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This is a conversation with Al Weilband at his residence on the evening of August 29, 1983. And it may help you, George, I've played the recording I made of your phone conversation about the piece of film that made and Al, here, has made a whole bunch of notes and he's got some interesting observations and we may get into a little chit-chat after this, but I'll hand you and the mike over now to Al Weilband to make a few remarks.

O.K. George, this is Al Weilband. I think I'm on tape now. We just had a bit of a boner but anyway. I just listened to your notes and I'll make the following comments.

You mentioned two wheels at the front and one wheel at the back which is completely opposite to the Project Y mock-up. Project Y mock-up was a tail sitter, as you probably well know, sort of aimed in the air at about 75 degrees. And it had a wheel at each end of the spade shape. It was almost circular but it was, in fact, spade. And it had a wheel at the two bottom spade ends and it had one nose wheel which was a very long, praying mantis type, nose wheel.

The second thing that I have to say, yes, it was full scale. It was in the approximate area of 36' in diameter. Now, when you talk about rolling the thing out - I happen to know - I was involved from the beginning until I saw the thing destroyed - it was non-mobile, the mock-up itself was all made of wood and it was locked in one place and, to my knowledge, the wheels didn't even go round. So, there was no possible change that it would be rolled out of a hangar.

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Now, the next thing that I notice from your notes is that you had folding doors. Now at Moulton there is, every hangar has rolling doors and I think you understand what they are. They disappear and slide - one behind the other. There is no folding at all to the doors. So, it's very unlikely that these photographs were taken at Moulton. Now, as you know, anyone can show a split in some movie of walking past a row of jet engines at the AVRO plant and they certainly were there and certainly you could get a bunch of officers and they did tour Moulton frequently during those years, so you can get that kind of footage very easily. If, as you describe the rolling out ceremony and the camera disappearing under the thing as it went overhead, you were describing the AVRO car, I can understand that looking at two wheels at the front and one at the back which the AVRO car had. But the date of '53 doesn't go along with that and since you are very conversant with the AVRO car, I'm quite sure that what you have, and what you've seen, and I hate to disappoint you, is really - has to be a spoof. There was only one mock-up. The mock-up had no stabilizers on it at all. It had no center body that I remember. It had a large intake on the top and on the bottom of it which ran almost from one third from the front and disappeared to the back. But there were no stabilizers whatsoever. The cockpit is a standard cockpit that everyone was doing in those days. You describe it exactly. Everyone had a cockpit like that.

Well, I guess that kind of buttons that one up George. And the other thing now - I talked to Al earlier and I see he has really some



interesting sketches here of the actual, he just made these. He tells me they are hot out of the oven - of the Project Y, setting up of the praying mantis and the spade shape and he's got a side view and I'm just going to stop a minute. Now, what I've just done here, I've reached into my case here and I've shown Al, Czerwinski, and do you know, you'd think that Al had copied Czerwinski's drawing. And, of course that's the way it should be. The plan form is almost identical line for line. It's incredible. I didn't show this to Al until now and Al is looking at it in amazement. The nose set that Czerwinski's got - it's dead one, the two of them. You'd think that one just looked over the other guy's shoulder. So, I don't think there is any question of memory there. The praying mantis type thing, again, the only argument might be Czerwinski shows  $60^\circ$  and Al said perhaps  $60^\circ$  to  $75^\circ$  so we won't fault them for  $15^\circ$ , I don't think. In fact, you could almost say Czerwinski  $66^\circ$ . It's very interesting to see these two. These two people having compared notes and I'll make photocopies of Al's, I've got photocopies of Czerwinski's and I think you'll find the whole thing pretty interesting. And now I'm going to have a bit more session here with Al. I may or may not put this on tape but I just got my little cassette recorder with me, but anyway, we'll do what we can.

I'm visiting with Al Weilband. This is a little extension on the other little bit of tape there. I've got Al's remark from the film you inquired about, George. And, I thought I would tape this section here. You may have it. There may be some duplication but like all good historians and sort of researchers, you tape everything

because sometimes they bring little goodies out of the bag and Al is no exception and, like I said on the other bit of tape, Al had a sketch. I see now he has some sketches, so he has three of them and we'll just discuss these. I'll let Al do the talking.

O.K. Les. While I was waiting for you to come up this evening I promised you that I'd do a little bit more descriptive work for you so while I was waiting for you to arrive I did some little thumbnail sketches here of how I saw the overall, crude, quick, development of Project Y, which led to the AVRO car. Not necessarily, we didn't want to lead to an AVRO car but that's what we got to. And the first sketch I did was of the Original Project Y, was based on a flat engine. And this was the whole dream of John Frost. He had this vision, if you like, of rolling a jet engine out flat and having this huge disc going around generating this tremendous horse power so I drew this picture of a flat disc engine, with the cockpit in the center and the intakes at the front into an intake plenum going through an axial, radial flow, axial compressor, if you like through some burners to a radial flow turbine at the exit, going into a high pressure, high temperature plenum chamber, which was around the tip of this whole circle. Now, to make this thing work the original project was, well, it cannot all flow out radially, we've got to make it all go backwards. So, a spade shape was drawn around it with a point at the front with a whole bunch of exits aiming in a general backward direction around the periphery of this thing for the two sides and of course, when you got to the back, everything was going in the right direction. So, instead of having



these sharp, tooth type outlets around the periphery of the sides, we had, if you like, a thin jet sheet going over and under and aileron? on either side to provide tremendous control forces. And now, if you think of this spade standing up at about 60 to 70° you can visualize the fact that it had a wheel at the outboard end of each aileron, which stood on the ground. An inside view, of course/<sup>in order</sup> to hold it up at 60 to 70° it needed a very great long front undercarriage and it was nicknamed the praying mantis by the people in the group at the time. That was, the whole idea was to put this flat engine into something and make it go. And that is how Project Y started. O.K. Now, I drew that one and then I've been trying to explain to Les how we went from there and no one, of course, liked the praying mantis idea, nobody like the tail sitter, nobody liked very difficult thing to land, very difficult thing to take off. Other people have actually taken off and landed in this direction years before with conventional type \_\_\_\_\_ airplanes. But, then along comes the, what we called the flat riser, which was really you might say, Mark II of Project Y. And, we retained, of course, the flat engine because that was what we wanted to have was the flat engine. We retained the intake and the exhaust. But, instead of having all these sharp teeth around the outside we got this not plenum which was now circling the whole airplane and, O.K., so we have this hot plenum and what do you do? You put a whole lot of little outlets on it with veins. These outlets can be either shut off, or aimed in any direction. So, now, if you want to take off you shuttle the top ones; you open the bottom ones and you shoot

straight down. And now you have a jet escaping around the periphery of this whole thing, providing an air cushion and using all the ground effect that you can to get this thing off the ground. Then you can start twiddling these things-opening the top ones, turning them all backwards until you've turned it into forward flight. And this was, you might say, almost a Mark II of Project Y, which we called Y II. This went along for quite a while and I think this is when Des went to England with John Frost and Czerwinski and spoke to the \_\_\_\_\_ over there. And I think in general, general terms, what happened was - everyone said, well it's a great idea fellows but the engine is going to cost a tremendous amount of money to develop - Des Earl has mentioned the bearing problem - this is where, I do believe John Frost was the inventor of the air bearing, however, we went through many, many ways of trying to make this engine and I'm quite sure that if enough money had been available and was available now, the engine could still be developed. But, they said it was, in those days was going to cost a hundred million dollars, which in today's terms would possibly be eight or nine times that and you can understand why no one would want to pay that much for an engine when the aerodynamics of the airplane weren't really proven. So, people said, well, let's see what we can do to replace this engine with something which will give us a hot plenum at the tip. In other words, we will have the hot plenum at the tip doing exactly what you want it to. You've got a high pressure, high temperature, if you like, doughnut around the outside of this circle. And we will supply it with engines. And we know what they cost. So, then we started drawing multiple engines, which I've now drawn



the third sketch of the central intake, just the same as YII or the Y I, except instead of having this massive disc spinning around, you know, with the \_\_\_\_\_ speed of/ <sup>about seven</sup> hundred feet a second, and costing a hundred million dollars to develop, we were talking about buying six, eight, ten, or whatever jet engines - facing radially outwards and going into a fan shaped jet pipe, which, if you like, squashed the jet down and spread it out along the circumference of the circle, and I think you'll see when you see this sketch what I mean. And now we have exactly what Project Y I and Project Y II had. We have a hot plenum chamber of high pressure around the outside of a circular planform. And this is where we managed to keep going by saying we don't need your hundred million dollars to develop it. All we need is a half a dozen or so engines. And that's where we got into the 8 Viper or whatever engines were available type airplane.

That comes out very interesting, George. But one thing I notice here, and actually, you see, that last one that Al described is the brochure I sent down to you on the radial engine. And that was listed as a Y too. Actually, what Al is doing in fact here, by intent, or just by the fact of stating the facts we have three, we have another one now. In between the tail sitter we have, the tail-sitter and then we have the flat riser, which was, I believe, it's kind of a Y II, and yet that one with the 8 or 10 Vipers was referred to as Y II, so we could have had a Y, a Y I, which is perhaps a flat riser, and then Y II, which is roughly the same thing, but done with a bunch of conventional engines, getting their inlet from the center

and ejecting out to the periphery, to the outside to get this not circular air, as Al said, on this flat riser, you see on the sketch, and I've seen it on that other one, the artist's conception and that little metal disc I have. There is a whole bunch - they look like rain things, something like that shut off your hot air coming out of your furnace, they are circular. And as Al said, you can rotate those or you can cut them off. You can rotate them so they all point backwards, you can cut off the top, \_\_\_\_\_ top and bottom of the flat disc aimed out toward the outside. They all \_\_\_\_\_ round like the outside of the perimeter and you can close off one side and open up the others to, there's a multiple, as well as you've got control and this big engine has these two great rotors and, like one above the other, one rotor, Al corrected me. Stator blades one above and one below the other, but above that on the actual skin of the vehicle, you've got the circular little deflectors and Al is pointing these out right on the edges. The sketches he's got, they tie in to a great extent to the brochures and the literature we've got but they make the whole thing a lot more sensible. And some of those little sketches that you sent up to me that you said you didn't know what the devil they were, Al, you would think Al would have seen those things and he actually has redrawn them. They are on the flat riser one. Of course, this is exactly as it should be because this was part of his program and, it's kind of interesting tying it all together. We haven't actually run across an actual brochure yet apart from that one of the 8 Vipers. But, we've certainly got a lot of background again from Al here that wasn't on the earlier tapes or we've got a little more clarification.



O.K. then. Now, after you finish with what you call the 8 Viper rig or airplane, then we went through another major change. I don't remember the numbers but we finished up with 6 Vipers doing a quite different job. They were driving a Lundstrom compressor which produced a very large amount of cold air. And I think, on thinking back, possibly removed all the difficulties associated with hot jets, hot vanes, operation of hot vanes, all sorts of ground erosion problems, so now we used 6 viper engines in a little different manner to drive a cold compressor, which is the Lundstrom type compressor and I'm sure you know what that is, which drove a whole lot of cold air outboard and now we have a cold plenum doing the same thing that the hot plenum was doing on the Y II. This was, whether it was a part of the 606A or 1794 or, you know, this is too far in the back of my mind. So, we went from the 6 Viper rig with the Lundstrom compressor and we finally graduated or deteriorated, if you like to call it that, into three tiny little J69 engines driving a single stage fan in the center which became the AVRO car. And that's the kind of logical step progression from Y I to the AVRO car.

It's really a squirrel cage type of thing. You know what a squirrel cage motor is? The one with the vanes go around? (Um hum) Well, it's a multi stage squirrel cage, if you like. A multi stage squirrel cage, Lundstrom compressor. And it does just what I'm talking about now. Instead of making it a single stage centrifugal compressor, it's a centrifugal axial compressor. You see the idea now? (Um hum) You see the idea now? (Um hum)/ The air comes in the middle, it gets accelerated outwards because it's a centrifugal compressor but it's compressed also by the fact that it has a bunch of stators and a bunch of rotors.

And the bunch of stators, and a bunch of rotors, and it's really on a squirrel cage with, I think we even had, as a matter of fact, it's all on an axle with a tubular framework holding it all together. So, really it's this compressor that we had on our Y II or whatever, or Y I or Y II, in a much smaller way. But what it is is one step more than the centrifugal compressor. And I notice in this booklet \_\_\_\_\_ talk about was why did they go to this business when the obvious way to compress air when you're doing it this was is a centrifugal compressor, so the obvious answer to that is, there is an end of the road with a centrifugal compressor. You can only get a certain pressure ratio out of it. But as soon as you make it an axial compressor you can have more and more stages to it and you get higher and higher pressure. And, of course, with vehicles of this nature the higher the pressure is by the time it gets out here. The more energy you've packed into this small space. So, that when you get out to this plenum chamber that I keep talking about around the tip of this airplane, you've got very, very high pressure air here. And, you know, in thinking about it, Y I, Y II, and the radial 8 Viper rig all had the one thing in common. You know what it was? It was a hot plenum chamber at the tip. And when it's red hot, and that's what it was, \_\_\_\_\_ it was jet pipe temperature, it was 600°C like 1500°F, now you got vanes in there that you tried to slew around and slip around and slide around and they all, they all were operating very, very tough environment. And so you can't put oil in the \_\_\_\_\_ you have to start using graphites and you have to start using all sorts of exotic materials and you can't operate them with hydraulic jacks anymore because the hydraulic oil boils so you have to use



pneumatics and then they get very high temperatures and you can't use teflon seals because they melt so what happens is, this is the end of the road. This is the super duper but they say, well o.k. so the flat engine is going to cost a hundred million dollars the next problem is this hot plenum chamber is going to cost a lot of money too. You are going to have to develop, we are going to have to develop, I mean, you know how much money it cost to develop just the operation of the afterburner vanes. Which are very simple, really, on a jet engine compared to all this stuff to have to operate. So someone said along the line, well, hey fellows, you can save yourself a hell of a lot of development money and you can start with a helluva a lot more people who would understand that if this was relatively cold if this was just compressed air out of a compressor now we can start using hydraulic actuated, we can start using aluminum vanes, we can start using all sorts of known technology to make this control system work. And that's when the Lundstrom compressor came along and that became the six Viper rig. You understand? Then they said that even then eventually this is getting too expensive. We have balancing problems with it. We have all sorts, you know, we never did have all six vipers running at once. O.K. But, so, then the whole thing then started getting a bit, the people that were giving us the money were starting to get a little bit harried and said, we still haven't got to the nut of the problem. We said to you, if you can get the money out of this thing and prove that aerodynamically a circular airplane will fly, then we can come along and then we can back track into all this stuff later on. But, give us the simplest form of airplane that's round and so it generated into the AVRO car with

three engines blowing on a tip turbine driving a multi bladed propeller. That's all it really is, which provided a great big plenum chamber of compressed air. Which we then squirted around the various directions. And that was the AVRO car. And if the AVRO car had been successful and there is many reasons why it wasn't and not all of them technical, you know, there was lots of political considerations, lots of bad timing, lots of all sorts of things. If the AVRO car had been successful then I'm sure we would start back tracking through these other more expensive pieces of machinery and we would have probably finished up with PROJECT Y II. Not my Y II, nor your II, but flat engine with the rotating nozzle and a flat riser. That's where we would have finished up. We'd have gone all the way back through that whole lot had this, this was the keystone of the whole thing. This was simplicity itself, to prove the aerodynamics of a circular airplane. It was the cheapest possible way of getting a circular airplane into the air. And what happened? They had some P69, which was actually a French \_\_\_\_\_ engine, which had been modified and built by Continental in the United States. There was a J69 they produced, I remember the number - it was 902 pounds of thrust and every time you speak to anyone today about 902 pounds of thrust they laugh at you and think you're running a lawnmower. We had three of those driving a fan which we got pretty close to 5,000 pounds of thrust which was very, very creditable but it's very very difficult to build an airplane to carry two men, enough fuel, all the necessary clobber to drive these engines for less than 5,000 pounds of all that weight. And if you don't reach one point one \_\_\_\_\_ of all that weight you don't go \_\_\_\_\_. And so we were running on the edge of insufficient thrust all the time for the want of somebody coming along



and saying we'll give you some really good engines which will produce 10,000 lbs. of thrust between the three of them then the thing may well have gone the other way. I'd say it would, but it may well have gone the other way. And because the AVRO car was finally dropped we never did get into this return loop to make it more and more exotic and work our way back through the steps that we had progressively come down from in order to do something rather than nothing. I mean if someone had given us a hundred million dollars when we came up with Project Y II, or Y I Mark II, if you like, with the flat engine, if someone had given us a hundred million dollars then, we could have gone the whole ball of wax. But we stepped down, and down, and down, and we finally got the three 900 lb. thrust engines which were man enough to do the job. I think with what we had we did a helluva of a creditable job with what we did. But it didn't make the grade, had we made the grade we now would be progressing our way back up through the exotics. We would have been back to the flat engine. We would have been talking about the flat engine with the variable vanes around the periphery and so on and so forth.

That's exactly what \_\_\_\_\_

Is that right?

That's exactly what he said he's going backwards the other way so he had a knowledge of the engine...

Well, the whole thing, and I knew John Frost as well as Des Earl, well I guess almost, and John Frost had the flat engine. And that was his whole deal and then all these things.....first brain, spark of an idea.

This engine that rolled out that had the power, and I told you before and I'll tell you again, the power of the Queen Mary and he was quoted on the radio as saying when somebody said do you think it will fly? And he was quoted as saying, "If you give enough thrust to a brick it will fly." And it will. I mean, you know, if it weighs a hundred lbs. and you give it 200 lbs. of thrust it's gotta go somewhere. Whether you can control it or not is something else. So, he had a quarter of a million horsepower/<sup>sewed up in</sup> something that was 36' in diameter and about 3 1/2 ' thick. So, it damn well had to go somewhere. But, you can understand why no government would give him a hundred million dollars to develop that engine when they said well, hey, let's back off and see whether a circular airplane will fly first. And they were right, they were right. They were proved right.

That's MIT?

Boston, Massachusetts -- Institute of Technology. They were the super sonic whiz kids of the day. And we did all our low speed or \_\_\_\_\_ speed stuff at Dayton, Ohio, Wright Patterson Air Force Base /<sup>where</sup> we did low speed characteristics of all these. We did the high speed characteristics at MIT and we did all the original of Y I, Mark II, if you like, still talking about the flat engine, still talking about the hot plenum, still talking about the supersonic intake with these variable \_\_\_\_\_ inlet. And all that work was done with reflection planes which were made at Moulton and I was instrumental in a lot of the design of those models and they were taken to Boston and they were tested. And if I ever get that damned stuff back from Arnold Rose, I gave him a complete book of all the models, and they are artists pictures of all these models, on 8 x 10's, with all the various



different, you know, interchangeable nozzle plates, that we tested, very interesting stuff. That was done in the early days. That was done before we ever got into the 6 Viper rig, that was done right in the early stages, that was when the Americans first got involved and they got involved with the flat riser, you know, they came on board with the flat riser with the flat engine in it. That's when they got on board.

After the original Project Y?

After the spade shaped praying mantis. When that went flat and became a flat riser with the ground cushion everything started making a lot more sense and they got on board then and they did, all the wind tunnel model tests on that, we did an awful lot of work on that. So some of this stuff here you'll find some of the dates go back to '53 to '54.

You may find some of this in this list of Joe Gurney, I think that's what we are looking over now. One here I see '53..

What is this? It's just a newspaper, front page or whatever.

Maybe if you see something, Al, you can make a note what item it is if there is anything that looks particular interesting here.

Course at the same time, all these little reports like this SPGTR 252, that was Special Projects Group Test Report, No. 252. Report on analysis and tested a gyro stabilized hovering model. And all these models were made and they were tested at Maultan in our test laboratory with compressed air and they were all like little toys really. There's a whole, whole pile of this airplane that I haven't described and that

is the control system for the airplane, was all based on the fact that now we had this large rotor going round with tremendous gyroscopic forces with the \_\_\_\_\_ toppling this gyro to provide very powerful control forces to operate these controls. And even up to and including the AVRO car the central single stage compressor, thrity-three bladed fan was actually floating on it's bearings and it was allowed limited movement and that movement was magnified at the bottom onto an arm which operated the control system. So, the thing was gyroscopically stable. In other words, when it toppled one way the gyroscope told it - hey, and changed the controls to straighten it out. So, it was automatically stablized by it's own machinery. There was no black boxes. It was directly coupled mechanically to, to the floating gyro. And that's one of the main, one of the main claims of the orginal Project Y, was the fact that it was gyro stabilized. And that feature went right through to the AVRO car and remained with the AVRO car, and did a very good job of stabilizing the AVRO car.

Well, let's go on down this list, now. See if there is anything particularly interesting.

Well, as I say, when you get to this gyro stablizer, that was done in the AVRO lab. Well, then we go on to the progress reports of the AVRO car which were reports that we had to do to get more money every time we did a, went through one phase of testing we had to provide the report so that we could<sup>get</sup>/the next gob of money. AVRO car \_\_\_\_\_ test report, this was all....(Page four, Al is looking over now) That's done in '74 you're looking at.



What are these arrows mean? (Research. Some of these are not available)  
Oh, I see. In other words, you can't get these? (Apparently not.)  
No. (Who knows, George seems to be able to get most things, don't you George?)

There you see this...(Point six? around there.) That might be an interesting one. (108, Al's \_\_\_\_\_. See Project 179....) That was the original contract for AVRO to start 1794. And that would have outlined what it was all about. Oh, boy. That wouldn't mean anything. I don't know where you got that from. AVRO design study 1952. (Item 110) That must have been the original. (That must have been pre....) I mean, there isn't even a report number on that. (No.) That was what Des Earl was talking about, the wind tunnel model of the UK53. (That's Item 111) The spade shaped airplane.

(Point 7. I see Joe has a lot of these with these X's on. This is stuff out of the Flying Review.) Oh, I see. (Not too much of documentation, it's sort of what people suppose, or what they've picked up.) Yeah, these are all.

(Now we're on to Page 8 of 8.) This is been the first test of the AVRO... 151 was the first test of the AVRO car in the 40 x 80 wind tunnel at Ames Research at Moffett Field. Dick Grife, remember I told you about Dick Grife? (yeah) Well, he was the project engineer, he still works for the Ames Research Center. I think he works in either the centrifuge or the flight simulator section. I think flight simulator section. Richard Grife, and Bill Tallhurst. He works at the 40 x 80 wind tunnel.

(That's the last one, 151.) 151, that would have been the first test of the AVRO car in the Ames Research Center.

(Now we're into miscellaneous references. This is all AVRO car. But I see these are just research only.) That, well now necessarily. Now, (according to Joe's marks here, the R's, got some good stuff there, anyway.) This was Dayton, Ohio (Item II) was a sixth scale model of the AVRO car tested at Dayton, Ohio by Patterson Air Force Base. (You were on that, were you) Yes, I designed the model for that. Took it down there. An awful lot of this is the AVRO car. Very interesting Number 9. (Item 9) Armstrong Sidely Viper Test Rig for Ground Hopper Test. That was our Viper Rig, with Six Viper Rig, with the Lundstrom Compressor. That was after Arrow, that was your bunch of bull. (Number 10) That was where all the Arrow boffins decided to change it and make it work. They came up with 34 or 35 different schemes. I don't even know that one. (Number 11) Well, that was a fairly early one wasn't it? And that's from \_\_\_\_\_, England (Item 13, the one in the book.) (He just told me he never heard anything about that one. But it's been a very interesting evening, a short one. I very much appreciate/being with Al again. So, it looks like he's got some other packages here maybe he's going to show me. I've got a couple of photographs here that I've picked up hither and you and I'm going to get Al, you've got photocopies of them, George. One here, it looks like a tusk sticking through a wall. Probably Al can make something of this thing.) O.K. It's the jet pipe on the AVRO car that came from the J69 engine which fed air through the tip turbine of the 33 bladed rotor in the AVRO car. (Well, that's all nicely buttoned up. And we've got the AVRO car.) With John Frost at the



weigh scales. It was when it was being weighed. (John Frost is across the other side of a hoist on the bottom of stairway.) And this is John Whitley, I think. I won't be sure. Don't say that. (It may be Des.) It could be Des Earl. (With the back to the camera.) That's Harry Befford. (Harry Befford, on, the guy you can't see his head is missing) This is one of the workers from the shop. You can't see... (This is somebody behind the hoist...) These are strain gauges, you see, strain gauge, strain gauge and a balance weight, so they can measure the weight there, the weight there, and the weight there. This is when the airplane was finished, before it flew then they weighed it. (This is the chain fall in the center and the one to the left of the strain gauges and then the one over there that John is actually looks to be reading off some of the facts and figures. And he is standing on the bottom of the stairs and they are weighing this beast.) And these are some spare... (You can see those horn things to the left of the canopy.) These are spare wing tips. (Oh, a pair of wing tips Al tells me. They are over there to the left hand side above possibly Des Earl, back to the camera, on the far side wall there, behind one of the bubbles on the left side, spare wing tip sections.) And that was at AVRO's of course, Moulton. (And now I've got the couple of artists impressions of the 606 supersonic that Al is looking at with the little...) Yeah, that was an artist's conception that was obviously done to raise some more money. But, it was typical of our round airplanes, typical of the concept. What can I say. It could have contained 8 Viper engines or it could have contained a flat engine. It obviously had a lot more power put on it for supersonic acceleration.

And, it was obviously a flat riser and it was obviously a \_\_\_\_\_ job done on the USAF to get some money to develop, I would think PILOT 606A or BB1794. The other one he is showing me is 60, it says right on it 606A. It's the same airplane in a hovering mode. It obviously couldn't happen cause it would have burned the grass for sure. That was one of the reasons why we went to Lundstrom compressor and some cold air. So, that when we were squirting all this \_\_\_\_\_ out we weren't squirting out stuff at 6 or 700°C. We were squirting out at possibly 200°C or 180°C. And so those two pictures of one of it in the air and one of it coming down amongst the trees is all part of the sales pitch to get some more money to carry on development. (Now we are going to have a look at what Al's got his goodies here. He's got some packages. Oh, I thought you had some over there in those.... Oh, I see. Some of the old stuff we had. Here we are, George, Al is looking at the aerial jeep, which was the start of the AVRO car. The first illustration there,) Well, I just had a long dissertation there trying to describe to describe the natural evolution of the Project YII, the AVRO car. And lo and behold, I discussed with him these peripheral outlets with multiple nozzles which was infinitely variable. And here, lo and behold, when I open up the aerial jeep, which was really, possibly the forerunner of the AVRO car, or the first attempt to get some money out of the Canadian Government on a very small scale to make a very small airplane, lo and behold, here are these very nozzles that we had on our 8 Viper airplane. So, that was a most interesting thing to me. I noticed too, they talk about a controver\_\_\_\_\_ airplane so they haven't back right off to square one. They still were trying to get



a little bit more money than they finally got.

Well, George, there's the bit of tape that I've picked up again with my second, sort of very informal, and unplanned visit with Al Weilband and I think there are a few articles on there. We cut the tape off because my wife and Al's wife had been out visiting for a little bit they came back in so it got so noisy so we just chopped it off there and agreed that after I come back from England I'll have another good session with Al Weilband.

Incidentally George, I probably be phoning you before I leave. I did get your letter with the list