

Church: My name is John Church and I was assigned as the contract administrator to the Gemini Program under a subcontract with McDonnell Aircraft in March 1963. Our contract with McDonnell had been in existence for about one year at that time and we had proceeded through the basic parts of the program - research and development - and the program really was just getting under way at that time.

Grimwood: What had you been working on before, John?

Church: I'd been on transtage for about six months and about six months before that I was on the F-1 and J-2 programs at Rocketdyne. Prior to that I was out at BSD as a buyer, with the Air Force - government -- Contracting officer at San Bernardino Air Materiel area. Coming in on the program in March '63, it was some history to pick up from that point on. Looking back, I find that the first year really didn't count for me because there were three more big ones ahead. And I worked all the way through the program on them and stayed with it.

Putnam: It was a letter contract when you came on, right?

Church: It was in letter contract stage and we - just about that time we had definitized the price - in March, April '63. We had definitized the price and it was just a matter of processing the document, which I went through and it was a matter of picking up the paperwork of what we had definitized. And so we went through the definitive effort on the document, terms and conditions, and the price was firm in March of '63. I came around about the time they were finishing negotiations - or rather in the middle of it there. Krachowsky (?) was back at St. Louis for three weeks.

Grimwood: About the summer of '63 they realized that the requirements that they had established were not good enough, that they needed to just about double the lifetime of the components. They had found this out in astronaut usage of the trainers where you have a significantly more pulse factor than a steady state operation.

Church: Are you talking about long life?

Grimwood: Right. How did that affect your contracting efforts, when you had to suddenly go into some redesign and so many change orders coming through?

Church: We had many, many changes coming in. In fact, it was averaging about a change a day.

York: May I introduce myself first and give you some background. My name is Irving York. I'm chief of contract negotiations here now. Just about

when the program started, February or March of '62, I was put in charge of the group having one of its key programs, Gemini. Of course, that was before John came on the program. I had another guy, Monte Weiner, who worked on the program for about a year. He's since gone out to practice law but he worked about a year. Almost from the very beginning, the program had a lot of changes. Sometime back, John and I did a survey and figured out that there were more changes on this program than, say, the Atlas and programs combined.

Putnam: More change per dollar than anything else ever seen.

York: I'm not trying to evaluate why - but there were a lot of changes.

Grimwood: Were you in on the proposing era, before the Gemini program was approved?

York: Actually, no. I want to make one thing clear. I don't handle the proposal effort, at least not the main proposal effort. There's a man named Petrowsky --

Grimwood: Steve Domocos is the one we talked with.

York: Well, Steve was the chief engineer. Al Petrowsky is now chief of one of our program administration groups. At that time, he was the program administrator on the program and he was helping put the program together. By program administration, he's a proposal man as well as working jointly with contract administration in our business administration function to see that the program proceeds properly. He perhaps can give you a lot more detail about the specifics of the proposal. I was not in on pricing part of it - I was in, certainly, on the terms of the initial part of it.

Grimwood: He was in on the pricing or you were?

York: He was.

Grimwood: Really, when you joined Gemini, the company already had the subcontract with McDonnell.

York: We had just about got the wire authorization, were just about getting it, if I recall.

Putnam: Everybody realizes at this point in time that when the sub was let the program was, in terms of what the missions were going to be and precisely what performance would be expected, pretty vague.

York: I can't comment on that. I don't recall - there had been some negotiations and proposal effort prior to the actual letting - I think it was a wire authorization that we got - and at that time there were many discussions, I am sure, of the technical requirements.

Putnam: What I was going to ask - even the mission wasn't very set for another year or so - precisely what hardware was going to have to do - what effect did that have on setting the terms and conditions - the details of the contract? Did that have a direct bearing on your work as you first ---

York: It was considerable effort for us. As you recall the early stages of the program it was supposedly a fixed-price basis and, if you know anything about contract administration, when you do an R and D job on a fixed price basis, you pay considerable attention to the work statement and all the other provisions.

Grimwood: There was one big phase you were on, and that's the program definition, even though the program comes in. There's a lot of TPD's along the way there - To Be Determined - for components and what-not - so all this first year, you were no doubt struggling through that thing to try to get something precisely defined - not only from your people but from McDonnell --- Can you give a few incidents in that era?

Putnam: Let's get the type of contract thing clear in my mind. It was a fixed price procurement?

York: It wasn't really. There was a discussion of it going. I believe the original terms talked fixed price. And after a while everybody realized that it was so complex, there were so many changes, that the fixed price arrangement was not appropriate form of contract.

Putnam: So the letter contract was finally signed that you went to work under - it was what? Just open?

Church: They contemplated a fixed price contract and then about six months later, they wrote an amendment - they asked us to propose CPFF.

York: Before we definitized.

Church: Yes. They asked us to revise our proposal, come in with a cost type proposal on the program. That's what we did, in fact. We came in with - that's the March proposal that was negotiated, was on a cost type. But it was about three to six months after the program was let, they started looking around for a statement of work, and like you said, everything wasn't solidified at the time. We had specifications but the specifications had to be changed for the mission - there were a lot of changes to go on that thing - and as a result they did decide - between NASA, MAC, and Rocketdyne - a joint decision - to change the type of contracting, because it just didn't fit. The type of contract could tend to handcuff you; on a fixed price program, ordinarily, you're limited. It could hold you down.

York: A fixed price normally indicates that you've got a frozen product.

Grimwood: Why would you even accept such a thing in the first place?

Church: Well, we never really accepted it.

York: I'm not sure that I'm in a position to answer that.

Grimwood: Because everybody did underestimate what this thing would be.

York: I imagine there was some of that. You've talked to the engineers, and I'm sure that they told you a lot.

Grimwood: We've heard this from all angles, that everybody was trapped in the beginning.

York: We have had a lot of experience in the rocket field. We feel we knew an awful lot about design. We had done some work in R and D on this. I guess we felt confident that previous experience would get us through.

Grimwood: So, fortunately, you got out of the fixed price.

York: Of course, it's to nobody's benefit to get in that situation. They can't get what they want and it makes it that much more difficult to run an R and D program and make a lot of changes. And everybody gets pretty nervous about what each change will do. It wasn't the appropriate instrument.

Putnam: So, in March of '63, you were negotiating with McDonnell for a CPFF?

Church: It was negotiated and definitized, for all intents and purposes, at that time.

Putnam: Then we still have a whole sequence of changes in details?

York: Yes. As John pointed out we figured out we had one change per day. When you're a subcontractor, as against a prime, and I've worked on both sides of this, you're bound to get a lot of changes from the prime because of other problems that they've had in-house, or they have incurred in other vendors, some of which may not directly affect you - they just kind of touch on you - some of them, on the other hand, are very significant. A lot of people did a lot of these changes, and you have to evaluate each one of them. And then you have only 30 days to propose. You've got to really concentrate your effort on getting all the changes evaluated and your proposal back to the customer.

Putnam: This creates quite a workload for you.

York: Yes. No question about it.

Church: We went from one contract administrator to two, to three ---

York: It was even worse when we first started - Monte had three different programs -

Church: You were working on two, though. During the course of the program we had three contract administrators at any given time. This was about a year after I got on - we started picking up speed. Then the program administration went from one proposal man, to two, to three, to take care of the proposing, the evaluating, of these changes that came in.

York: In the heyday, about how many people did we have out there, doing pricing?

Church: We had six in our organization, and we had about three - and at times, in a crash workload or estimates to complete - they would run two or three other pricers in the pricing team effort to work on the inputs that they'd get from manufacturing, engineering, and the changes in the program, just to keep up with them. We went from - we had approximately 12 spacecraft sets of hardware - and in the early phases of the program,

each spacecraft set was different for the first five or six. After six, we pretty well locked - this was the long life setup on the thrust chamber - we were pretty well locked onto a frozen design from six on out with spacecraft 6 through 12 hardware - it was basically one part for practically all components. What helped to compound the changes was it wasn't like getting a single change for the RCS system and a single change for the OAMS system, we had a total of 23 components for both systems, and you'd get a change on a tank, you'd get a change on a regulator, you'd get a change on a thrust chamber, and this would compound a number of changes. Each item was like an end item that we were delivering to McDonnell.

Putnam: Was that because you were delivering them physically separate?

Church: Yes. As a separate package, as a separate end item, instead of possibly completely assembling them as a system, which was impossible. I guess that they had to set them into their spacecraft when they got them back at St. Louis. So it just increased the amount of effort in the way of changes.

Putnam: What was the total number of items? 20?

Church: 23, I think.

Putnam: Instead of delivering one system or two systems, you were delivering 23 discrete units?

Church: A little box, thrust chambers are yea long, 25 pounders, 100 pounders, each item had its own background, so to speak ---

Putnam: That really put you down deep into the hardware in the contract.

Church: This compounded, I would say, the administrative effort. I'm not real close to the technical effort - how much more work it was technically - but administratively, it did compound my record - in that when I go to a contract and look at something in the contract, instead of like some contracts - an H-1 engine, for instance, I look for the H-1 engine and there it is - line item, H-1 engine. But I'd go to my contract, and I've got 23 different line items and well, here it is here - it increases the amount of paperwork, in effect. That's what it does. So the complexity of the system does have a direct impact on the amount of paperwork that would flow and the amount of communication that you need.

Grimwood: That's what I was talking about - communication.

Putnam: Between here and MAC?

Grimwood: Between here and MAC, and also between your suppliers, maintaining the lines of communications to those, too, and also working with whoever your local manufacturing people are and your materials people.

York: You can imagine with as many vendors ---

Grimwood: That causes a need for increase in personnel, too.

York: Well, in the need for speed, because as a sub we're catching a change only after it's been decided higher up, and we had to get it out to others. There's always a need for speed but on this program, with all the pressures and meeting schedule, etc., we really had to concentrate our efforts and I believe after - the program's now over - but we did a hell of a good job.

Church: We made it. We were glad to have done it. Let's put it that way.

Putnam: If you look back on it, now that you have a chance to get a little perspective on it, at least, how does it compare in your point of view with - or have you ever had anything that's really comparable to this?

York: Well, every program is a little different, every customer's a little different. But in terms of challenge and complexity, it was probably one of the toughest ones that I was ever associated with.

Grimwood: I was going to say - did, maybe, preconceived notions on running the contract get you in trouble on your operation to begin with? Just like preconceived notions got us into a little trouble technically?

York: You could say there was some of that, in the sense that we at North American - at Rocketdyne - had really not, outside, I imagine, of the Jupiter program, had really not had a lot of experience as a subcontractor - I mean as a major subcontractor.

Grimwood: Leaving the associate field for the sub was kind of a shock?

York: I won't say a shock but it required some adjustments. But we adjusted and we may well have benefited by it, because we believe we satisfied the customer in spite of all of it.

Ertel: I assume you work both ways - from yourselves down to the suppliers

as well as with McDonnell---

Church: No. Our purchasing department worked with the suppliers and - I might say that we had - let's say I came on in March - about that time we did start solidifying design and we had a big push on through that summer and we had Larry Stewart who came on the program as program manager and right in through there we had very good team of people that - our program purchasing reps - manufacturing reps - that tied this together for the program manager. We had weekly meetings. We sat down and communicated and talked to one another on what our problems were, etc., and who was doing what about what. So, our purchasing rep was at the meeting and he would have a full story of just exactly where everything was, and what National Waterlift was doing and what Wescon was doing, and we were sending a man out there to check up on this, and get this in, and manufacturing would know, and so would the program manager and the program people, what was going on and just generally tying things together so we could get the flow of hardware through the system. This was the tie-in, if I had any tie-in at all, with the purchasing, through this purchasing rep.

Grimwood: Maintaining communications.

Church: So that if they were doing something that wasn't necessarily contractually required - or if they weren't doing something that we had to do on the contract, then I was there to point out that this was what we were contractually obligated to do for McDonnell and are we doing it and if not, let's find out why and shape it up.

Grimwood: Who was your contact at McDonnell?

Church: Ed Helbling was the buyer at first, then I had - Doug Vaughn came on - and Don Stuckenbroker, who was the senior buyer -

York: But essentially you worked with Doug Vaughn.

Church: Yes. And once in a while we'd get to Stuckenbroker - Irv would talk to Stuckenbroker mostly, working things out and keeping things moving.

Grimwood: Did the MSC contracting officers ever visit out here?

Church: They visited but ---

Grimwood: Armstrong, Bailey, any of that group?

Church: Atkinson, I know of him coming out to visit the local office here, secondary --

York: This was rare, though.

Church: Visits were rare. I might point out that I just - we're in the throes of getting rid of all the hardware - we've got a little bit left on the contract. Residual property. Atkinson - I met Atkinson for the first time on the program in that action of disposition. I had heard his name and he had heard mine. So he was rather pleased to see me and I was pleased to see him, of course. Many times the buyer would say well, we'll have to check with the NASA contracting officer. Occasionally we'd see Atkinson's name on a wire. But I never had any direct contact other than the final property disposition action. Jerry Zimlak came out here in the fall of '66.

York: The only contact we had was in the presence of McDonnell.

Grimwood: That's the point ---

York: We didn't have any but ---

Grimwood: You were----- the subcontracts and the lines were maintained.

Ertel: How much time was spent on renegotiating the CPFF to the CPIF?

Church: CPIF? Time spent? We converted on 15 October '64 ---

Grimwood: You beat us with McDonnell.

York: Actually we wrapped up the final negotiation - and I happened to be there - in January '65.

Church: The cutoff date was effective October '64. But in January, I think, they settled the price and the conditions.

Grimwood: That's parallel then.

Church: As far as our relationship with the MAC buyer, we probably had our tirades and ups and downs but I had a lot of respect and appreciation of Doug Vaughn. He was a very even-tempered individual. I look back and I say, well, we could talk to each other and we really got along pretty well, at least the two of us in that respect of contact point. I think the same with anybody else that ever dealt with Doug on the program. He thought positively. He was out to try to get the job done and he created that kind of an atmosphere.

York: You recognize the problems of two major companies dealing with each other whether North American is the prime or the sub, or any other major company. Both companies have ways of operating - they have to establish ways of operating. The big problem is the interface between two companies. And that's where John---

Church: We've got a system here - he's got his and I've got mine -

York: MAC's got different words for describing things than we do.

Grimwood: That was one of the criticisms that I've heard - that McDonnell didn't get on Rocketdyne soon enough - that McDonnell had the attitude that if you give a company a job to do you let him to do it.

York: I'm not sure that's ---

Putnam: Because you may be sub to him next time.

York: No. They paid considerable attention to what we were doing. They had a rep here constantly. Of course how you describe what they did is a subjective thing. They were meeting with us constantly, advising us constantly, obtaining information from us ---

Grimwood: They had a rep out here?

York: They had several - they had one Keith - he had a number of people working for him.

Church: He paid a lot of attention to our program. He was with the program manager half the time, the first part of the program, the first year, as I understand. I don't know that there may or may not have been some underestimations of our - underestimating the tasks that had to be done. I know in my own area - how many changes am I going to get? Tomorrow I'm going to dig out, you know, I'll really have it made. I kept - well, I'll get there tomorrow - you keep plugging away and you get a lot of work done but it seems you put three heads down and five more would pop up and you go after them and get them down - it went on for quite some time. In many programs you'll have ups and you'll have downs. I saw this in buying for the government - the workload would peak out. You'd have hills and valleys. But on the Gemini program it was just one hill.

Putnam: I was going to ask if there was a turning point where you could see that everything - that the change flap was coming to an end.

Church: The turning point was the last three months of the program.

Ertel: GT XII.

Church: We were following the deliveries of the last items of hardware and it was toward the tail end and things kind of - they had all the hardware they wanted --- they stopped.

York: When everybody else is finished with the program the contract administrator has a lot of paperwork to clean it all up.

Church: I had that, afterward, but it wasn't as pressing.

York: You didn't have time to get it all done while you were working feverishly, but it was a very busy program but after spacecraft 6 design had been frozen it was a little bit - then we were worried about getting the hardware out and meeting schedules.

Church: It depended - as I said you've got 23 items. McDonnell kept us informed, through our rep back there, as to what tank or what thrust chamber they needed extra support on as we went along with the hardware deliveries. Not all items were critical but they'd get ahead on a few of them - they'd say ok - this one's down at the Cape - we need six more of these thrust chambers, or this tank - we'll need an additional spare item here. They kept us informed as to where all our hardware was at any given time so that they could support the Cape as well as their in-house production. And when they'd get kind-of thin on an item, this was a red flag. We had to scramble six and everybody knew that these were the items that came first - priorities were established so that we could take care of any areas that they would like. And they were pointed out and they were - and we must have had 22 dozen charts for the various phases of the program. The completing of the qual program - we had to tie it in with certain flights. And we were racing time and also racing that what we qualified was going to be good. Here again we got the qual finished, we got the reports out, and we did meet many, if not all, of their deadlines; as far as the crucial ones go, we were basically right there with them.

York: Also, from John's standpoint, although he's off the program, the program's still not over. I'm talking about the original Gemini purchase order. We still have close-out procedures to follow up on.

Grimwood: There's still Mercury money floating around.

Church: ---- was telling me this. "Don't feel bad, John, we've still got a Mercury program."

York: Even in that area I think you did a fine job in working up an expeditious and economical procedure, accumulating all the hardware ----

Church: I think we're in real good shape on disposition of property and within the next two months we'll be there. It's a matter of shutting off all the effort, going through our - we do have indirect rates that have to be negotiated with the government and incorporated and then the CPIF, actually costing, and once we've gone through that, I'd say - what, three years - it'll stay dormant. No work will be being done, the property's all gone---

York: We haven't yet negotiated the final cost figure.

Putnam: Have you picked up any new approaches-anything you did differently that you might be using -

York: You mean in terms of the contract administration?

Church: I'll answer that. I'm not going to brag - but I think possibly that I gained the most worthwhile experience that I ever could have in any program - and then in meeting - for instance, I'm on another new program - and in meeting the problems and challenges of the new program, it's like - I feel like I'm rolling off a log. It's that much difference in me, as an individual, and having experienced what I went through on the Gemini program and believe me, it was a fight uphill all the way. It was a matter of sticking to it. Not that I wasn't experienced going into the Gemini program, because I brought with me six years of government purchasing experience in the contracting area, and I had worked about a year, a year and a half, with Rocketdyne before going into the Gemini program, and was somewhat familiar with Rocketdyne's procedures. I think the biggest education came with the three-way setup in working behind MAC, more or less. You know, NASA giving it to MAC and then MAC to us. I did have to become accustomed to these directions coming out of MAC and supplying what MAC wanted as well as NASA, and maybe we didn't exactly do what NASA wanted because the word coming to us might have been MAC's way of saying it, but we did feel we were fulfilling MAC's requirements and we kept attempting to do this. And MAC did always have a handle on us to make sure that was what we did. They followed it up, at least the buyer did. I would say that I am doing things differently - I'd say that other people - Irv, probably, in training his people in his group and the other contract administrators he's got, he passes this on to them, too, and even now, I think, he says - once in a while he comes trotting back with another man and says, "John, what did you do on Gemini?" These things are being passed on to other people, new people coming in, and other people coming in to the major programs and jobs that they're doing. I think we've benefited a lot. Aside

from that, we performed - we got the program off the ground. We flew a spacecraft. We can look back now and say, "It was good."

Ertel: Maybe Rocketdyne better pay NASA for operating a training program for them.

Church: That's why I pointed out I didn't exactly come in ---

York: You can say that about any contractor.

Church: You can say that there isn't any other program with as many experiences in it as the Gemini program. You can't really compare the complexities to any other program that we've got. And we do get experiences there but they just came faster and much more furiously on the Gemini than any other program.

York: As you know, every customer, even within NASA or DOD, they're different customers and all have different ways of doing things - not that different, but different enough so we have a big operation here. We try to have uniformity at least to the extent that's appropriate. We have a problem, and the Gemini program was one example, of seeing to it that all the customers are satisfied. As John was saying, he had to react to what McDonnell wanted, which was in turn something that NASA wanted. It filtered down to us one way. With other customers it may filter down just a little differently. The experience was certainly profitable to us in many ways.

Grimwood: I'd like to ask you a question that may have caused you a problem. Have you had customers that wanted to buy equal quality for normal money? The man-rating quality for normal money? I know another company that's told me they've had that problem.

York: You know we've had larger programs with larger engines---

Putnam: Where you're the prime?

York: As a prime. For Gemini you needed clean rooms and fortunately we'll be able to use them on Apollo and a few other programs. There's a ruboff in that - if you're going to have to change your procedures, so that it accomplishes the most stringent requirements, you raise your costs for every program, so that we have the reverse of that being true - because you're using what we consider very stringent procedures to meet the most stringent requirements. Some of our customers may be paying a little more but - that maybe under certain circumstances they don't need - so ---

Grimwood: They said they wanted the quality - they told them you'll have to spend the money. It's a different ballgame.

York: That's right.

Putnam: How about some general comments on the incentive contract - what were the major incentives - incentive contracts are like motherhood, you know. Everybody says they're the greatest things since peanut butter. I'm curious about some specific stuff.

York: I think John can probably answer a lot of the details of how it operated, but generally speaking we had a cost incentive only.

Putnam: It wasn't scheduling?

York: No. By the time we converted --- we thought the schedule wasn't a problem so we didn't put any ---

Church: They saw hardware and they saw it coming on schedule and it was moving pretty well about the end of '64.

Grimwood: How did you establish the cost incentive there? What became the point?

York: We tried to determine what the estimate at completion was and that, of course, had to be negotiated. Both sides had different opinions. We reached a figure that we both thought was applicable, supposedly; philosophically, it's supposed to be the mid-point. We believed it was the mid-point, pretty close to it. Of course, we had already had a good chunk of experience and that was wiped out contractually, so we were just talking about the estimate at completion. Then we budgeted in-house and did our very best and I think it reflects that.

Church: Well, we'd had budgets before that.

York: I don't mean to say that we started budgets just because of that. We had stringent budgets when we specifically had a target cost - then you budget in a way that points at that target. There were some changes, by the way, which made a change in the budget, physical changes to the program.

Putnam: Then you've really got to take a close look at the changes, from the contract administrator's point of view? You're really talking about direct money, now.

York: I believe that we had an equitable target - the target cost - and that the incentive - we tried to underrun that - was fairly established and that we earned it. I don't want anyone to think that we outnegotiated McDonnell.

Church: When we negotiated the target - the minimum and the max - it was a cost incentive, we did not sacrifice schedule or performance or anything else, but we said, "Ok, we're going to really try to make max. That's the purpose of an incentive program, to try to get it to maximum." Otherwise why establish a max fee? So this was the thing on the program - it was only a cost incentive and I guess MAC felt, and we did, too, there wasn't any reason to have a schedule incentive, or any other technical incentive, because we were delivering and we were, I think, about spacecraft 6 pretty well frozen on the hardware.

York: And I believe thereafter we continued to deliver on schedule so - if you know anything about cost incentives - if you're going to be late, your costs are going to go up - so you've got to try to meet schedules to keep your cost down - it goes hand in hand. One of the reasons we felt we were going to meet schedule and cost - to keep our cost down.

Church: I think MAC saved money and everybody saved money by going to the incentive contract.

Grimwood: It would have been pretty rugged to go incentive that first year, wouldn't it? Would you like to have been on incentive in 1962?

Putnam: I don't see how you could do it until you get the program defined.

Church: That's the thing. You have to define it pretty well in a CPIF atmosphere, then you have to define it real well when you go fixed price incentive.

York: When you're talking about early stages, you would also, I would assume, want performance incentive. Trying to establish an arrangement both sides can work with is the most difficult thing in the world.

Grimwood: The feeling was at that time you could have been fairly well trapped then, couldn't you?

York: Oh, hell, yes. On the other hand, I assume that both McDonnell and NASA felt that maybe we were going to make too much on ---

Putnam: Well, everybody was trapped, because the government would have been trapped, too, cause they didn't know what they wanted anyhow ---

Church: With all the changes, you'd have had to sacrifice cost for performance and performance for cost and you never know what this thing is - the way they would go ---

Ertel: It would have been one steady renegotiation.

Church: Because of all the changes there would have been anyway. I'm not sure, in view of the dynamic aspects of the program, we wouldn't have time to sit down ---

Ertel: About ten years from now you'd find out how much money you'd made.

Grimwood: I've only found one guy that said he thought the incentive could be done at the beginning of the program.

Putnam: Of what program? Gemini?

Grimwood: Of any program. You know who that was? You heard him say it. Walter Burke.

Putnam: Well, he was optimistic about that.

Church: You could, depending on the program. On this program, you mean?

York: It depends on ----

Church: You can go with the incentive, but you might lose everything and the guy comes out with the minimum fee. He gets his cost - maybe in that respect he'd get his cost back out of it and very little fee, but it wouldn't pay him to do the program.

York: I would assume, on the other hand, that if some of the new concepts they have in mind were properly carried out, such as PDP, phase 1, phase 2, you would eliminate as much of the uncertainty before you get into the incentive, that you could make it work. But you've got to spend a year or so ---

Grimwood: Have they gone into this PDP stage 1 and stage 2?

Putnam: Why, hell, yes, they exercised that in depth on Titan III. John _____ said he'd saved the government \$750 million on Titan III by defining the program explicitly to the last nut before he signed ---

York: I'm not in a position to agree with what he said. I haven't really seen it operating. Of course, we've been a lousy subcontractor - and that sort

and actually we end up supporting three or four ---

Putnam: If it's real R and D program and is really pushing the state of the art, it's just exactly the kind of program you can't write incentives on.

York: How would you write an incentive contract for Thomas Edison?