Dean, Pinkham, Parker

W. Dean S-II Program Mgr.

I had been the program manager since last September of 1970. Prior to that time, which will take us back to about December of 1960, I was the deputy program manager, _____ being the program manager. Then for something on the order of 3 years, prior to that I was assistant program manager for the business side of the program, if you will - program planning and control, financial operations, contracts, material, configuration management, data management, all of the disciplines that fall in the area that you would nomally call business management or business administration side. I won't bother to go through the 2 or 3 iterations of organization that _____ put one function in and add another, subtract one, those kinds of things. During that time, one that might be significant somewhere along the way - I was also responsible for something called Saturn applications, or derivatives, meaning the beginning to look forward to what other uses might NASA make of hardware similar to the Saturn V and specific, the Saturn II hardware. That would take us back to 1966, roughly. I was _____ space division but in the central organization, I was director for a space division called - something called management planning and controls, which involved current - the establishment of current policy and procedure for the division as well as long range planning. Prior to that, I had that function - reported to the president's office and was involved really in evaluating operations of all of the activities of the space division. I joined Space Division in 1962 after a little over 10 years in the Air Force. In the Air Force, the latter five years was associated with the Air Forces' ballistic missile program which I namely concentrated on the Titan program, and was on the Titan system program office on jobs that

started as chief of the air frame division and ended up as an assistant deputy program director. Prior to that time, Air Force assignments involved other kinds of engineering activities, as well as operational activities. Graduated from Georgia Tech with a degree in aeronautical engineering and had a masters degree in business administration from _____ University.

_____ answers to any of the questions _____ to you over the course of this interview. _____ what I'd like to start would really shoot us back to your days in the Air Force. I want to examine some of the transfers and procedures, management controls and what have you that came out of the Air Force ballistic missile program - Shrivers office, and what you, came into _____North American and into NASA. and the _____ to talk about the various management techniques that you learned in the Air Force that was adopted by the Air Force and applied to the management of the S - II program.

O.K., thats interesting. That's, I guess, an aspect, John, that I have not tried to collate in my mind in any fashion and talk to someone about before. These will be kind of random thoughts. One, and I guess I'll have to own up quickly to the fact that what I'll try to do is give you sone examples which will be by no means all inclusive.

Rather have it that way. One or two very specific things - one of Shrivers strengths I think, was in his continually having contingency plans, continually thinking forward to - this is a great plan but what if this part of it doesn't come to pass? What do we do then? I know of several of us that have gone into industry and taken that kind of thinking and applied it _____

applied here on the Saturn program. During the time that I was assistant program manager, for program planning and control activities, the program manager was Bob Greer.

Good, then you know his background also in the Air Force. And he had instilled that kind of thinking on the Saturn Program. Another specific example - There was a thing we called the Red Bandit system which is a precise, direct steal, I guess, _____. General Tom Garrity - when he took over the ballistics systems division after Ben Shriver moved to A F S C - Tom Garrity had a system called the Red Bandit System which was a means for identifying critical problems assigning a specific senior person to work the solution of that problem. And the system provided for a reporting - periodic very frequent, reporting on the status of the problem and forecasting resolution of it. We used that here at Space Division precisely as it was generated by the Air Force.

Yep. In fact, interestingly, it's been used for technical problems for years. Mory _____, the vice - president controller, has just started using it in connection with indirect budget problems - same form and everything. He calls it, I think, critical problem report instead of Red Bandit, but the Red Bandit was a slang name. The proper title of the system was Critical Problem Reporting System or something like that. And it goes on a form that has red border across the page and that kind of thing so that it catches your attention. So, it's being applied in the business side as well as the technical problem solution side of the house.

Listen, let's go back to Tom Garrity's days in New Guinea ——— That's where he

got the idea, because that's what they used to call Japaneese fighter pilots when they were coming in and attacking the B - 25 airplanes. They used the term bandit.

Yeah - a bandit was - it wasn't red bandit - a bandit was an identified enemy.

But it was also kind of a single fighter - that it wasn't.

No, you would generally - or first of all, if we back up one step and this applies also - you have something called "bogies". That's just something that's unidentified as another aircraft.

We still - that's part of the Red Bandit system - We have bogies. We can go into the control center here next door and we can see the list of 13 bogies, some of which may become elevated to Red Bandits when they are identified as really being critical. And the analogy there was that you spot something and it was just a bogie - some place. When you identified it as an enemy, he became a bandit.

I see.

I'm sure - yes, that terminology used in identifying unidentified airplanes was the source for this Red Bandit system, but with the red being _____

_____ I was in Australia in 1943, had met Shriver over there and worked with him, but at that time, Garrity had just left and we sure used to hear a lot about Garrity after he left. He was a well known person - accomplished a lot, and then later I worked with him at Wright Field.

Well, the bandit and bogie thing was common terminology all over. I'm not sure that as good a way back before World War II.

Now, Mr. Greer mentioned the whold idea of a staff meeting and manager visibility and some of the problems you had here with the S-II before we took over and the fact that nobody knew what other parts of the house were doing. Could you comment on that for a little bit - on how you manage a large operation like this - how you get control over it and how you get this kind of visibility and data reporting and what you need to control the organization.

I guess knowing that you have talked to Bob Greer already causes me to think I wouldn't have too much to add.

O. k., now I didn't mean to do that-understand now, what I've done there.

Oh, I'm still going to talk. It will be pretty repetitious, I'm sure.

No, what a historian trys to do, you know, is stay in various places and I'm here with you and Greer - and I've got a greater degree of intelligibility and you'll put the problem one way or put it the other way but I'm not going to keep - I'm not going to have a running account that you say this - he says that and so on just like _____ I'm going to try to put it all together, and by having a number of people tell me what's essential that sounds like the same thing, I'm going to get a much broader picture. Now, I've heard about the Red Bandit twice before but I've been connected with aircraft. Now, that's a nice little thing and you know, _____ yourself into a _____.

Maybe I should put one little piece of that into context. Tom Garrity's use of the Red Bandit system was initially for the activation of ballistic missile sites. The ballistic missile site activation task forces, out in the field. Call them Red Bandits to him. The system was successful enough in that kind of an operation that it got expanded to cover other types of problems - problems at contractors facilities and so forth. Well, just to keep it in context - that's how he was using it initially was with the site activation task force - minuteman ballistic missile sites around the country, a fantastically large job. So he was needing any kind of visibility on the key problems and that was the system. Let me say, before we get onto the other subject of the management, there are many, many examples that we could fall back on of things used by the Air Force that were carried by people like myself and Bob Greer and Sherm Ellis, or Jack Proctor, John _____, a lot of ex - Air Force people that came with North American, McDonnell Douglas, Boeing, and so forth - and brought along tried and tested little techniques of that sort. On a bigger scheme, and a little less specific, would be things like the importance of having something specified, the importance of specifications, the importance of having a business system for carrying out something - the importance of feedback. I guess the military is kind of a classic place where it's common to give orders, but you sure have to have feedbacks or you have no idea whether those orders are doing anything effective or not. That learning was clearly brought over by people like myself. That's not to say it wasn't here already, and it's hard for me to pick out any of these more general areas that might not have been here going full bore.

Well, obvious the contract has been talked to Air Force people for some time ——— and even missiles for some time by this contract period, so obviously they've ever - borrowed techniques all along whether you people permitted actual imple-

menting, or they see things in their meetings with you —— They probably would have adopted some of this material even before you got here, whether you came here or not.

Then I guess that causes me to realize John , really, that the Air Force might have borrowed them from some contractor, and they shouldn't. It is a team when the smoke all clears.

I found that some of these boards that - Boeing did a lot of these boards and they kind of passed out over the organization and I found out from some of them that the Air Force had this system. Things are invented in parallel and when the time is ripe for these _____ we have this program obviously a number of people are going to be thinking and adding to this _____. And they do, you know, borrow quite _____ from each and that's what I'm going to try to say _____ probably very kind of impressionistic. These techniques were all being developed —— in space industry during this time - some of them _____ from the Air Force, but it's not all Air Force.

That's right.

It's very difficult to trace back, you know, the origin of the first occurrence of these kind of procedures and of course they are modified every time somebody uses them. The whole idea of PERT with the Polaris system was _____ in the industry right away. It went on and was changed _____approaches.

Let me mention two other quickies then and we'll talk about management. The Air Force - well, let's talk first about Ben Shriver developed something he called black Saturdays. I don't know whether those have been mentioned to you before or

not, but a black Saturday per Shriver - once a month, he had all of his senior staff and his program directors in a meeting in which the program directors would report in detail on the status of their programs and every time they identified a problem he then turned to the staff member and when I say staff, I'm really talking about functional head. If it was a material problem expressed by the program director then to the head of material, the one in action, to get in and help solve that problem. Personnel, logistics, right on down the line. That technique, Bob Greer started applying to the Saturn program, when he took it, and he was having black Saturdays daily. They were limited to about a 45 minute session, but the individuals responsible for each of the stages being produced would stand up and give the detailed status of the stage and Bob had sitting with him the head of engineering, the head of manufacturing, the head of tests, the head of logistics, and so forth, and as that man would identify a problem that was holding him up or whatever then _____ would go the actions to these fellows. We went for oh about a year with the actions being every day and then shifted and sometime in '67 or '68 to 3 times a week and we have now shifted them to twice a week. O.K., I had another example in mind - a specific - I don't recall. Well, I'll think of it in a minute and tack it in. Getting to the point of how to manage something like this. The reason I said if you had talked to Bob Greer that it would - I would feel that I probably had little to add is because I've never worked with any one person whose ideas of how to manage and mine were so completely in sync, so that I could just off the cuff agree with everything that Bob said - that type of thing.

I guess the best thing to do is to have everybody else to work for you. They'll agree to all your decisions and _____ you'll work yourself out of a job.

It's difficult John, to keep from using the text books cliches when you talk about management as a big problem. At the beginning, you've got to know what the task is and my view, knowing the task means putting on paper everything that you can think about or that anyone suggests as part of the task and pounding that around until you really have identified what's the thing you are setting out to do. Once you have that task identified and determine what kind of an organization you need to carry out that task and don't be inhibited by what it was the last time you performed a task about like that. We are always very quick to say "oh, that job is just like the so and so job and it rarely turns out that it is. Now, I like Bob, am a strong believer in people. In the process of organizing - yeah, look to the blocks first, but I believe that an organization is its people, regardless of what the blocks say. So, after roughing out an idea of what the organization should look like in chart form, the placing of people against those slots I feel should allow the blocks to change, the boxes to take on a different shape or title, a different mission within the individual parts of the _____ chart. Once you get the people in - excuse me - people identified, and I guess this is kind of in the staffing of the thing, select people that you know, you can give the job to and they will do the job completely. Well, that sure sounds like a text book. Let me try to say it a little different way. I think that one of the very keys to managing any big job is the people, and the person who is managing the overall job can't always have precisely the people he would like in each case. I guess the important thing is to know the people that you do have - have them calibrated so that you know that - yes, even though this man happens to be the director of configuration management, he's also just an all around good trouble shooter, or he happens to be very well versed in safety or whatever - know the

of the people and don't feel that you can only use them by what their title on the ——— chart says. By having the people calibrated and turn over to them the jobs you feel that they are capable of doing; and I guess then, kinda as Bob Greer says, turn over every job to somebody - don't keep any for yourself, because the work at this job is not today's activities, it's next month's. If you let yourself get involved in more than about 5 to 10 percent of today's activities, a month from now things will clobber up again. O.k., having giving out responsibility and accountability and the authority of course for the day to day tasks, you've got to have some visibility systems, some statusing system. I should back up and say you've got to have some formality to the way you hand out the tasks. In my experience, the key to the formality is the budget, and I don't hand out budgets in an arbitrary fashion. A person responsible for that work and myself sit down and talk through the budget he's going to get. If he sincerely thinks he can't do the job for the budget I'm going to give him then we'll find a common ground, but he signs up for the budget he gets. We have a contract and he knows then that I'm going to try to stuff everything into that contract that I possibly can, so my giving him work goes along until he feels stuffed and that's when I know he's reached the limit of his resources because I'm going to hold him to reporting against the budget that he's contracted for.

Yeah - you say contracts - is this - does he really something ————

Yeah - we have a statement that he's going to do so much work within these dollars. The budget on the Saturn program the way I've handled budgets is on an annual basis - we sit down and go over the beginning of each government fiscal year - each of the people who report to me and we agree on a budget for that year. Now, my head of financial management has staffed this previous to this

time and he and I have worked out what we think the program should operate for the year, and then splintered up, I sit down with each of the functional heads - chief engineer, the director of manufacturing, the director of tests, and so forth and having previously agreed to what the tasks are, we then look at what the dollars are going to be and he has staffed it out and we can meet at the top and sign up. He signs a piece of paper recognizing an amount of dollars and then I sign a thing handing him that amount of dollars.

Are you both as honest with each other as you can be - he's not trying to rat hole any money to protect himself against things you might _____ on him later, and you are not trying to run the organization for 10 per cent less than your predecessor did the year before.

Not necessarily. I'm not. I do know, having been in their position, I do know that my ability to forecast what I need is very good for today, tomorrow and the rest of this week, and the rest of the month, probably. But 3 months from now, I'm not rial sure of what I need so I'm just making my best 3 cushion shot. I know that that's what they're doing and I know therefore that I'll be able to give them some additional work as the year grinds on without additional budget, and they know that they'll be able to accept it. And they know I'm expecting to give them more work, etc. So it is a very open thing. Now, it is normal —— for me to hold some reserve. The government normally has a funding limitation on the year, so that I will, in order to prepare, or protect, against any problems or contigencies, I will hold what I call a management reserve.

Is this any set formula or figure?

Now, it - I guess it's a seat - of - the - pants kind of thing ————————

_____ from your negotiations _____.

That, really I take the reserve - establish it pretty early, and it is based on where the program is in its process. If we have a lot of hardware in manufacture, a lot of testing going on and so forth, I would tend to hold a larger amount in reserve. But, by the same token, during that part of the program the government is funding more than early or late in the program, so it's easier to hold out a larger amount. But I don't have any set percentage that I would hold back. O.k., the work having been given out, I status them two or three ways. First of all, I have financial status once a week. Each week I know the actuals expended and forecast of what we are going to spend for the year, and then that weekly accounting is broken down again by these individuals to whom I have given budgets, so I know exactly where they stand, and then in total where we stand. I have mentioned previously that twice a week we review the schedule status of everything that's going on within the program, and that's not limited just to hardware. If we have a major study of which at this particular point in the program we have probably half a dozen very major studies. We status those in detail, we status the activities of ————————

O.k., I also gain visibility from weekly staff meetings and at those staff meetings - I'm very much a believer in staff meetings that have communications in both directions. And I guess in order to be sure that we have some of that, the first half of the meeting is communication up and the second half is communication down and sometimes it's almost nothing to say during that period and we

look at each other for a few minutes but at least it's there, set aside - everyone knows the pattern. In the first half of the staff meeting which is the communications portion, I do require on a rotating schedule such that each member of my staff reports one time per month. He reports on - a particular chart format that is standard for all of them - he reports on such things as his - again, his cost control. He reports on his equivalent personnel, on his head count, on his cost reduction program progress, on house deeping, on his indirect budget status, on safety, and then on something we call our objectives. We do have the management by objectives system used on the program and they each report on the status against the objectives that we have agreed to at the staff meetings. And these are objectives that range - just a whole gang - for example, the chief engineer will have objectives that are associated with the reduction of drawing arrows, or the reduction of material reviews, and those kinds of things. So he has charts that he would report his progress in those areas. Then the second half of the meeting is me to them - anything that I have, and then we always have a final wrap - up which is again once all the way around the table to see if anybody has anything else - be sure they are getting enough pay, leave, flying time _____.

How long do they last?

Try to keep them to one hour - sometimes it's an hour and fifteen minutes. That's another thing - I dislike long staff meetings. Most meetings that they go beyond an hour, you're saying the same thing about 3 times rather than just twice. Now, we've covered sending the work out and reporting the status back - how do you make corrective action - and I don't have

any set technique, formula, or handy guide for that. If the problem is a very large problem I will quite often make some senior member of management the pivot man or the czar for the solution of that problem. This would be done normally when the problem has some duration to it, like it's a six weeks type of problem or something. Otherwise, I will make it clear to one of the members of my staff that that problem is for the most part in his area. Maybe the majority of the problem is a technical problem - then the chief engineer becomes responsible for its solution. I will say this - as far as getting text books solutions, we've had an awful lot of our people attend the Kepner - Tregoe problem solving course and I have found that to be very useful in causing us to use systmeatic problem solving.

Can you spell that name - Kepp -?

Kepner - Tregoe, I believe it is - Kepner - Tregoe.

I'll look it up and find out - what it is this, a school or _____?

A couple of fellows - first I guess they wrote a book. Let's see - what's the name of the book - I'm sorry. I'm sure in the office ——— find it. Scinetific problem solving is the theme. I don't think that's the title of the book but that's the theme of it. They started much like Lewis - Allen or some of the AMA seminars - they give a course a couple of days I think it is in systematic or scientific problem solving. And while most of us if we had sufficient time to sit down and think out what's all of the things you ought to do in solving a problem we would probably come up with the majority of these. We rarely have the time, or the inclination, or the motivation or something to sit down and kinda

plot a course. By having almost all of our senior management go through this ——— course or at least read the book. I have found that they do follow that pattern now almost intuitively and it does cover such things as really probing until you find the source of the problem. And then, in the process of constructing the solution be sure to have some contingencies and alternatives set aside. The people at Marshall have commented to us - I don't mean to advertise but - I think we've been very successful in implementing these problem solving techniques because we've been complimented on the thoroughness and timeliness with which we've solved some fairly major problems.

Dick Smith. Dick Smith has commented a couple of times in this regard. O.K., I again said on the management thing, you cut me off because I guess one can talk about this for the rest of the day.

I believe very strongly in this thing I said earlier that it's really the people that are doing the work and I try to choose the right people that work immediately for me and encourage them to follow that right on down. I try to stay in very close touch with the people who work for me and encourage that right on down the line. One of the objectives that everyone in this crew has - every supervisor has an objective of meeting with all of the people who work for him at least once a month - excuse me, I'm sorry - once a quarter. This means that some of them have meetings once a month, some of them have meetings once a week with smaller segments but to meet with everyone that works with him once a quarter and to have what I like to call a round table discussion - there's a lot of jokes about that - we used to have a round conference table and now it's round coffee table, but really where the people

can say anything that they want to it not be considered anything other than constructive criticism - now the supervisor has got to run that through his own thumper quite often ———— some guy just grouses every time. That should tell the supervisor something.

Do you go on tour of the plant and get out to get feedback that way so you can evaluate your decisions on the floor. How do you go about doing that - do you just overhear people talking or do you - 'cause if you decide to change _____ your interest why any conflict, you know a man that's actually doing it can't get in there to do the work any more because the way this things been located _____ down a change order _____ did you hear about something like that. Some guy in there standing up says "Son - of - a - bitch that designed this is really good -"

Yes. It usually, though, is in connection with some problem that will come up and, like - something wrong with the batch, and yes, I like to go see it wi with the high balls, or there's a connector mis-mated. I like to see it mismated and how could it have been, and so forth. But really, John, I sometimes think those are things, because of maybe my makeup - just like them to be interested and so forth - if I allow the people competent to solve the problem to work it, they will solve it without my having to have looked at it. It does help me as I listen to their solution, though, to understand what they're talking about. And every once in a while, yeah, I will torque their solution just a little bit by virtue of having seen it myself. I guess my walking around probably has more to do with trying to see what - well, the general feeling of the work force is, if you will. I guess something called morale - I feel

that people that have a pretty good morale are going to be doing good work. People that have bad morale are going to see the workmanship problems start going up. I look for a lot of little things. I have a funny thing that says "If a place looks businesslike, the people probably have kind of a high morale, they're so proud of what they are doing. If it looks sloppy, you can expect that their work is sloppy. Again I don't ————————

We were admiring your clean desk when we came in.

How about some more coffee?

No thank you, but go ahead.

You want to shut the machine ————————

————————that came about in the 60's ———— people talking about configuration management, where does that technique ————————

———————— text books.

Again, I was in the Air Force in the late '50's and that was the first time that I saw configuration management. I truly think that the discipline configuration management did start with the services, probably the Air force. The manner in which it works on the program - let me just state it in kind of general terms. I imagine that you will be asking that question as you talk to some of the other folks on the program and - for example, I don't know whether you plan to talk to George Phelps or not. George has - well, he was for years, the director of configuration management. He's currently the director of safety. So I think he might be good to interview kind of from two stand points. George is very

familiar with the safety background on the program, but just quick general terms - 'course we use configuration management to (a) determine that we have built what the contract says and that the engineering that has come out is what the contract says and that the people of manufacturing have fabricated to the engineering, so that what comes out the end of the door is indeed what the contract required. And then secondly, (b) part, I guess, is that we really know what it is - not only that we have built it to the contract but that we know in detail what the configuration is and we've accounted for every change from the original engineering and that we can identify all of the important or critical pieces of hardware that are on that end item. Reasons for needing to do this are very many. Some of the obvious of course were to include if you have a test and something fails if you don't know in detail the components, the make-up, of all of those - well, of that end item that is being tested, you don't know when to start in doing a test evaluation for failure analysis. Configuration management has been expanded with experience to include the accomplishment of things like configuration freezes, if you will. ——— The supplier, or you contracted with him to supply us a particular component or you - the supplier in engineering feels that they have that component then up to exactly what we want, then configuration management performs a FACI, First Article Configuration Inspection. If the component successfully passes the FACI then it configuration is frozen and any change to it from that point on has to be approved by the configuration control board on the program. The same is true for elements of the work that we do in house. We freeze the configuration and then changes to it have to come through the configuration control board. The CCB

is chaired by myself and is made up of the functional heads on the program or their representatives, and also includes people like safety, which sometimes is not considered a functional head.

Now Kurt, this ball park statement that when you're engaged in a business such as launch vehicle development or spacecraft development, that the general budget breakdown or rule of thumb, is 30 percent for R & D, 30 percent manufacturing, 30 percent for test, does that sound reasonable to you, or do you try to set things down in this kind of a formula ——— going after something like S-II Contract?

Back in the early '60's, I think we might, as a company, tended toward that kind of thinking, but I believe that our experience on Saturn and CSM would reinforce the school of thought that says "specify exactly what needs to be done and then price that, and if it falls out 30, 30, 30, how interesting - if it falls out 10, 60, 30, whatever - great! The CSM, as an example, has a much larger percent of its total cost involved in engineering than does the S-II. Then we find occassionally, statisticians within Space Division will attempt to compare CSM and S-II, some factor or other, and being pretty well screwed up because they've tried to use some general stuff. For the past several years, five six, seven, we've not been doing any pricing or really rough estimating - any way but grass roots up. Now, this grass roots estimates is becoming more and more successful as you learn more about what you have to identify, but this is something you didn't do even when you bid the S-II contract probably. Oh, no, I'm sure that did do it, _____ but _____. Well, you gained sophistication in doing it _____ if you were doing it today you could do better than you did before. That's right. I will say this.

If we were to tackle a new job today, as new to us as the S-II was in 1961, I think we would make a better grass roots estimate today by virtue of having learned the importance of thinking through and planning out in an nth degree of detail the early phases.

This is my _____

Tried this on yet. It seem to me that of the 60's we underwent a phase of just greater management visibility. You had to do this for your own planning but you also had to make it available to the person who is doing the order -MSFC, or the Air Force or what ———— and a lot of these things just weren't known before and they were left very hazy. You had very big overruns in the '50's on one _____ ballistic missile system, but nobody knew where they were until it was all over. The general accounting office finally totaled it up but it was after the hardware was in and the contractor was still to be paid, and it seems now that these problems have more identifiable earlier, and they just make people feel uneasy. The government people for example, they've got to keep up with this and they may be almost ———— the system. Ten years ago they didn't know where the air frame people were when they were making something. That sound at all reasonable? And you're not quite to the point of completely being able to predict what you're doing in a development venture such as the Saturn program.

I guess I have to react from a personal standpoint. When I was on the government side, I felt uneasy in not knowing where I stood in costs. Today, I feel comfortable even when I'm overbudget position - at least I know where I am with some confidence so that I can steer back to being on target. I would therefore,

say from a personal standpoint, I much prefer today's visibility as opposed to yesterday's kind of fuzziness and happiness.

I didn't mean to put it exactly that way but I had to get out what I was talking about that it seems before we have undergone is this whole new concept of visibility. We're still not there where we can predict with real accuracy - and that's why I say the next time you do a program like this you'd be much closer to the mark than you are now. And maybe that's one of the things that a history could trace. But the decade opened with just kinda general ball park estimates and how they finally got things down to a more concrete level. This grass roots estimating that you were speaking of —

It would probably be difficult to convey that to a reader - now I don't mean to delve into your business, but it's fifficult for us to communicate sometimes among ourselves regarding the complexity of the tasks, the lunar landing tasks, if you will, so that if we look back and say at the beginning we didn't do planning to the degree we do it now that would be a true statement, but it's still the planning that was done was not what I would call ball park estimating. It was done in a fair amount of detail. But it's something like problem solving, maybe. You can solve a problem - look it over, look at what seem to be the causes - choose the one that's most obvious, fix that and the problem seems to go away and you're satisfied. We know a lot more about solving problems today. We know not to stop until something has proven itself to be the cause, as opposed to taking an obvious cause. But we've become more sophisticated there and I think the same kind of thing applies. Not that the estimating, pricine, planning in the early 60's was to rough but just two things probably; we did, in the 60's recognize the magnitude of the management task

and recognize that key to managing it was knowing what was going on.

So our visibility into the details both from the government standpoint and from the contractor standpoint was increased many fold. And number two, some of this was prompted, as you say, by the fact that in the late '50's, early '60's, there were some overruns on government work that were being brought to the public's attention and therefore, government agencies were having to - because of that pressure, having to put more attention to visibility - management visibility.

We still gain more ———————— in this - would you go - now is this campaign to identify indirect costs. Would that help in, you know, your bidding for further contracts? I mean, are you still going down this road, learning more and more how to _____ this visibility?

Oh yeah, I think we're learning more - your comment about indirect threw me off a little bit.

I don't really know what I meant by that either.

O.k., we've - to be very candid, I have to be careful when I'm talking sometimes as we are to not imply that the way things have been done and are being done on the S-II is common for all of Space Division, because we have done some things differently. For example, well, our meetings. I don't think CSM has status meetings quite as often. They have now adopted our weekly cost control reporting, but for some period of time when I talked about it, I was really talking about Saturn only and I had to be careful - be sure that it didn't apply Division wide. The indirect costs - Space Divisions Techniques for controlling indirect costs are, I think, the best in the industry. I'm very shy about it ———————— I think they are the best I've seen in the contractors that I looked at. O.k., that makes me think of that other

example, all of a sudden - that I said earlier I couldn't remember. Just quickly, Shriver developed something he called Management Assistant Surveys, in which the Air Force would go out to a contractor's plant and move in with a team of experts - engineering experts, fabrication experts, logistics experts and these people would review in great detail exactly what that contractor was doing and then they would back off and write a report saying, here's what we observed you doing and here are areas in which we think you could improve your operations. It's not like an inspector general visit where you get written up and criticized and pretty well beat up for the things you're doing wrong, but, it was instead an assistance by a team of experts. We brought that technique to Space Division and I know also that _____ used it among the North American Divisions.

Who is the team _____?

The team originally was called Operational Evaluation -

But its internal _____ team.

It was an internal team.

_____ MSFC come out here and do that.

No, it's an internal team that has no allegiance to any program or any fun tional organization, and they review their mode of operation was for example to go to the Tulsa Division and move in for 3 or 4 weeks with experts in each area, and then at the end of time, back off and advise the vice president and general manager of the Tulsa Division, that's when it was a part of Space Division - forgetting for a second there now it's a separate division - but to advise them of things they saw in the operation that might be improved.

You taught them this is a program theme, a division theme you_____ a corporate thing coming in here with people - experts. I've forgotten - it was a corporate theme - thank you. That was a corporate theme which was directly adopted form the Air Force and Major General Wes Schott headed it up for the corporation - for Inspector General.

And we would loan people to that team for a couple of weeks and be off on special assignment. Yes, now Space Division started it first ———

Shot? Wes Schott?

S - c - h - o - t - t.

Space Division started it first, then autonetics, and then it was adopted as a corporate thing. O.k., excuse me, that was another specific example that was adopted from the Air Force and used by industry. McDonnell Douglas, I understand - Oh, excuse me, this would be Douglas aircraft, I also understand set up such a thing. O.k. we had been talking about indirect costs and I just mentioned I thought we had those well under control. ———