrected paper work, inspected A.D.'s, and finally applied for and attained a temporary (1year) "Experimental Airworthiness Certificate" - for "Exhibition and Racing". As I said, this lesson was painful, but I feel I know the aircraft much better and feel safer because of it!

One top of all this, there were some pretty major politics brewing within the club, causing second thoughts about continued flight there, some of which still carry on today! (What did I do to deserve all this?)

When was my first flight, in the DIAMANT,..... April of the next year! Yes, that's seven months after I acquired it! (And each one of those days I wondered.....!)

### **Adventures in Assembly:**

The next topic for review should probably be the "Rigging and De-Rigging" of the ship for/from flight. (Note, as there are just as many trailers as there are DIAMANTS, and each one has its own recommended method for getting the ship into/out of the "BOX". I will bypass this element and proceed to the actual assembly process. -- With many additional, non-published, at least in the "Flight Operations Manual", side comments!)

Assembly of the ship is straight-forward, (When it wants to be!) for a ship of this size and vintage, and can be accomplished by two people (although my personal choice is three, and in winds four!). With the fuselage removed from the trailer (although remaining in the fuselage cradle), the tail dolly, canopy, and seat back are removed and set (far!) aside. (This would reduce the chances of accidental fuselage roll-over, and potential damage to the canopy during further rigging.) The battery is installed, secured, connected and checked next. (Afterall, there's no use in going any further, if you don't have operational instruments (Vario and radio), right?)

A cleaning, inspection and greasing of all attachment points (wing fore and aft drag spars, aileron, spoiler and flap and elevator interconnects), and a check of the static and probe pick-up points is conducted next. All (three) safety/interconnect pins are also pulled. (And placed in the cockpit tub, so you don't forget to reinsert them later!)

Now comes the FUN part, ....the wings! (This has been known to clear a gliderport, faster then 10 knot lift, or seven days of continuous rain! With the 5 ton crane properly positioned-- No! No! --just joking! However, somedays', it feels that you can really use one! -- Remember in the "Bad and Ugly" part of this report, I noted that each wing panel is upwards of two hundred pounds, well on top of that, its (the wings) fit, or mate, and alignment to the fuselage and opposite wing is extremely critical! {Picture trying to install "Timex" pieces into a "Rolex" watch.} ) With a wing stand approximately located (out where the wing tip will be), the right wing is the first to be removed from the trailer dollies, and "manhandled" (one person on the tip and one person on the root), into proper orientation with the fuselage. (It should be noted that several owners, including me, have special wing trolleys which are supposed to eliminate the "manhandling", however most of these trolleys work fine on macadam aprons, but are completely useless on grass, dirt, stone and sand! (Which is what a majority of glideports' have in the set up areas.) This is the "single spar" wing, and although heavy, usually presents no problem when being inserted into the fuselage. The wing stand is positioned, under the tip, usually at the end of the aileron. (It is at this point, your helper tries to

think of any way possible to get out of any further assistance! -- and believe me, there's all kind of new, exciting and different excuses that you would never imagine!) Here's where that third person comes in handy. (This third person doesn't have to be strong or smart, as they are only required for "grunt work", and for the purpose of adding stability, to the partially rigged sailplane) This third individual is assigned the task of holding the inserted right wing in position on the stand. This prevents it (the wing) from being "Bounced off" the stand, (thereby allowing the spar stub to rapidly and destructively protrude through the top of the fuselage) while you and "Gungah Din" are busy attempting to align and install the left wing! As mentioned previously, the right wing has the single spar and two drag spars to align. Now the left wing is slightly different, as it has the forked spar (which must be positioned around the protruding right wing spar stub) and the two drag spars, which require alignment with the previously installed right wing and fuselage. (To give you an example of how critical this alignment is, on my ship, after the A.D. on the spar had been completed, the wings were put together outside of the fuselage and the clearance checked and noted, as being approximately 1/2 millimeter! Now consider this tolerance over the span of both wings, and... while holding these 200+ pound wings halfway between your chin and your belly button, and ... trying to make final adjustments in an area which you have no visual access to! FUN, right?) To keep things positive, on most occasions, this is really not as bad as it sounds, with actual "dolly to pin" time being about ten minutes! (A few instances being a little less, and several non-alignments taking significantly longer!!)

After both wings have been mated to the fuselage a single "king" or "Heart" pin is inserted through both spars, and safetied. The wings are now in place and your help (crew) can breathe again, as only one final task remains for their assistance. This final task is very simple and easily accomplished, and only requires their assistance as, there is too great of a distance spanned, for you to do on your own. The main landing gear needs to be lowered at this time, and there is no possible way (for one person) to lift the tail (which is required to provide the necessary ground clearance for the wheel to drop into position) and reach the retraction lever at the same time! After your helper lowers the gear, they can be dismissed as the remaining assembly, is now a "piece of cake". I usually replace the tail dolly, at this time. (This is not necessary here, but it makes pushing the ship out of the main (usually crowded) assembly area much easier, when there is 3 or 4 other people waiting to put together, and you remember that you may need these people to help you de-rig later that day!)

The stab, (the DIAMANT has a full flying stab!) is light, and easy to install. (Most people {crew} do not believe that the stab and wings belong to the same airframe!) The control connection is automatic and positive. When the trailing edge of the stab is lowered in place first, and as the leading edge of the stab is positioned it is automatically aligned with the carry through shaft. A hex head bolt secures the shaft, and then is safetied in place by a self-aligning spring clamp.

Coming down to the "stretch", the pins which connect the aileron push rods to their respective push-rods in the fuselage are installed, and a positive control check (on all surfaces) is performed. (Very important, as this could have severe affects on the outcome of not only your soaring day, but also your remaining life!) The seat back is repositioned in the cockpit, the "legal documents" checked and positioned, the canopy is reattached to the (unique?) opening/closing mechanism, and an emergency release check is performed. A note on the canopy should be included here, the idea of a forward sliding canopy (as used on the 16.5's and the 18's. The HBV's did not include this feature) was/is pretty different. The mechanism, used to accomplish this is well designed, and thought out, however the price of a replacement canopy, with installation, is approximately twenty-three hundred dollars, therefore most owners treat the canopy like gold and do not place much trust (especially in windy conditions) in this mechanism!

The only remaining tasks to accomplish are the taping of the aileron doors and the wing/fuselage joints, and the actual preflight check.

De-rigging at the end of the day is almost a reverse of the rigging procedures outlined above, with no special tricks included!

## **First Flight Thoughts:**

It was finally over, one of Pennsylvania's worst winters' on record for longevity, and ice storms! The mud on the field became solid enough to drive on, (Not to mention take-off and land on!) The sun was "kind-of, sort-of" out, light winds, and most important of all my DIAMANT was legal and flyable! (I did survive dealing with our government (FAA), and came to understand that as long as you give them exactly what they ask for, (no more and certainly no less!) they are quite reasonable to work with!)

It was the middle of April, and I hadn't been in the air since late December. Using and religiously maintaining the "DIAMANT DIET" I spoke of earlier, I was now a trim 195 pounds and felt pretty healthy and good! (Boy did I ever get comments from the wife! -- I'm sure you've heard the type, .."You wouldn't lose the weight for me, but you lost it for an "airplane"! etc...) I arrived at the airport early (for some reason, it seems that I usually am the first one there!) but this morning the field is bustling with activity! I guess everyone got a bad case of "Spring Fever". I located a spot, which appeared to be large enough to throw the DIAMANT together, opened up the trailer and proceeded to set-up! (See the "Adventures in Assembly" Section, for some thoughts on rigging!) The "Chief Instructor" in the club, (who flies a "Standard Cirrus", not to mention is the same "AI" that reviewed the airworthiness of the DIAMANT, with me, over the winter) came over and started "pumping me up" for my first flight. Then he started in a line of conversation about the design of the DIAMANT, that sent chills into me then, and sometimes still makes me think about the DIAMANT! This being the stories and movies he had seen while attending school to become an "AI". He related how the wings are so "Soft" and the control surfaces flutter at speeds that it still may be an unsafe design? Man, what the hell was he trying to do??? Almost all confidence went out the window here! To add to this, not only did he say this to me, it was said in such a manner, that all around the field could hear it, and (to me) it looked as if the vultures were starting to "kettle" in anticipation of an early spring meal! He then stated, that from his memory the ship was extremely easy to fly! (Does this make any sense to you? It sure didn't to me!!) And that I should just get in it, and do it! Keep in mind I hadn't flown anything in almost four and a half months (not even a 2:33 or a 1:26). Now, he wants me to "hop-in" and fly a 42 to 1 glide ratio sailplane, with a center of gravity tow hook, and a full flying stab, as my first flight of the year? (What's wrong with this picture?)

Much "collection of thoughts" was done. A review of the flight manual was conducted, then a second review of the material. Probably one of the most detailed pre-flights I have conducted was also executed! Oh what the hell, after all, he was the instructor, and one whom I had flown with many times, he knew my abilities, and he did fly the DIAMANT, he knows what he's talking about, right? However, he... won't be in the cockpit with me, at any part of the flight!!!

I threw my chute into the cockpit, slid the canopy closed, gathered up a few "friends" and pushed the DIAMANT down to the far end of the field. I had arranged the towing speed, and to take a high tow (5000' AGL) on this first flight. While I was waiting for my turn in line, I started talking to myself, saying things like this wasn't the first "high performance sailplane" I flown, and what about those "things with fans" I had flown all those years ago, I did that with no problems, didn't I? How 'bout my soaring experiences in Spain, where they let me go, on my own, after only two flights? Maybe I could do this! And then maybe it would be fun! Then it hit me, this was my own sailplane. It was a "classic" design and would be impossible to replace, if something didn't go right! How would a full flying stab be? I've heard they are very prone to P.I.O.'s (pilot induced oscillations)! What about a CG tow hook? On the R/C models, we use a CG hook for winch launches, and with this we didn't need to pull any up elevator! Will I have to hold "down stick" to just fly straight and level! What about directional control on take-off? Would the wing runner give me a good run? Would I have directional authority quick enough? Or would I have the same problems, that I witnessed another Cirrus pilot have last year, when some cross wind got him early in the take-off roll?

There was only one ship in front of me now, time to settle down, stop thinking like this and just do it! The DIAMANT was positioned, the tail dolly removed, I put on the chute, slide myself into the cockpit (by now I've done this at least a hundred times) and thought, man does this seem tight! Did a final check of the instruments and controls! (You see, once you're belted in, the controls are within easy reach, however the instrument panel is jussst barely out of reach. In fact, a lanyard has to be placed on the tow release, and the

emergency canopy release to actuate these! Also, as I fly it, only my finger tips' are able to reach the altimeter set knob and the radio adjustment knobs!) The belts came over my shoulders and I was belted down. We did a quick check on the release, ("Worked fine, that time!", was the return comment.) Slid the canopy closed, (I never felt so alone!) Then I noticed, or at least acknowledged for the first time, how optically distorted this canopy was! Although side, upward and downward vision was acceptable; when looking front, I saw a reflection of myself (from my sneakers to my now grinning face!). Beyond that a Cessna 180, which looked as if I was looking in an old "FUN HOUSE" convex/concave mirror! (Besides totally ruining the lines of the DIAMANT, this canopy was going to remain unacceptable to fly with!) The flaps were positioned for take-off, one last look and check around, the "thumbs up" signal is given, along with the conventional rudder waggle. I watch as the slack comes out of the tow -line, and feel the gentle yet solid pull underneath my butt. HERE I GO!!

The acceleration roll is smooth and steady. I didn't feel the wing runner drop away. Airspeed is coming up. I feel the rudder begin to bite, shortly followed by the ailerons, at this point I'm supposed to move the flaps from the "full reflex" or negative position, to the "full positive" position, which is to be used for the remainder of the tow. With this control movement, I instantly feel the DIAMANT jump into the air and break its grip on the ground! Feeling this surprise, I figure that I'm starting to rotate, as if on a winch launch (remember, first time on a CG hook!) and input some down stick to correct! Here come those dreaded P.I.O.'s that I thought about! Hey wait, the tow plane is climbing well ahead of me! I'm still in ground effect, and he must be 25 feet in the air! And what's this yellow rope coming up the outside of the canopy? (If it isn't clear by now, I was probably 1 to 2 seconds behind what the sailplane was doing!) I needed to get control of the situation, and FAST!!! Only because of literally hearing Dan Pierson, telling me what to do to correct this I quickly regain control of the events! (What a scene this must have been to the observers on the ground!) The rest of the tow went pretty uneventful, as we climbed to altitude!

Realizing how this CG hook actually works, took some getting used to. On the DIAMANT, the hook is a standard European style as manufactured by "TOST", and is an integral part of the landing gear mechanism. That is, it is mounted to the gear retraction pivot, and is only accessible when the gear is down! When the wheel is up, and the doors are closed, and the hook is also retracted into the fuselage! Today, I find it no more difficult than a nose hook! I had to understand that I was not being drug around the sky as if in a Schwiezer, but I needed to actual fly the tow! What a noticeable difference! (Example, picture yourself being pulled around by your nose, you pretty much follow whoever is doing the pulling! Now, picture yourself being pulled around by your belt buckle, here you have a lot more movement before you actually feel the control of the person pulling you!) During the course of the tow, I took stock of the situation, am I still alive?! I've succeeded! But what about this "unnatural position" to be flying from? Hey those are my feet, all the way up front, what are they doing there? I'm looking straight into the instrument panel, not down and into it! How about an altitude and landmark check? Do I even know where I am? We circle the airport for what seems to be forever. (It has been a long time since I took a tow to 5K') Aileron, rudder and elevator all seem to be responding in the normal manual. Adverse yaw is much more pronounced, then in anything I've flown to date!

Hey look, we're coming up on 5k! Soon time to get off, and let the tow plane drag someone else up here! Clear right! Pull the release lanyard (twice) watch the rope drop away, and break right! Now what? That's right, this ship has a landing gear, and it should be pulled up about now! Next, it's time to set the flaps to the airspeed. (In the DIAMANT, every few mph change, requires a different flap setting to keep the fuselage in trim with the airfoil!) I hear someone on the radio, calling for me to respond. It was the "Gang on the Ground", all wanting to know (for some reason) the color of my underwear! After some quick joking around, I returned to the business at hand. Some shallow turns, a few medium turns, now the steep turns. I found that I could not keep the string centered to save my life! I was in control, but it sure didn't feel comfortable! The adverse yaw really took some effort to become familiar with! First to much rudder, then not enough! Speed control was very smooth and docile, I found that holding a desired speed took very little concentration, and the flap setting kind of locked that speed in place! Now it was time to shoot a few "high level approaches", and get the feel of a dirty ship before I actually had to commit to an actual landing. I was still about 3500' AGL, so I had lots of room, if things got tense. Okay, let's see full flaps, approach speed of 57mph established, gear down. Hey wait I have to remove my hand from the control stick again, no problem there's your other hand, but that's already used on the flaps and spoilers! Well, the flaps are

locked in place, and it's not time for spoilers! Not so tense, Just put down the gear! After all you pulled it up, not to long ago! So this is the view on landing, that Dan P. had tried to show me at his shop! Looks a lot different now! Let's see left big toe on one side, instrument panel in the center and the right big toe on the other side! Okay so I line up the landing by sighting between my feet! Okay, gear coming up, check speed, flaps coming up, check speed! Now do it again! Second time feels better then the first! (Ever hear that before?) Altitude check 2700' AGL, still time to have some fun! (Yeah, right!)

Still real tense in the cockpit, still wondering if this is the right ship for me! But here I am, now is one heck of a time to think of these things! Do some "S" turns, to try to understand the roll, and adverse yaw. Listen to the sounds that the DIAMANT makes, and at what speed it make them! Yeah, there's the elevator squeak, sounds alot softer up here then on the ground! (Dan said this is common in all DIAMANTS, there's nothing that can be done about it, and you should get rid of it (the DIAMANT) only IF/WHEN the squeak goes away! Check the altimeter, hey it's getting to be time to think about the pattern entry, approach and landing. (It's got to be right!) About this time, "sensory overload" sets in, (Not a good time for this sort of thing to happen!) The mind again races back to the "AI's" earlier comments, no this isn't right! Just fly the &%\*#@ Sailplane! Call the ground, inform that you are entering pattern. Flaps down, Speed check, Gear down, Speed check, Altitude check, Position check, all fine, with no problems, (Dan P. was right, "This ain't bad, at all!") Call turn to base, Coordination sucks, speed building, position check. Call turn to final, again coordination sucks, speed still building, If using the "TLAR" (That Looks About Right) system, it DIDN'T! I was high and fast! Hey stupid, I got spoilers, use them! Glide slope improves dramatically, still carrying, tons of speed, (not good in a 42 to 1 ship, attempting to make a low energy landing!) Reduce spoilers, and ease back on the stick! (This was going to be Hot! Over the marker, cross the thresh-hold, check spoilers, all is moving fast, then... first contact! A bounce, (Which feels like I'm sent back to tow altitude, or at least pattern height!) then a second bounce, less severe, then the third contact with the ground. By this time I've dissipated so much energy, the DIAMANT can't bounce any more, and I'm locked on the ground, still pointing straight down the runway, I roll to a stop no further then were we normally roll! (WOW!! What a flight! What a machine! One take off, and three landings!) I said it earlier, and I want to stay it again here! "Although my take-offs, flights, and landings have improved (More on current flight stories later), and flying the DIAMANT has become second nature, (it should have, after four seasons of flying it!) there has never been a time that I don't say, "WOW!!" when I either strap this machine on, or force myself out of the cockpit after a flight.

So there, you (and whoever, this letter is passed onto) have it, my first flight experiences, totaling about 45 minutes, in the DIAMANT! The memories, to this day, remain fresh, (as do those comments from the "Friendly AI"), however that facts do speak for themselves! The DIAMANT is a very stable, and docile (if not somewhat unique) airframe flown within the normal flight regime, (As I do not consider myself a test pilot, I can not speak of flight characteristics outside of the "norm"! I also put much faith in Dan P's comments, referencing that in its' (the DIAMANT'S) "heyday", they were putting pilots with as little as twenty hours, of 1:26 time in the type, and all managed to survive. I also have come to believe that although the initial "Horror Stories" may be true, all but one (The rigging and de-rigging nightmares!) have been corrected!

### **Back to the History Lessons (or.. more useless stuff!):**

This section is really not intended to be another history lesson! What I am including it for is kind of as a "dumping ground", for any miscellaneous "Stuff" I can either think of, or come across! It is important to note that this is not a complete listing, it is only a list of those things, I have either seen, or have an actual copy of.

- The first shipment of HBV's to the states, suffered from a "Pond (Atlantic Ocean) crossing incident. The story goes that they broke free from their mountings, and started to break up one another! (Letters to the Editor column, "FiberGlass Repair, by Robert H. Wentorf, Jr.) from "SOARING", September, 1967, would seem to confirm this.)

- First 16.5's arrive in United States: (4 enter U.S. at one time S/N's 011, 012, 013, 014) these were identified as "DIAMANT HBV 16.5" and received in June of 1967.
- Two of these "DIAMANT HBV 16.5's" were entered in the 34th National Soaring Championship during 1967, George Moffat finished 4th, while Miller did not fly.
- Date of issuance of U.S. Standard Airworthiness Certificate: 16 October, 1967
- First 18 m in United States: I don't have a month, but the year is confirmed as 1968
- Importers of the DIAMANT:

East Coast:

Mid-west/Central:

Jilisco, Inc.  
2708 Red Bluff Rd.  
Seabrook, Texas

Wes-Kan DIAMANT  
222 n. Kansas Ave.  
Liberal, Kansas

West Coast:

DIAMANT - West  
1023 Kirkwall Rd.  
Azusa, Calif.

Western Soaring  
1812 Delaware St.  
Berkeley, Calif.

- First cover shot of DIAMANT HBV on "SOARING" magazine: December, 1966
- First cover shot of DIAMANT 16.5 on "SOARING" magazine: September, 1967
- Additional cover shots on "SOARING" magazine: Not sure, but I remember at least two other cover shots, from around that period, both in "Dou-Tone" format, maybe there was a fourth one I am not sure.
- Published Photographs: (Those that I am Familiar with. Feel free to add to this!)

"SOARING" magazine: Cover September, 1967  
Pg.15, July, 1969  
Pg. 57, July 1997

"The Joy of Soaring" Flight Manual: Pg. 26 and 114

"Americas Soaring Handbook": Pg. 76, 140, 145 and 150

"PLAYBOY": (Not sure of page, or issue, but I've seen the add, in Dan P's. collection of "STUFF"!)

- Published Articles on (or referencing) the DIAMANT:

"DIAMANT test Pilot's Report", "Soaring", December, 1966  
"34th National Soaring Championship", "Soaring" September, 1967  
"Competition Confidential", "Soaring" July, 1969  
"Polars of Eight", "Soaring" June, 1970  
"Rigging the DIAMANT", "Soaring" August, 1971  
"Two Long Final Glides", "Soaring" April, 1979  
"DIAMANT on Display", "SOARING" June 1995

“DIAMANT”, “Janes’ All the World’s Sailplanes and Motorgliders” 1978 publication  
“DIAMANT 18”, “Americas Soaring Handbook” 1974 publication

I’ve seen in the past, but do not remember what issue, nor do I have a copy of the following:  
(Note - The title may not be 100% accurate, but the intent is there)  
From “SOARING” - “Flying the DIAMANT”  
“Jet Power, makes the DIAMANT self-launching”

- Other interesting “STUFF”:

In George Moffat’s book, “Winning on the Wind”, his efforts with the DIAMANT and the 34th National Soaring Championships, in 1967, are not even mentioned!

Ross Brieleb finished 6th, in the 36th National Soaring Championships, in 1969.

Near the end of the production run, FFA presents T. Bircher with S/N 072, as a gift in recognition and appreciation of all his work throughout the DIAMANT project.

S/N 072 becomes a “Self-Launching” derivative of the breed, as T. Bircher (one of the original designers) installs a jet engine, on the fuselage, above the wing, and the project is dubbed, “Prometheus”.

First known event of a Coyote attacking a tied down fiberglass sailplane, when a Chipmunk it was chasing crawled inside the fuselage. As the little critter scurried down the inside of the fuselage, to the tail, the “varmit”, literally “chewed the tail-off”, in an attempt to get at his meal. Don’t know if he got the chipmunk, but as there have been no successive attacks on fiberglass, it should be understood that fiberglass is not included on the regular diet of a Coyote!

First (and only!) known Sailplane to be advertised in “PLAYBOY” magazine! (Maybe it had something to be with the shape of the fuselage??) Also Serial No. 42 had carried the Contest Letters “PB”, and had been authorized to carry the stylized “Playboy Bunny” logo on the fin!

Sailplane to score the highest grade in the “Bunny” (No relation to “PLAYBOY”) test. Explained, a small object, in this case a “stuffed rabbit”, was placed in front of tested sailplanes to determine at what point an animal crossing the runway on take-off or landing could be seen and avoided! You guessed it, with all that glass, no other production sailplane even came close!

Production run (inclusive of all three versions) spanned 4 years, which included 80 airframes. For a ship with “such a bad reputation” that’s not too bad at all! (Compare that to some other sailplanes, both then and now!)

Although the type has been out of production for all of twenty-five years there is still an active spare parts inventory available from FFA (and other sources!) Including the same resins, and glass should it be required!

With a production run of only eighty units, 84% are believed to remain in flying condition. Some thirty years after the first flight of S/N 001! (What other sailplane can boast of this?)

First production sailplane to achieve less total drag, than a 1’-0” square plate held into the wind!

Only “High-Performance” sailplane to be left out of the 1983 U.S. directory of sailplanes as published by the SSA. (It can be argued that Dan P.’s Modified 19m. version and the Ka-Bi-Vo are included, but these are not actual production run machines!)

The first “fully composite, flight rated structure to be put into mass production!” (Beating Rutan, Lockheed, Boeing and the other giants by how many years?...and these guys were only students!)

The stories of people selling their DIAMANTS, missing them so much that they tracked down the current owner (not necessarily the same individual they sold it to!) and paid more money to buy it back than what they sold it for!

First production sailplane to have organized, worldwide 30th Anniversary Festivities!

Only “type” of “High-performance, Fiber-glass sailplane” to have an established “Owners’ Network”, to pass and collect information!

- Model Kits:

Sterling Models- The first “Flying Model” kit of the DIAMANT. Originally issued in 1970, includes “Die-cut” (Crunched) parts, and vac-u-formed canopy. Intended as “Free-Flight” model. Basic “Stick and Tissue” method of construction. Box and documentation (Three-view drawings identify it as an HBV, however, plans reflect 16.5 wing planform, and 18 rudder. Kit remains currently available (Although dies do not appear to have been sharpened for many years if ever!).

Wingspan- 74 inches

Length- 33 1/2 inches

Flying Weight- Approx 5 oz.

Approximate Price- \$20.00 (U.S.)

Windspiel Models- Refer to the description of the “Soarcraft” model kit below, for details!

Soarcraft Models- Produced in mid-seventies, probably a copy of the Windspiel kit or vice-versa. Came “stock” as ??? Designed for what was then referred to as “Stand-off-Scale”. (Paint it white put a “T” tail on it and call it whatever you want!) This was actually the first true R/C model of the DIAMANT. Although the quality of the kit is extremely high, (I had the luck to find one of these kits still in the box in early June of 1998!), the fidelity to scale is extremely poor! To review this kit in detail would be extremely lengthy, to make a “Scale” model of this kit would be difficult bordering on the impractical! In quick reference, starting on the fuse.; the cord of the wing at the root is about 1.75 wider than a scale wing would be, the cross section of the fuse. Has the cross section of the “Libelle”, rather than the oval cross-section of the “full-scale” DIAMANT. With “some” effort the wing be could be made into a 16.5m, or a 18m, however either would be out of scale with the kit fuse! To construct a “HBV” wing, you may as well just start from scratch! From the box, the wing has a light, strong, but complicated construction sequence. The horizontal stab is generally “over-sized”, which is typical for a scale model. Somewhat on the heavy size for a model of its size. The kit probably should be viewed as a “collectors kit” at this time, as company is out of business for some time, and whereabouts of fuselage molds are not known. Perhaps the best thing to do if one wants a large-scale DIAMANT, is to blow up the Sterling plans to the appropriate scale and start “Cutting-Foam”! Specs for the “Soarcraft” kit are as follows:

Wingspan- 120 inches

Length- 54 inches

Flying Weight- Approx. 3 to 3 1/2 pounds

Approximate Price- Last seen advertised for \$89.00 (U.S.) in 1978

As mentioned in the description above, I was lucky enough to find one of these kits in June of 1998, and paid \$300.00 for it! (The quality of the kit, even

today 20 years after it was last produced, warrants this type price!)

Note, there are no known plastic "static display" models of the DIAMANT, nor are there any commercially produced display versions of the DIAMANT produced, at this time! (Although there may be! -- I ever get my butt in gear, and do it!)

## **Questions and Answers:**

Over the past 2 weeks (or so), and 12 e-mail communications you've asked several very good questions, a few of which I attempted to answer in the proceeding text. At this point, I would like to review all the questions you asked, write them here, then answer those which I believe were not covered. If you have additional questions, feel free to get them out. (who knows, there may never be another undertaking like this again!)

On 26 Sep, 97 you asked, "Anyone know where I can find info on the net about the DIAMANT sailplane?"

Well, technically speaking, my brother found your request, passed it on to me. The info I passed on, was not found on the net, so although you probably got more info on the sailplane than you wanted, I have to respond, No, I don't know where you can find info about the DIAMANT, on the net. However, if you find someplace on the net, which refers to the DIAMANT, I sure would appreciate you passing this information along!

On 02 Oct, 97 you questioned "History" - Who designed it? When? By what Company? And what are its Flight Characteristics?

Hopefully these have been covered above! If not, I need to know what parts I left out! As a final note regarding my current feelings on the flight characteristics of the DIAMANT, I intend to close this paper with a section on "current thoughts and views"!

Also you wanted, success stories, awards and accomplishments - Did I give you enough to satisfy, or do you require additional "STUFF"?

Then at the same time you wanted the Problems! Yep, there were those! All I can say here is, are you still as excited about the DIAMANT as you once were? *There is one thing that Dan P. kept reminding me about during our meeting at "Heli-Expo 98". I have searched for a place to include this element in this document, and having not found a suitable home for it, I will place it here, using Dan's own words! "With all of the teething problems of the DIAMANT, there has never been one accident which had resulted from a stall/spin scenario!"*

On 07 Oct, 97 you asked, How's the plane? (In fair response to this question, I must make the understanding, that this is directed specifically to the DIAMANT, which I am the current "Care-taker") How does the DIAMANT compare in comfort, performance and handling? What are some of your most memorable flights? Is my passion still at a peak? And are all DIAMANT owners (a.k.a. "DIAMANT DRIVERS") ardent loyalists?

Okay, one at a time here, the plane first, and understand this applies only to S/N 012 . The plane (and what was once the "Ghetto trailer from hell") is probably in excellent condition, in regards to its airworthiness. As related to cosmetics, I would rate it as good to very good! I'll explain;

Towards the end of its first flying season (with me), I got talking to a "Driver" out west, about the A.D.'s on the wing spar (as previously described). He explained how he fell in love with the ship, as one was based at a field near where he is employed as a "Crop-Duster". He indicated how this ship had been passed down to the chap that owns it now, from his father! Also, that his father obtained it (the DIAMANT)

new, and was originally from Switzerland. (How does this all tie into wing A.D.'s, you ask?) Now, as this father was a certified A & P in the states, and that he had accomplished the A.D. on other DIAMANTS, and additionally owned a DIAMANT, who better to do the A.D. on mine? Besides, if I could get him to do mine, I wouldn't have to drag it across the country, where the only other shop qualified to this A.D. existed! So I ran up the phone bill, wound up trailering the ship to New York, on a cold Friday night in November (with my son and my brother for company). Talking all of Saturday about the work to be performed, saying goodbye, and driving home with my son and brother (who actually did most of the drive home, as I slept!), that night. (and the feeling that I've lost a part of my anatomy!) Three weeks later, I returned to New York, to pick up my strengthened wings (along with the rest of the DIAMANT)! Upon inspection of the work, it was noticed that the quality, and craftsmanship of the work was better than the factory (FFA), again things just fall in place. I ask him if he would be the inspector and accomplish any future work required! (To date he has since given it each of the annual condition inspections required, and various miscellaneous work requested!) I would definitely recommend his services to any other "Driver". The weekend after "Turkey day", I took the ship to the "Ridge" for its first trip! What a feeling of confidence that work instilled! The "Ridge" wasn't working, but it was quite turbulent, and I was glad that I invested in the A.D.

As mentioned above, my first winter (yes we have winters here in eastern PA. We're not as fortunate as the folks, out in LA where the ship was previously based!) was spent with various "Pieces/Parts in my family room. Cleaning this item and checking that item. Getting all in shape for the rapidly approaching flying season. Then the spring came, I flew it every chance I could get! All the time realizing that next winter would bring a toll on my efforts, if I could not find a weather-proof box to store it. Well, it was either fly or find a new box, or fix-up the one it was currently in! What do you think won out? If you said "FLY", you are 100% Right! So there I was, winter was just about to set in, again, and I was no further in my search for a good home! Then I met this "Go-Kart" racer who had a pretty neat looking trailer, and strike up a conversation, he tells me of this little "Mom & Pop-Pennsylvania Dutch" Camping Trailer shop behind Hamburg, so I figure what the hay! (Still another one of those "strange coincidences"! It seems that winter is a perfect time for him, as he is usually slow and can use the work! Now, here's the leap of faith, he's never seen a sailplane, and knows nothing about sailplane trailers! To make a long story short, the DIAMANT spent a second winter (this time all pieces at one time!) in my family room! As a result of this, I got the proverbial "Ration of #\$\$&\*", from the wife and a beautifully finished Trailer. (Complete with ramps, internal tool boxes, interior lights, solar powered vents, a winch to pull the wings/fuselage into the trailer after a long hot day--a feature I've yet to use, even though I've flown on many hot, and humid days!) And Paul (the trailer man) received two additional trailers since then to rework, keeping him "gainfully employed" over the long, cold winter months!

Now that the trailer, was being refurbished, and the A.D.'s on the wings were completed, I was sitting all winter with a sailplane in my family room, what could I accomplish? Number one on the list is the canopy! You want to talk about strategic planning, things could not have been more timely here! I'll explain, ...Back in '94, there was the 30th anniversary of the first flight of the DIAMANT festival. The first one was organized by Thomas Bircher, and was to take place in Europe. Our "Stateside DIAMANT Guru" (none other than Dan Pierson), soon started to organize a similar event for us on this side of the "pond". (More on this later!) So in September, my father and I traveled out to the west coast and attend the festivities! Here is where I met Ray Poquette, who just happens to own and fly an 18 meter DIAMANT, that was also stretched to 19meters. (Similarly to, but not the same as Dan's) Now, included in Rays' methodology of employment, is the fabrication of aircraft canopies, and it seems he had just finished the manufacture/installation of a DIAMANT canopy for a gentleman in Texas. Also, that ship and its owner (not to mention the owners' father! Is this like "Deja Vu, or what?) were on the way from Rays' shop in Grass Valley, to our little get together, in Techachapi, CA. Nuff said, after seeing his work, there was no other choice! The old abortion of a canopy was "Outta here!" I ordered a new one (canopy) from Ray on the spot! It was delivered (by coincidence--I keep telling you about these strange things that occur to "DIAMANT DRIVERS") right as the trailer went into the shop! During that winter, a new original styled, DIAMANT canopy as manufactured by Ray Poquette, of Grass Valley, Calif. was installed, and signed-off on! The difference it makes is unbelievable! In addition to regaining the "Classic lines", and having a(n) optically corrected view to the front, I now have a side window, and vent (great on hot days!), the "Blue tinting" is absolutely stunning, and the added UV protection is something which I'll benefit from down the road!

The coordination, of the work (sailplane and trailer) is outstanding! As part of one task is completed, the next item requiring the just completed effort is on the "Critical Path"! As a result I now have a solid weather-proof home for the DIAMANT, and it is in top shape mechanically, structurally, and "line wise".

The second full season which I flown it (the DIAMANT) was magnificent, many good flights were enjoyed. (inspite of those reoccurring night-mare like thoughts, from my friendly "AI".) During much of that season I contemplated the overall appearance of the aircraft. There were many cracks in the Gelcoat, and it was fading and chalky. In other words, it still looked a little sick when sitting next to the new ships! I committed that I was going to refinish the wings and the stab, during the next winter! In mid-December, I decided that flying was completed for the year, through prior arrangements, I worked an arrangement to use the trailer shop as a work space to accomplish the required sanding, filling, priming and painting. In talking with various club members, who have done this, including one that has presented at the SSA National Conference, on this subject. It was recommended, and decided to use a product known as "DURA-TEK" White Poly-ester Resin, as a sandable primer, then a final coat of DuPont 5040L (1972 Corvette White) as the final color coat. My brother, son, a few friends and myself poured hundreds of hours to those wings, they seemed to go on forever, then there was the bottom, and that was only one wing! Anyway, the sanding was completed those big wings looked pretty good! We let the resin cure, according to the "Destructions" (instructions) then shot it with the color. Boy, were those wings white!! The stab underwent the same treatment. I had it finished right on schedule, as Paul (the Camper Shop owner) was starting to pick up work, for his coming season, and it was just the beginning of the flying season for me! The comments I received at the field were all very positive, as many didn't think that I would follow through to completion! (They don't know this "DIAMANT DRIVER" too well, do they?) The DIAMANT looked very, very impressive sitting on the field with its "like-new" wings and tail feathers! As the season progressed, this new look began to fade, with the primer beginning to crack from below the surface! So much for using what the "experts" recommend! As time went on, more and more of these "primer cracks" have been appearing. I figure, that maybe in another two or three seasons, it'll be time to do the entire process again! For now, I chip them out and fill with DuPont 611S Primer, then overspray with the 5040L. (Looks just as good, and no cracks, so far!) That about brings you up to date on the condition of the plane.

The next part of your question deals with comfort, "How does it compare in comfort?" Keep in mind the DIAMANTS were built between twenty to thirty years ago. (And they show it!) There is no "Sheep Skin" linings as in a Discus or Ventus, there is no quilting as in a Pegasus. The rudder pedals and seat back are adjustable only when the ship is on the ground. No creature comforts of any sort, were designed in. And,... there is definitely no excess room! (After four seasons of flying this DIAMANT, I am still amazed that Moffat was able to look at a map, fly this sailplane hundreds of miles, over unknown terrain, concentrate on the contest, and any other issues at hand, and accomplish so much!) Putting it simply, "strapping on a DIAMANT is kind of like getting on a "Loge", or in a Coffin that is two sizes too small, and going for a Saturday afternoon ride down an Olympic course!" On the plus side, all, and I mean all Flight Controls are exactly where they should be! You don't even have to think it them, they are there! (Not only this, they are not backwards, as in some of those "German machines"! My instrument panel is a modified "Mushroom Style", I have an airspeed indicator, an altimeter, a compass, and an Ilec SC-9 vario in it! There is no further room to install anything else! I use a NavCom Hand-Held radio, and I find it difficult to position the antennae, in such a manner that allows me to talk into the mike. My head is either banging against the canopy, or the canopy lock. I carry a "Camelback" water reservoir on the turtle deck behind the headrest, and that's about all that will fit! While flying, only my finger-tips are able to reach the instrument control knobs, and I need a Lanyard on the tow release and the emergency canopy jettison handle, to reach these!

Regarding performance, the numbers speak for themselves, 42 to 1 @ 56 mph, with a 1.27 fps sink rate, is not bad, even by todays' standards. At the high end, the numbers drop off dramatically! Personally, I have not had the ship above 100 mph, although its redline is 154 mph. I never found a use to drop out of sky that fast, and become a "lawn dart"! In the "East", in our normal flying, we seldom get above 5k feet AGL, I have spent a lot of time in the DIAMANT between 1,000 and 2,000 feet AGL, and sometimes pretty far from home, the ship has always brought me back safely. I fly regularly in the company of ASW-15, Pheobus, Grob, LS-3, PW-5, Jantar, 1:34, and Pegasus, and I believe around here, and since no one that I fly with is a "Die Hard" competition nut, the same pilot could do the same with any ship mentioned above. I

feel it is of importance to consider the financial trade here, that I eluded to earlier, that being: 42 to 1 at \$20,000 is a lot more impressive (to me, anyway!) than 45 to 1 at \$35,000, or 50 to 1 at \$55,000.

In the handling department, (I'll take it to mean "Flight" as opposed to "Ground" and/or "Rigging/De-rigging") once you are accustomed to the "Semi-Reclined" seating position, you will feel very unnatural flying seated! (When I fly Mike's ASW-15, the Krosno, the Grob or a 2:33 {Personally, I feel as I have my own single place ship, I should leave the clubs' single place ships for those pilots who need them, and refuse to fly them, as a courtesy.} Sitting upright now seems very, very strange and uncomfortable!) Handling in the air; the DIAMANT is a dream, as heavy as the wings are on the ground, they become that light in the air! Speed control is fairly easy to maintain, and by setting the flaps to the appropriate position, the desired speed is pretty much "locked in". Roll is slightly on the slow side, (about 4.5 to 5 seconds, 45d. to 45d.) and the adverse yaw (with all that wing), takes a lot of getting used to! Perfect coordination during turns, still takes concentration, as I find the yaw string(s) dancing all over the canopy. The rudder, (yes the rudder, that device that is connected to those "bars" your feet rest on, and one many "power pilot's are unfamiliar with!) I have previously illustrated how and why many "DD's" feel the ship is over-ruddered, it is also important to note that in certain flight attitudes the rudder becomes completely blanketed by the fin, and all the pushing in the world, doesn't accomplish anything! In thermalling, I am constantly turning a wider diameter circle than the 15 meter ships, but in all fairness, I must add that I feel this is me, and my level of comfort, rather than the ship capabilities! (*Dan was quick to identify that he agrees with me, and that this is definitely a matter of piloting technique!!!*) Take-off, tow and approaches are very easy (now, as compared to my first ones!) and there is nothing special about them. Stalling in the DIAMANT, is extremely mild for a ship of this class, with more of a "mush" or very slight break, than the "drop of a wing and over we go" scenario. I have never executed a full-blown spin in it, although the "book" states, that these are permitted, and relatively mild! And while we are here, some mild aerobatics are permitted, (loops, stall turns, wing-overs), again as I have never seen the need for these, I can not speak truthfully, on the handling in these maneuvers!

You also ask, "what are some of your most memorable flights?" My feelings here, (after my first flight in it) are not as to any particular flight, but to pieces parts of many flights! I'll attempt to highlight.

The first time I reflexed the flaps. It was late (real late!) in the day, and no additional lift could be expected. I was about 8 miles from home, and down to about 1,400 ft AGL! I wasn't real thrilled about the possibility of my first landout (especially in the "dusk!"), and a decision had to be made, "Do I trust the numbers and run for home, or do I pick a field?" I trusted the numbers, pushed the flap handle forward (kind of like fire-walling a throttle), and eased just the slightest bit forward on the stick. I want to tell you, it felt like I just "lit the can" in an F-104 or something similar! About four minutes later I was at 600 ft AGL in the pattern! (A little lower than I like, but I was home!)

Then the time Mike was flying a Platius (prior to his acquisition of the ASW-15), and I in the DIAMANT, we had decided to make a run for Morgantown (about 25 miles away). I was about 600 ft directly above him, touched those "magic flaps" and left him in the dust! We both new that there is no performance comparison between the DIAMANT and a Platius. But his (Mike's) comments about how I literally shot ahead, and left him standing still, (kind of reminds me of the old "Road-Runner and Coyote" cartoons!) bring a smile to my face every time I think of it!

My first run over to VanSant, also was memorable as I never stopped to thermal either on the way there or back home! After I made it home, I continued on and did the Quakertown, Doylestown, Penn Ridge, and back home "box"! (This was no record flight, by any means, but I was and still am pretty impressed with it!)

Some other neat incidents in the DIAMANT, include thinking that the day was "NO GOOD!", and then being talked into putting together, (including all the rigging help I would need!) Launching, and then proceeding to remain aloft longer than those who had encouraged me to fly and also helped me rig! (To me it appeared as a "sleigh ride" day, as observed from the watching of others get only 20 to 25 minutes per flight, and indeed not worth the effort of "slapping on the wings") (I wound up with an hour and ten minutes! Needless to say, this did not set to well on the field that day!)

Flying with hawks, or other “birds of prey” is always a beautiful and rewarding experience! I never pictured them to be, “as large as they are”, until they are only a few feet away from your face, at two or three thousand feet, AGL!

Now we come to the “Passion Part”, did you ever have a “first love”? Well, that’s the case with the DIAMANT, and myself! I know, first hand, all of her “evil ways”! I also know, I’m one of the few who had the pleasure of experiencing some of her “Charms”! Yes, I still love her, (now, as much as I ever did!) and probably I always will, even after I pass her on to the next “Care-Taker”! (And this to shall come to pass, as my human body ages. I calculate approximately 3 to 5 years before I am no longer to lift the wings! *A note from Dan P. here, “Get a wing carrier he has been using one since 1988, and has not needed any assistance since!”*)

In concluding the 7th of October note, it was questioned about other DIAMANT Drivers, loyalty. To this, I can only respond from what I had been a part of at the 30th Annaversary “Bash”! We had over half of “Drivers”, and a third of the ships in N. America gathered in one place! This gathering was proceeded by a similar “Festival” in Germany, and followed by a final gathering in Switzerland! Have you heard of any similar parties revolving around a “Schleicher”, “Shimp-Hirth”, “Glasflugel”, “PZL” or even “Schweizer” (*With the notable exception of the 1-26 drivers*) product?? .....Neither have I!!

Somewhere along the line you had also questioned what other sailplanes I have flown? (As I mentioned earlier, I also used to fly a lot of R/C Sailplanes, but for this paper we’ll limit my abilities to “Full-Scale” sailplanes. The following is a listing of all the sailplanes, I checked out in. It does not mean that I am an expert in them, but only that I have an endorsement (buried somewhere deep) in my log books, identifying that I’ve been checked out and found competent to maneuver that type through the sky!

- Schweizer - 2;22, 1:26E and A, 2:33A, 1:34, and 1:35
- Brasov - IS28.B2
- Blanik - L-13, L-23
- Grob - Twin II, 103, 102 and 109
- Blokow - Platius B-4
- FFA - DIAMANT 16.5
- PZL - Krosno KA-03, KA-03A, and Gapa
- Schleicher – AS W12, ASW-15, and AS K-21
- Slingsby - T-21 and T53.b

On 11 October you asked me to review what you had obtained from the VSA and SSA (at least that’s what the attachments look to be from!) I have some of the articles mentioned, and I’ll include them in the “long awaited “CARE” package that I will sent you! As I have mentioned throughout this paper, Dan Pierson is the undisputed “Guru” of the DIAMANT! He is also a good Friend, (one who I am very indebted to! and one I will always value!) Yes, he’s undergone some hard times, but he’ll be back! If you publish any of the information I’ve sent to you, I would appreciate it if you would also include his name in the credits, for without him much of what I pass on in writing would not be possible! Otherwise, the information seems to pretty much agree with what I’ve attempted to put into words throughout this paper, only with a whole lot less words! (What minor points don’t agree, aren’t worth arguing about! Choose the level of detail you like, and go with it!)

In closing this section you have probably noticed that many of the “Drivers”, “AI’s”, and “AP’s” names have been omitted from this paper. I have done this, out of respect of their privacy, if you would like me to contact them for you, I’ll be glad to do this and ask that they contact you in return!?

Hey Don, it is here that I am rudely awakened, I realize that I have typed 26 pages to date, (now I’m on the 27th page) and it is probably starting to bore you to death! I am sorry about this! However, I’ve reread what I compiled so far, and it all seems to be pertinent to your, “Requests for Information”. I don’t know what could have been left out! I think that I’ll conclude this paper, with an update on my thoughts on owning and flying the DIAMANT today (near the close of the 1997 soaring season, here in eastern PA and after just enjoying over three hours of air time in it, last weekend!).

## **Current Thoughts and Views:**

So here I am, still the proud owner (after 4 flying seasons' and five years) of DIAMANT 16.5, S/N 012! As there is substantial information ahead of this part, all that remains is to put on paper are my feelings about the ship today! Has it been a pleasant time? It was a great learning experience, one, (*I'm still, after 4 years, attempting to communicate with the FAA-MIDO, referencing certain items identified in my Modified Operating Limitations*) which the future "Care-Taker" will not have the "opportunity" to go through! The DIAMANT flies wonderfully, although it took a lot of getting used to! For the price I paid, and for what I had to do to the ship, I could have had (no not a "V-8") but probably a Jantar, or an ASW-19. I understand that the current market value does not justify this, but "love is love"! I found out much about the two clubs I belong to, who continued to remain as friends, not to mention crew (the wings are still heavy, and must be aligned perfectly)! When I fly it, I often think of George Moffat flying the very same sailplane, and wonder what he would do if he were at the controls! Then there are also the times I think of how selfish this sport is, and of the "guilt trip" the wife will attempt to lay on me, when I get home! (It is indeed a careful balancing act, we married pilots' must manage!) I also realize that I (not the bank and I) own, one the most historic (and arguably so) sailplanes in the U.S., and a little smile comes to me. I think of all the neat people I've met, corresponded with, and have become friends with through my association with the DIAMANT. (Pierson, Moffat, Bircher, von Voornveld, Brian, Glass, Wiess, Hundley, McCready (yes, that McCready!) and countless others) Knowing that I would have never met them, if it were not for the DIAMANT! I think of the uniqueness, mystery and the history of the DIAMANT, to soaring, and realize that there is an awful lot of myth, legend and lore experienced over the last thirty or so years, with no one, even the "Guru" himself, putting any of it down in writing! (Maybe I'll send him a copy of this and it will inspire him to continue, add to, fill in, or correct my efforts?)

As I can't think of anything else useful to contribute, I guess I'm about all done, and now it's time to get off the "Soap Box", and return to other things at hand. (Like collecting some things to go into your "CARE" package.) If you would write (or E-Mail) in the future, I'll respond. Thanks for the opportunity to put the history of the DIAMANT on paper (or file!) Best of luck with the model, hopefully you will send pictures (both during construction once completed, and including a few in flight). And if there's any other unanswered questions, I'll try to find the answers for you. I hope you found this an aid in your project!

Safe flying,  
Arthur T. Babiarz, Jr.  
DIAMANT 16.5 S/N 012  
N1193