ABE SILVERSTEIN & CARY NETTLES
Centaur Group Achievement Awards
December 1, 1966

Transcription of remarks made by Center Director Abe Silverstein, original Centaur Program Manager Cary Nettles, and Bruce Lundin, Associate Director of Development, at a NASA Group Achievement Award ceremony for the Centaur team following the successful Surveyor mission to the moon.

Silverstein

Nettles

Abe Silverstein: This is an outstanding example of cooperative effort among the folks here at the Center. On the Centaur team are people working in Atlas and people …….. The crew, our group here at Lewis and the Headquarters group who lead a large part of the program, was led by Cary Nettles, here today. Cooperation between the total NASA team and the industrial team. We worked with, GD [General Dynamics] and the Minneapolis people, various other groups. The military group we worked with to get the job done, and Lewis groups at the centers that we have worked with such as JPL and in the future with others to make it possible to use this vehicle on our advanced space missions.

And I'm sure all of you know that simply doing a job is never as difficult as arranging to do it. That is the providing this cooperation I'm discussing with communication among all of these peoples always turns out to be the most difficult thing. And I think of the Centaur Program, we were able to do it. And for this I think that if indeed we had not been able to fire the rocket successfully, we deserve a prize. I always like to talk about the Centaur Program because I was fortunate enough to be in on the very beginning of it.

And I don't know how you know the full history of the Centaur. You probably do, but very quickly let me go through it. It happened, it started before NASA was actually an organization. NASA was organized officially in October 1, 1958, but the work that led to Centaur was paved long before this time. And it started in the summer and early fall of 1958 at which time we were holding meetings to decide on the type of vehicles that were

needed in the Space Program. And it so happens I was chairing the committee that drew somewhat on this …….people were there in the rocket area. And we invited in representatives from DARPA, which is Advanced Research Project Agency in the Defense Department. We had representatives from the Air Force and one or two of the other defense agencies including the DFD, DOD, and the Defense Department. And we sat around the table and said what kind of vehicles are needed, what kind of engines are needed in the Space Program.

And one of the answers that we came up with was a rocket engine with 20 to 30 thousand pound class that would burn hydrogen, oxygen, or hydrogen-chlorine, and we weren't too definite at that point. And then we said that that should be combined with a vehicle for an upper-stage to be flown with an Atlas to give us the capability that we foresaw in future, the next 10 years. At the same time we lay down requirements for the F1 engine a million and a half pounds, I think we called it a million-pound liquid engine, at the time, burning kerosene and gasoline. And we ….out the need for the large solid.

This was all done at this preliminary group. This group, as I mentioned, was carrying on before NASA was officially formed although a part of it was done after Congress had essentially authorized NASA, but it wasn't effective yet. Sitting in on the meeting was a friend of ours, an old quarry of NACA who at that time worked with DARPA. And as soon as the group had agreed that we needed something in the way of a hydrogen-oxygen engine and a stage for it, he went back to his agency and sold his boss on the desirability of having DARPA do that. And so they got five million dollars. Just prior to that time, Convair, through the aegis of one their best salesmen, had been around trying to sell something like this rocket. And they went to him and said how about it and they said fine and they worked up about a one page specification for the Centaur. It was about that long, a paragraph that fully described the Centaur rocket. It didn't discuss guidance. It didn't really spell out too accurately any thing. It just said it shall start on the development of a rocket having about 30,000 pounds of thrust and using hydrogen and oxygen. Well, that's how it got started.

About the middle of 1960 I attended a meeting that was headed by Clellon. It was a meeting among all the agencies that were doing space work and at that meeting Keith Glennan was there, Dryden and I were representing NASA at the time. And there was representation from DOD and what we were doing essentially, what the group was trying to do, was to meet the requirement that the space dollar be kept within a certain limit. This was an Eisenhower requirement. And he said, "look, the military's doing space, NASA's doing space, we can't spend too much, let's try to get this divided up so that there's something for everyone to do but that we won't spend too much." And so they did. Clellon sat at the head of the table he said, "Well, we gotta kind of spread this around and distribute it, and we got these programs going, who should have what." And it turned out that NASA, at that time, picked up the Centaur Program. It was transferred from DARPA to NASA back to essentially where it had gotten started.

And this was in the middle of 1960. And prior to that time it had been operated by the Air Force for the DOD for ARFA and Horner had the job that Bob Seamens has, associate administrator, at the time and he called me in and he said, "How shall we handle this job we got?" And I said, "Well, I think we ought to set up a team in one of the centers and run it." He said, "Well, why don't we take the team that's there, the Air Force team, and simply put a few of our people with them." And you may recall, that we got to choose people from here, Reilly and others, to go out to the west coast and sit with the Air Force team while that stage was going on. Of course that was the wrong way to do it. And so the program, the Centaur Program, got a second lick, pushing it kind of backwards. Because up until that time it hadn't made much progress, and when they started a second method of management they did get a little more money in to, at the time. We got money in to it for guidance and started the guidance program with Minneapolis Honeywell. But, quite clearly a management of that type could not push a job along with this difficulty.

And so it became apparent in about the middle of '61 that this job needed better management. When von Braun's team was brought into NASA and was looking for something to do, they thought this would be a good job for them to do and they gave it to them. And we all know that the job struggled along there for a year and a half or so until about October 8, 1962 when the whole development was in such bad condition that discussion was, shall we junk it or what. And at that time they came to us and asked us first did we think it should be junked and secondly if it weren't going to be junked would we be willing to carry on the development? And the answer to the first question I told him was that I didn't think it ought to be junked because if it were junked you'd have to start another one about like it and maybe there was something they could save from this. Because I said within our program, as we said in 1958, we do need an upper-stage.

And secondly when they said, will you do it? I said, well, somebody's got to. And so we took it on in that way and said we'll do our best. And I think you all know, I don't have to tell you how successfully the job has been carried on. I think it has been a job that's required dedication from all of you. I mentioned the fine job, cooperative effort you've made and I say the fine and dedicated job you've done. Others, I'm sure, feel the same way.

I brought with me a few of the general statements that have been made about the program, several different times. Here's an interesting one, I think I've mentioned this to you before: From Humphrey, which was sent the time the Surveyor was put aloft. And Humphrey said, "As chairman of the National Aeronautics and Space Council, I heartily to congratulate you and your team for contributions made in Centaur research, which had a substantial effect on the dramatic success of the Surveyor flight. Your contributions move us closer to manned lunar flight objective." From Humphrey.

Here's one from Bob Seamens that I read one previous time to a smaller group. Bob was in the program quite from the beginning and I view his statement as being very reputable. He says, "The perfection of Centaur AC-10 is a special achievement. Previous launches have demonstrated the basic technical and operational confidence of the Centaur vehicle.

Now the precision of the entire AC-10 operation from vehicle delivery to spacecraft injection has demonstrated the ability of the program to support stringent operational missions without delay. This total performance justifies the faith, which was registered approximately three and a half years ago in both the Centaur concept and the competency of the Lewis Research Center." And he goes on further, the rest of the page and I won't read all to you but you can read these later if you care to.

I've got one here that's a later telegram and that's dated November 14, 1966 just last month or this previous month, from Homer Newell, the head of the OSSA, Space Science and Applications Program. "I should like to take this occasion to congratulate the Lewis Research Center and the Centaur Project office upon the successful launch of the Atlas Centaur Vehicle, AC-9. Although the first four successful restarts of the hydrogen-oxygen stage in flight is a major importance in itself, the flight of AC-9 represents a truly significant milestone in the National Space Program, and it marks the completion of the development phase of the nation's first hydrogen-oxygen propulsion stage. Your center may take justifiable pride in the aggressive manner in which this most difficult task was undertaken and the professional manner in which it was completed. I should like to express my personal appreciation as well as that of the NASA Administration to you and all the members of the Centaur team, both government and industry for a job well done." A very nice statement.

Here's one dated October 28, 1966 following the AC-9. It says, "Please accept, on behalf of the Lewis Centaur Team my sincere congratulations and …..thanks for a difficult job well done. Recalling the situation at the time you undertook to manage Centaur, I cannot think of a single other group in the country, which would have accepted that responsibility in such dire circumstances. I can still recall your personal response to me when I asked you to consider it, which was in effect someone has to do it. Having watched Centaur development fairly closely I'm acutely aware of the personal sacrifice made by many Lewis employees, not to mention their families, in……development. Although it has been tough, I can't help but feel that most of them will look on these years in the way many of us look back on an old pair of…….namely. We hope would never have to do it again but we wouldn't have missed it." This is from Ed Cortright, the Deputy Associate Director of OSSA.

Other wires that we obtained at the time that Surveyor went aloft. One from Bob Gilruth, "All of us at the MSC were thrilled to see the Surveyor pictures. Congratulations to you and the entire Atlas Centaur Team at Lewis for making this tremendous accomplishment possible." That's from Gilruth, Director of the Manned Space Flight Center.

Here's one from Kirk Davis, "Please convey to your associates my warm congratulations for the unqualified success of the Centaur and the equipment functional, which made the flight possible. It is indeed a shinning example of the superb technical confidence. The men and women of this center extend their solicitations to your fine organization."

So we do find that those who are technically competent value this very fine job you've done, as do all of us here. And I would like, personally, and I'm sure on behalf of all of

us to thank you for this wonderful job you……and Ed and……..and all of you for the job you've done. To……..when it stands up, I think, with all the jobs that people have tried, the most difficult ones as being an example of what you can do with a tough job when you make your mind up to do it and when you acquire that dedication and purpose that tough jobs require to accomplish. And Lewis, always, not afraid of the tough ones. We know how to do them. We know how to take them on and we know how to lick 'em. And I've said that we can do almost any job that we set out to do and I think I can prove it and so we challenge them to bring on the tough ones and let the others have the easy ones. Thank You.

Cary Nettles: Thanks Abe. You know following Abe to the podium is always something of an adventure. I usually make a few notes of what's on my mind but he never tells me what he's going to say, so …knows a little bit about the overlap. Of course, he doesn't know what I'm going to say either but that's all right because he comes first. But I don't think this is any occasion about sparing any kind words. This is indeed a very proud and very happy occasion. To think back over nearly a quarter of a century of my life here at the Center, I can think of no achievement of a group that merits the recognition greater or more deservedly than that which we…..here today. All of you have worked long and hard at a very difficult and a very important task. And it certainly fitting that we pause here for a moment to recognize these contributions.

Although, I was not personally involved with the rather inauspicious birth of Centaur, which Abe outlined for you, I'm sure that I and many of us here remember well the snowy day in October just four years ago when we first became engaged in this project. The project was then, of course, some four years old, and six other management groups, government groups, had been involved with it. And we did, indeed, inherit a pretty sick patient at the time. With technical flaws and mistakes were evident in many places. And factually it was something of a mess. It had many unclear goals and program objectives.

I remember it was supposed to carry Surveyor but there were still some three-burn engineering in the vehicle. Responsible people in the government were advocating that it be cancelled. General Dynamics, our contactor, was confused at best and demoralized at worst. And all of this had to be done as we had to take on these difficulties that can only be described, quite understandably so, with the glare of an unfriendly press. I think many of you might remember, I believe it was in August of last year, being cheered to read a newspaper just before the launch of AC-6, to read that the "ill-fated Centaur" was going to try again. All of these difficulties were not all evident at first. I'm sure we all sensed, all felt a great importance of the task we had undertaken. It was obviously, clearly a key step in our national lunar program, which was a national commitment. It was also clear that if you failed here that it reflected most seriously on the competence of our entire center. And also would indeed have had a half a billion dollar fiasco on its hands, which wouldn't have helped at all.

I recall very well, as Abe has recalled for you, our visit with Mr. Cortright that September morning some four years ago and all that we could say was that we would do our best. And this you did. And your best was good enough. Although, I frequently think that the margin between your best and what was really required was not always a large one. It's impossible, of course, to and it's not important to recall all the many individual contributions to the project of all of you. It's difficult for me even to remember all the events that we've gone through the past four years.

Few, if any of us, I doubt will ever forget the liftoff of AC-2, just three years ago almost to the day. And 70 seconds after liftoff we discovered that Centaur didn't breakup and we had a chance to continue to the project. Yet, I remember there wasn't much hardware around at the time. If there was, it wasn't much good. And I vividly remember in the elation of the AC-2 flight, the useful comment of someone here, that we sure wish we could get it back down from orbit because on it was the only pair of good……around. It's hard to recall all these events, sticky panels and ……lights, ordering…..and frequent budgets. Of leaky GG177's and clear the moon within about a half a signal on the first try. Of course contract negotiations and RNQA reviews and change control. And balloons and buckling limits and blue margins. All of this comes to mind. Cat beds and manpower loadings. All of these things and others, of course, tend to blend together as part of some total process. I'm sure, all of you, all of us here, will hold all these a very vivid memory of that first picture from the first Surveyor as it came in on the television set out in the Guerin House on that memorable moment on June 2nd. It was sure nice that the first spacecraft that Centaur carried was a successful one. I can't help thinking back, I believe, a turning point in the project also came at our greatest failure with the flight of AC-5, which has been rather generously described in the NASA Project Summary as a sub orbital flight.

Laughter

Looking back on this now, from kicking your asses around [Launch Pad] 36A in March, to the successful launch in AC-6 just five months later from a new complex, was a fine accomplishment that really made professionals out of all of you. This really turned our greatest failure to the source, I think, of our greatest strength. In the beginning, of course, we were all pretty green with this four years ago. About all we approach the job with was a great willing and determination to succeed, some experience in ground testing, some applied research experience on engines. But that was not enough.

Because I occupy, in a way, a sort of an in-between job here at the center, I'd like to claim the right to make one further comment. I think it's important that we recognize also here today it was also Abe Silverstein who contributed several additional ingredients that were essential to success in those early days. And so it was Abe who insisted on a thorough technical review of the vehicle, which was much needed in the beginning. It was he who clarified the goals of the program when they needed clarification. Remember he kept saying, "Centaur's going to carry Surveyor and forget everything else for now." It was he who insisted we concentrate on a single-burn mission in the beginning to bring

the technical problems into manageable form. And it was his help in management meetings, I recall, that did very much, I think, to get our contract to walking vertical again. I'm sure that all the people that participated in those monthly management meetings will never forget them. In retrospect, I think it was all of these actions…….that were also essential to the success that we now enjoy.

So now after four years of sweat and blood and struggle you may take pride in a job well done. You'll hear some kind words and they too fade away as one memory dims in the rush of events. It is an endearing value here, I think, for those qualities that are now part of you and that you carry with you because of the experiences that you've had. The long hours, the hard decisions, accepting responsibility in public view, being able to be standup and counted when it counts, these are the things that, in a way, added a new dimension to your life. You're acquired, in your experience here now, a habit of devotion to a task at hand, of pulling your weight in team effort, and striving for excellence that will stay with you, in which you'll carry forward in to what ever project or activity that the future may hold for you. It's important, I think, that you also recognize these values and that you now take on a job and transmit them to other with whom you may be associated or who may come after you.

And then as a last remark, it's appropriate that you look not only back at this time but you also look ahead. In a way, in the broadest sense, we're not standing here today at the completion of Centaur development. It's not the end or even the beginning of the end. This is rather, I think, the end of the beginning, a chance to transform Centaur from a successful launch vehicle for Surveyor into an effective general purpose upper stage for a variety of high energy missions. And with this task ahead, in order to do this we have to hold what's good and to further increase the utility effectiveness of this vehicle by working on its reliability, by reducing costs, by improving its operational characteristics. And if we can be successful here also, I'm sure the Centaur will live for at least a decade ahead.

Bruce Lundin: As a final personal note, although I've not been as close to Centaur as I may have wished at all times, I'd like to say, my every contact with every one of you has always been the most pleasant and enjoyable experience. It's been a lot of fun and it's been a privilege to work with all of you. I'm particularly delight that both Cary and Ed [Jonash] can be with us here today. Cary has labored as long as any and longer than many of us being the leader of a small group of Lewis people who first met the Project Office Team here from Marshall on that snowy morning of October 8th when we greeted about some 25 people and 50 filing cabinets of paper, which then constituted the government project Centaur. Cary consistently provided very rare quality of the excellence of technical leadership, the demand for perfection at every point of the job. His contributions to the success that we now all enjoy here have been both unique and very important. It gives me more pleasure than to now shake Cary's hand, hand him a replica of the Joint Group Achievement Award. Congratulations, Cary.

Of course also, a real pleasure, delight as I note Ed Jonash can also be with us here today. And I might add, that both Cary's and Ed's contributions were of course recognized for individual exceptional performance awards, which you see in these pictures of three happy fellows on the front of the auditorium here with us if you want to look at later. A real pleasure to have Ed here also with us. Ed has not only provided very major contributions to the whole Centaur Program through the past several years but since he's up the task of Project Management he's demonstrated and given to this job his many fine qualities of leadership. Enjoys the respect, I know, of all he works with both here at the Center and many other locations throughout the country. His approach has always been a sound one. He's always had a good grasp of both the technical and the managerial administrative aspects of the job. He's in every way an outstanding leader for the Development Team. I think it's all together fitting that the completion of this phase of Centaur Development Program that the first mission success of Centaur could have occurred under Ed's direction and leadership. So Ed congratulations, it's a real pleasure. I only want to do one thing more here today and that's to shake the hand of all of you. And to help me do that I'd like to ask Ed if he would come up and read your name at which time