

Interview with

Roy Tharpe

By

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**Dr. Butler:** Ok. I'm Dr. Orville Butler and we're in the Kennedy Space Center Headquarters Building this morning talking with Roy Tharpe and I guess I'd like you to start off very quickly summarizing your background here

**Mr. Tharpe:** Ok. Thirty-three years with NASA starting out working on the Apollo program. Grew up on Merritt Island. Local, I'm one of you local folks. And after my thirty three years in the NASA family I've worked for Boeing for a little over seven and a half years. So I've got currently forty some years in the aerospace business but a whole lifetime of watching it.

**Dr. Butler:** Very good. What we'd like to do today. One of the things on the KSC history project that we're working on and struggling with right now is the time period of the 1990s in which there were a lot of changes that went on. Uh. And so maybe in general what your positions or what roles you played in the 1990s and then we can go back and address some of the specifics.

**Mr. Tharpe:** Well in the '90s I worked for Jay Honeycut and he was the director of Shuttle Operations and I had the Launch and Landing Project. And early in the '90s I was asked by Jay to be a part of a team and we went to Russia and we were evaluating Russia and their capabilities as to launching our astronauts on their Soyuz vehicle. And we had to generate a white paper for Congress, well for Mr. Goldin who was the NASA administrator at that time, because we were embracing the idea of the international partnership and involving the Russians very heavily in the International Space Station. And, uh, following that, Jay moved up to the Center Director and Bob Sieck took over and I was his associate director for Space Shuttle Processing. And during that time NASA had come up with the idea of the Shuttle Flight Ops Contract or the SFOC. And so I was the KSC rep for NASA on the Space Flight Ops Contract

and we were at that time going to competitively bid the whole concept of processing flight hardware, performing mission ops utilizing a contractor. So I spent a couple of years on that initiative with a team that still had some of the folks. Jim Kennedy was a part of that team. Shannon Bartell was a part of that team. We had uh Schiller [phonetic], Don Schiller from the legal cause the whole concept was completely different. It made NASA Civil Service very nervous because we were going to transition from the hands on day to day business to the Space Flight Ops Contract. In the Space Flight Ops Contract we crafted the words in there that the contractor would be performance based. In performance based we establish metrics that the civil service could take and utilize in judging how well the contractor was performing that work. And the idea was to have them, the civil service who was the brightest and the smartest folks and have the heritage of human space flight forever, have them concentrate on the significant items of training the launch team, training the flight teams. Let them do the kinds of things that they needed to do to ensure a good launch, a good mission and a mission success for the total processing time. So that's what we did.

**Dr. Butler:** So it had. let lets go back and generic questions and then we'll come back to this in a little bit more detail. One of the struggles that we've been dealing with in the 1990s has been this is a time period in which there appear to be significant improvements in the processing of the Shuttle. NASA does become more efficient. But we have not been able to identify apart from the metrics, what those changes were. Now we talked with Mr. Phillips and he indicated that there were a lot of administrative changes, reductions in the number of signatures he had to get, a transition to to uh a more sophisticated database, less paper work and a lot of administrative things. Were there technologies on the shuttle or in the processing of the shuttle that made dramatic changes as well?

**Mr. Tharpe:** They were uh a lot of initiatives that NASA had. Jay Honeycut was the prime mover. When he looked at the total processing time of an orbiter in the orbiter processing facility it ended up being over a million labor hours. When he looked at all of the procedures that were required, they were tremendous amount of procedural details that were in place that required NASA to reevaluate those processes. In that evaluate, reevaluation there were recommendations that took processing time in the OPF from a million labor hour, his goal was six hundred thousand labor hours and we ended up prior to the SFOC at seven hundred and fifty thousand labor hours. So we took a twenty five percent reduction in hands on labor hours and that was using the team sitting down and saying look folks, we've got to streamline. Where is it that we've got these pressure points or choke points that does not allow us to knock down the barriers that enable us to take and meet something like a six hundred thousand hours of work so that we can take and still meet critical milestones, still be safe and not exude critical pressures on the people or on the system to do that. So yes, we removed signatures out of procedures. We removed folks having to be there to monitor activities. We streamlined the processes to for preparation to get that work done and in the planning and preparing for that activity you were able to streamline that activity. We didn't have to wait for a safety person. We didn't we had a call to station that was integrated to get people together. We used a lot of team work tech, ideas, to make the processing go much faster without any compromise to safety or the technical aspects. As a part of that we developed some tools that assisted us in that. We had through the level three and level four control boards, we approved ground support equipment modifications, we approved newere technologies; thermal topography to look at things where we used to take and open up a cabinet to look at circuit breakers. We had an infrared technology that allowed us to just bring up a machine, look at the circuit breaker panel and say that's ok. We don't need to

go in there and do that. So we removed some labor hours for work. And that was, it was quite rewarding at that time. And that set the stage. And that's what made in my mind the early '91, '92, '93 time frame set the stage for implementing the Space Flight Ops Contract in 1996.

**Dr. Butler:** Ok you mentioned thermal imaging

**Mr. Tharpe:** Hm hm

**Dr. Butler:** as as one thing that saved time. I have heard another thing that took place about that time was it used to be that you worked on the engines on the Shuttle and that required other people to wait to work on other things. And it was about that time that you started removing the engines from the shuttle so that work could be done in parallel.

**Mr. Tharpe:** Well we did another thing, I talked about GSE mods. We also took the engine shop out of the Vehicle Assembly building and in OPF bay three we added an annex and the annex next to OPF bay three we put in eight engine stands and we were able to process eight engines at one time whereas when we were in the VAB we could only process three or four engines. So therefore the idea, there were two reasons. One, if we ever had a major accident in the VAB we would wipe out engines that were, you can get cost estimates that were, we used thirty-five million at the time we did the the construction of facility project we used thirty-five million per engine. They're up to fifty million today. But we used that as a cost. The safety, we always introduced hazards. That facility was hazardous to those engines because the clearances for moving an engine out of a stand ended up being only three or four engines from either steel or a ceiling, concrete. So we went in and moved the engine facility out of the VAB over next to OPF bay three. We had synergy with the work force because they were housed in the OPF and uh we were able to streamline the process. So the engines became non critical path from that point in time. We had enough engineers. We had enough technicians. We saved time

from going back and forth from where the engine technicians were over to the VAB and we were able to do that and we also upgraded the engine removal and installer set of equipment also. So we were looking at the hazards analysis to justify those kinds of things.

**Dr. Butler:** And of course the VAB is an ordinance facility so your taking it away from high explosives and the solid rockets too.

**Mr. Tharpe:** At that point in time Captain Crippen asked that we take and remove everybody out of the VAB because of that one point, or General McCartney I should say. We've got folks that are here in a very hazardous facility. They don't get hazardous facility pay and so we need to get all of the people out of the VAB from a housing standpoint. So we had OSB 1 the operations support building 1 and now we have OSB 2 that is being built and the idea is to have better working space. So that's, from the engine standpoint, that's a big a big item and I was part of the C of F team that went up to Washington to do that. We also did some upgrades in launch processing. In the Launch Processing System, we had hardware interface modules in the Mobile Launch Platform that were giving us trouble, we were going to do some upgrades so we spent some money doing some of the infrastructure and major support equipment changes.

**Dr. Butler:** If you were to pick three things. You've already mentioned thermal imaging and we talked about the engines but lets say there was a third thing that really transformed processing times, what would that third thing be?

**Mr. Tharpe:** Well we talk critical path. I'll say critical path scheduling which involved the engines. I'll say the procedures which included the preparation for a major activity and then I'm going to say the team relationship, the industry government team relationship where as everybody realized we needed to do some things different and the only way we're going to do some things different was lets force this integration where everybody gets together and if that

requires a major facility mod or if that requires major equipment to be bought than Honeycut, Jay Honeycut set up the infrastructure and the mechanism to make that happen. He put the focus back on the processing teams and then set up the organization and had the organization go and make those things happen to help the team at 39.

**Dr. Butler:** Could you tell us a little bit about the organizational structure.

How was it different and what was it, what was the process before Honeycut set this up and what was the process after?

**Mr. Tharpe:** The we didn't have a project office before KSC following the Challenger accident. And with a project office it it established a focal for the monies. And at that time KSC through the Shuttle Program, we were getting seven hundred million dollars and we needed eight to nine hundred million. So he set up a an office, the office got in lock step with Houston, the Shuttle program office under Leonard Nicholson and we built a rapport so that KSC then started to get out of some of these critical paths that we had, we had put ourselves in. I'll tell you another one. We had a challenge for the payload activities. The payloads work at Kennedy at never been in the critical path. The Canister activities, the rotation of all of our canister ops had to be done in the VAB because that's the only place where we had a crane and a height dimension to do canister ops to go from horizontal to vertical. Well at the same time our contractor, the shuttle processing contractor under Lockheed-Martin, they were needing the cranes to stack boosters to stack tanks. So we were always in competition. So the canister ops always went to third shift. Well Jay Honeycut was one of the big proponents in our construction of facilities process to say why don't we build a canister processing facility at KSC, put it up here in the industrial area and we'll have the canisters and transporters there and we'll remove them out of the choke point at 39. And we did that too. And that's the Shuttle people doing that for

our payloads folks at six million dollars. We took six million dollars out of our budget C of F budget to help, but Jay was on this kick that we need to remove these choke point and if that's for the betterment of the process we need to do that. So that's the way I characterize the three without getting into the specifics of whether it was thermal imaging, whether it was a hyster to do engine work or whether it was a mod to help us open the payload bay doors on the orbiter. The idea was to put this organization in place and Ron Phelps, you mentioned his name, he is out of the project office today and we still have that in place, and that's going to be one of the key things is to lets get more project emphasis back and let the government do that. That is one of the things, that is one of NASA's job. They need to take and establish those requirements and defend them through a budget process so that we get enough money and we have the right skills to go do the work. And that was one of the things from the Space Flight Ops Contract that we wanted to instill. We wanted KSC Civil Servants, we wanted them to plan, to test and to launch. That was, that was their whole focus. The team under Civil Service where we let them do all the day to day work, let them do all the hands on things. We were not, we would do that from an oversight, not an insight. We would take and be there we were not a critical player from the stand point of stamping things off, signing off procedures, approving those procedures. That was USA's job and that was how we transitioned. We went from the Shuttle Processing Contract folded that into the Space Flight Ops contract and I think the USA contract was three hundred pages all total and the just the SPC contract alone was like 2000 pages. So I mean we were able to learn a lot from a SPC shuttle processing contract concept to a Space Flight Ops contract concept. So that's that's how I characterize the three dynamics and the organization change. Now that organization change didn't come easy because the mind set of the culture that was in place at that time, we pulled some schedule responsibility away from the Shuttle Ops processing

folks at 39. We pulled budget responsibility into one organization and the Shuttle Program Manager for that time made the director for Shuttle Processing, Jay Honeycut, responsible and he had to every month report on the schedule and the budget for his work at KSC. So I mean it was just a little bit of a tweak and it had significant rewards. Significant rewards.

**Dr. Butler:** And and so, at this time Mr. Honeycut was? What was his position?

**Mr. Tharpe:** He was the Director of Shuttle Processing. He was the number one person in KSC for Shuttle processing.

**Dr. Butler:** And and this is during the time period when your preparing for what event, eventually becomes Space Flight Operations Contract?

**Mr. Tharpe:** Yes.

**Dr. Butler:** Uh, which which is implemented after he becomes Center Director.

**Mr. Tharpe:** Yes it was.

**Dr. Butler:** Describe how. You mentioned that that the Shuttle Processing Contract back in 1982 or 3

**Mr. Tharpe:** It a

**Dr. Butler:** '83.

**Mr. Tharpe:** '83 was the first

**Dr. Butler:** Yeah.

**Mr. Tharpe:** fiscal year

**Dr. Butler:** Yeah. You mentioned, you mentioned that one was was about

2000 pages

**Mr. Tharpe:** Yeah, I don't

**Dr. Butler:** and

**Mr. Tharpe:** large number

**Dr. Butler:** Yeah, and that the Space Flight Operaitons Contract was only about fifteen percent of that.

**Mr. Tharpe:** Very small number.

**Dr. Butler:** Uh, how would you describe the change in roles both for NASA and Contractor under the SPC and under the Space Flight Operations Contract?

**Mr. Tharpe:** Well I think the most significant part of that was under the SPC we still had a lot of government involvement and we had to have. We had a new contract. The concept for the new contract, we folded a lot of things in that had been separate before the SPC and so the government had the the corporate memory for processing and so we had to remain involved because our contractor did not come up to speed. Lockheed Martin in those early days, it took a lot of partnering and partnership activities between NASA and the contractor to have the contractor ramp up and do the kinds of things and meet the milestones that were required and so it it it was a teamwork initiative where NASA had a lot more involvement, I mean a Lot more involvement. NASA was telling the contractor how to do things rather than saying contractor these are the things we contracted you to do, you go make that happen. So we had to grow Lockheed Martin into doing the kinds of things that were required. Once Lockheed Martin ramped up and got up to speed it was hard to get NASA to back away. Honeycut wanted the NASA to back away. And so we had to start transitioning to start thinking NASA KSC Shuttle operations, we had to get them to think differently. The civil servants had to take a step back. And these were a lot of young engineers that had been hired for return to flight and they were

anxious to be more involved or and so we had to take and change things because the old guard in '83, '84, '85, they were veterans of Gemini, some Mercury and at that time you couldn't tell the difference, it was a badgeless society. Contractors and government folks, civil service were working hand in hand shoulder to shoulder doing both sets of work and so we had to give those NASA hard core folks and some of them did under the SPC for a period of time and some of them never under the SFOC ever could pull back because they did not want to relinquish what we considered control of the process and activities to the contractor.

**Dr. Butler:** Another another way that you talked about it in the past, you mentioned that under the SPC NASA had the corporate knowledge

**Mr. Tharpe:** Yes

**Dr. Butler:** And Lockheed really didn't have a corporate knowledge on how to process the Shuttle.

**Mr. Tharpe:** Right. Great concepts but the application was a little different

**Dr. Butler:** And some people have argued that NASA needs to maintain that corporate knowledge and that can only be done through having a hands on element. Where do you think that corporate knowledge resides today?

**Mr. Tharpe:** I think it resides in both sets of industry and NASA. We, and that's a very touchy critical point because if you start to look at your skill base in the Space Flight Ops Contract we we were really torn because we knew what the SPC was and we knew where we were going with the Space Flight Ops Contract and we had a lot of nay sayers. And the nay sayers said NASA has to be involved in every aspect of the processing because if they don't it isn't being done right. Jay Honeycut, Bob Sieck and myself believe that you can have the contract be structured, have them have the technical expertise and they can do the job without the

governments involvement. The government can go in at any point in time and penetrate the task look at it and check it, but they are not in line in the process of activity. So the hard core who grew up in the old days because they were there with hands on, they wanted it to be done a certain way and they were pretty hard over. And, and I was, since I was writing the words, or are team writing the words in a performance based contract scenario, you let the contractor do that work, you give him a performance metric and then you grade that metric as to how well that was done. In critical interfaces you could interject the civil service. In launch planning and launch operations it was one hundred percent the civil service responsibility and in Mission Operations in Houston it was one hundred percent civil service. Civil service participated in the training. Civil Service participated in the flying. So that was a Houston aspect, whereas at KSC, KSC participated in testing, it participated in the launch and that was their prime job in the Space Flight Ops Contract. So you have that dichotomy of well how are the young people going to get smart without being out there being hands on and and the the way I uh explain that is you don't have to be written into the procedure to take and know to find out what is going on with the operation. You can be there. Your not a distraction. You can be there to observe. You can be there to ask questions at the right time and you can be there as a part of that team. So that and I personally thing the Space Flight Ops Contract in concept is a great concept. I think it has saved NASA a lot of money and I also think the relationship between the NASA and the processing contractor has gotten better and NASA should be off doing the things for exploration and not be worrying about how we process the shuttle on a day to day. They should establish milestones that that USA processing team go out and do those milestones and interject themselves when they need to. And that's going to be and that is the struggle with the new hirees and just how do

we interject back into the process and the civil service role if there is one, to be sure that the contractor has done the job right.

**Dr. Butler:** Now you uh in in the late 1990s you left NASA and went to work for Boeing

**Mr. Tharpe:** Yes

**Dr. Butler:** So in one sense your taking your corporate knowledge from NASA to a contractor

**Mr. Tharpe:** yes

**Dr. Butler:** Is there significant movement in both directions? Are there people who come from contractor and bring their corporate knowledge into NASA as well?

**Mr. Tharpe:** Yes, you will find and what I've, with the two contrasting careers, uh the one thing that I have found is that the contractor is motivated in the same way. The contractor is motivated in one, doing the right thing, two, knowing that they are very critical in the processes they are not going to do something that is going to take and compromise safety or compromise the technical demands of the hardware. And NASA needs to let the contractor do what the contractor is being paid to do. The contractor is not there to be motivated from a selfish profit standpoint. The contractor is motivated to do the right thing. That is why NASA and its contractors have a very very good relationship. A lot of respect and so when I went over to the Industry side, we had to do a little bit of culture change because a lot of our uh folds did not take and have that respect for the overall processing and what NASA had brought to the table. And Boeing was one of the and that was a big deal, because Boeing thought that they as the SPC, Lockheed Martin, thought that they had the right way to do do things without the involvement of NASA. Boeing found that we do have to blend, we do have to work together and we do have to

have a good product delivered to orbit. And the only way we're going to have a good product delivered to orbit is to utilize the corporate memory of NASA and to take and process the flight hardware for the International Space Station the way the contract has dictated. So we did that and I think we've got a great product on orbit and Boeing and NASA can be very proud of the accomplishments to date and I'm very proud of the KSC team that does both parts of that.

They've got the Space Flight Ops Contractor, USA. They've got the Boeing contractor for the CAPS, Checkout Assembly Processing and Support activities for all the payload with Boeing. So I think its been a, I'm glad to have watched it mature over the years, I really have and I'm really anxious to see what the transition is going to be from a NASA standpoint looking at post-Columbia and returning to flight and exploration. I think that NASA should be doing back flips that the President has set a vision for them to be doing exploration and that they should be chomping at the bits to go off and do that and not be worrying about the day to day activities in the OPF.

**Dr. Butler:** Ok, you mentioned that in your opinion the contractors, like NASA, did not have a primary profit motive concern

**Mr. Tharpe:** Right.

**Dr. Butler:** But isn't there still a difference? NASA depends for its resources on Congressional allocation. The contractor, if they don't make a profit, they go out of business. They go bankrupt

**Mr. Tharpe:** Yes

**Dr. Butler:** So it is crucial for them to make a profit or else they don't have, or people are not going to invest in them. They're not going to buy stock. So isn't there still a profit concern on the contractor side that you would not find on the government side?

**Mr. Tharpe:** There is a profit motive to some degree. Uh, let me assure you that going to space is not cheap and the contractor in the space business does not get rich. Boeing really struggles with do we want to stay in the space business. And because

**Dr. Butler:** Its not like a defense contractor

**Mr. Tharpe:** Its not like a defense contract. But our CEO Harry Stonecipher says that America needs a space presence and if America is going to have a space presence than we Boeing are going to be in the business of space, knowing that there is a lot more lucrative business on the defense side and in that contracting scheme than there is on the NASA side. When your looking at a four hundred billion dollar DOD budget and your looking at a fifteen billion dollar NASA budget and your looking at all that's on the plate of both of those contracts then there's not a huge profit margin. So the motivation from a space standpoint, and I truly believe this, is not for the profit. The Boeing brand has been on all of space flight since the early fifties. And we expect to be in space flight through the next exploration part of time.

**Dr. Butler:** So that suggests that that one issue is indirectly related to profit is brand identification

**Mr. Tharpe:** Well

**Dr. Butler:** and having that Boeing logo on those craft.

**Mr. Tharpe:** Yes, that is part of our heritage and we do those hard things and make those tough choices because of that. And I'm very proud of that.

**Dr. Butler:** Sure.

**Mr. Tharpe:** And uh, and I'm very proud of the President coming out and setting a Presidential vision which is now transformed into a national vision because if it isn't a national vision it is going to span ten Presidential tenures. If you start to look at 2020, 2030 with humans

headed for the cosmos and the president who set that in motion is not going to be there for that whole time, just as President Kennedy in 1961 said we're going to land a man on the moon and return him safely to earth before this decade is out. Well he wasn't the president who saw that to fruition. Neither was the next president Johnson. But it was President Nixon. So right there when you're looking at it and that was in a span of eight years. So we've got to have a vision and Boeing wants to be part of that exploration vision. And NASA needs to be in the forefront going out and doing all of the things of, with the help of industry, because it can't be done just by NASA alone, but promoting the vision, getting Congressional support for that vision and then developing a contracting stream, stream to ensure that we can accomplish what the president has set out as that exploration vision. So I'm very excited about it and whether I wear a Boeing badge or a NASA badge of I am a voting tax payer and I look forward to helping NASA get the sixteen point two billion dollars that they need in the next fiscal year.

**Dr. Butler:** You're living in an area where there are a lot of people who are tied to space employment. They're going to have one congressman and two senators. How are you going to get a majority? I want to tie this in to the battle over space station in the early nineties where most votes won by one or two votes.

**Mr. Tharpe:** yes and if you look at the latest Gallup poll where it says two out of every three American's support space. And, and so we, in our local community are very high on space. I also lived in this community where it was all Orange groves. And, uh, and if you didn't talk about oranges or if you weren't associated with the orange growers, you didn't, there wasn't much money here. So we've just shifted a priority and if you look at the space business for this community you may find that the aerospace industry was not as dominant, is not as dominant, was not as dominant today as it was in the sixties and seventies, because that was the

business. Then post Apollo this community went into a sticker shock and realized that we needed to have some diversification and so now the county is a more diversified. So yeah you may not get more political consensus, you probably will get political consensus in Brevard county, uh, but in the surrounding counties of Orange county or Valousha (phonetic) or Indian River, you may not. And that's our challenge, our challenge as NASA and Industry is to go out and promote space because if two out of three American's support space then why isn't it an overwhelming feeling in Congress and we don't get that feeling in congress so we've got to go make that happen. So yes, and its going to be hard. When the Shuttle isn't flying and the Gee Whiz is not out there in front of the public as to what has space done for me lately then it becomes a fainting dream and that's a real problem. But if that American goes to the doctor and the doctor says we're going to do an echocardiogram on you because I want to check you heart, that came out of the Apollo program. The technology and spin off for the echocardiogram was developed for the Apollo astronauts so that we could test them and and get a good baseline for their body. And we have not done a good enough job on space spin offs. And that's where we need to do a better job. Space is not just about doing earth orbit. Space has an effect on everyone of us American's today cause

**Dr. Butler:** Cell phones they use.

**Mr. Tharpe:** Cell phones and what happened when the satellite got a solar blast and the cell phones when down and we wiped out so many hundreds of thousands of users for that cell phone. But the cell phone is people don't relate to that being a space spin off. They don't think of the satellite industry being a part of the space industry. We take, we take all of that so much for granted and if it hadn't been for space, if it hadn't been for those early days we would not have the quality of life that we have today. Give me a break, for the price of a

cheeseburger, every American can donate less than one percent of our taxpayer dollar to the space program. That's what we've got to do. Industry does that. NASA is limited in doing that. We we have to be those chosen disciples to go out and do that. And if we don't then my forty years in the space business is for naught, because we've got to have something for inspiring those next generation of explorers.

**Dr. Butler:** Ok we've gone through Shuttle processing

**Mr. Tharpe:** hmhm

**Dr. Butler:** and the development of SFOC. Lets go back now. You, You were involved in the early 90s you went to Russia

**Mr. Tharpe:** Hm hm.

**Dr. Butler:** as part of the group that was evaluating Russian launch efforts to make sure they were safe for American astronauts going up to space station.

**Mr. Tharpe:** Right, To the MIR space station at that time

**Dr. Butler:** yes. Going up to Mir.

**END OF TAPE 1 SIDE A**

**Dr. Butler:** We made the transition to space station and I'd just asked you about the transition from from the cold war concept of space station with space station freedom to a far more integrated world space station, an integrated space station where we were, had earlier developed a relationship with European Space Agency and by '93 we're developing a relationship with with Russia. And I wanted you to tell us about Kennedy Space Center's role in that transition and and in the development of the International Space Station.

**Mr. Tharpe:** Well KSC had a, when your looking at setting up a new program and when we went from the Reagan era in the '80s to the '90s time frame we had a small group within a project office and the were establishing the processing requirements for the flight elements whether they were going to be American made flight elements, whether they were going to be European, the Italians, whether they were Japanese, we were setting up the facilities and the infrastructure for the inter, for the space station processing of flight hardware. In the '80s it was a ship and shoot concept where you didn't require much infrastructure at the launch site. You just took and shipped it here. It could have come by barge, it could have come by air, it could have come by truck. You took the elements, you bring it in, you put it in a canister. You took it to the flight system whether it was the Shuttle horizontal where you woud install the payload horizontally or install it vertically at the pad and you launch it. Not testing. No verification at that time. Now there was a lot of folks who were saying look, that concept is not a good concept. Your going to have to have a processing facility at the Cape, Kennedy Space Center, and your going to have to have a way to check that stuff out to some degree, whether it is a systems health check, power up, power down test, something, because at Kennedy we've never had a payload at the pad, stop a launch or be in the critical path for a launch activity and so our project office started to set the ground rules of we need to build a processing facility, Space Station Processing Facility. It has to have checkout stations in there. We need to have for the primary payloads which are the larger pay loads, we need to have an area for them to have a rotation stand or some kind of element stand that it can sit on while it is being checked out. We need to have a place for racks where we can have a rack that is, whether its is a human facility rack, whether it is an experiment rack from one of the universities or colleges. So they, the prime role there from a space station standpoint was to have this place have a new facility. And

that is what we did. We got a construction of facility project through, used space station program funds and built our new space station processing facility in the early 1990s like in 1994.

**Dr. Butler:** Yes, when it opened

**Mr. Tharpe:** Right. So that's the, So that's the project office. And then we started to set up an organization that was going to do the process and check out of the flight elements when they got here. So we set up an organization, a project office that had schedule responsibility, budget responsibility and responsibility to go get more funds that were needed and then you had a hands on processing organization that had a few civil service and a contractor to do the work. So that's what happened in the early days. And then with Dan Goldin, uh, when when the Space Station passed by one vote, that sent a signal to everybody of wait a minute we've got to have more involvement and he want the international activities, the international flavor put on it. So when were over there in the '92, '93 time frame, we, Dan Goldin was embracing with president Clinton the idea of Russia being an international partner, a big partner. And so Bill Reedy was on our team when we were in Russia and so we looked at what they did, looked at their history and came back with a white paper that said Yes, our Americans will be in good hands with the Russians. And then Norm Thagert [phonetic] flew as the first American to be launched on a Russian rocket. Same Russian rocket concept for Yuri Gagarin in the early 1960s. Didn't change much. The pad didn't, looked the same as when we were walking on it, looked the same as the pictures that we saw with the early '60s launch activities from bakanur [phonetic] So that's how I characterize the KSC's role in the '80s with a small small set of folk to the nineties to transition where we built facilities and were ready for processing the Space Station hardware. Great concept because they had a great crystal ball as to sizing the the amount of hardware that could be processed in there and the surge capacity with the operations and

checkout building that were built for Apollo. And we were able to use both those buildings and NASA KSC had the plans to do that. And they are, that's what the civil servants should be doing. They should be looking at how we should be able to do all these things that are on our plate and then task the contractor to go do it. That's and that was where I got into, if I were to debate some of my Apollo buddies or Gemini buddies that's where I had no problem adjusting to that change and letting industry do what industry can do best and the government should be doing those things which they can do best. That way you have the best of the best.

**Dr. Butler:** Who were some of the people who who had the most concerns about this transition?

**Mr. Tharpe:** Well we had, we had some of the young folks that had come in, uh, in the operations world we had uh, Jose Garcia out of our engineering world and he was a non believer in the space Flight Ops Contract. He was very vocal. Nothing against Jose, he was a super guy. He worked many years for NASA and I respected his opinion and I, I got it a lot and I did not mind that and I'm proud of the heritage of Jose and his son. His son is out her working Louis is out here working and so you know we the, it's a generational affair.

**Dr. Butler:** Uh, this is a debate that goes on in the history of technology as well. You know, how do you maintain a technology, skill technology knowledge base? How do you transfer it

**Mr. Tharpe:** Hm hm.

**Dr. Butler:** and things like that. And so the debate that went on here is a debate that has not been resolved anywhere else anymore than it has been here.

**Mr. Tharpe:** Yeah, but you know Dr. Butler, I'll go back to the Shuttle Processing Contract. We had the believers and the non-believers in the SPC. And Andy Pickett

was the believer was the believer of the SPC and Tom Utsman was a believer of the SPC. There were a lot of nay sayers, the die hards that were totally against it. You had the believers and the nonbelievers and you had to take a side. I took the side of I was a believer of Tom Utsman and Andy Picket and so I believed in the Shuttle Processing Contract and so that is what helped me transition to the Space Flight Ops contract. I never have thought about it until we're setting here reflecting but I can see how that change really influenced me and some of the other folks did not have that experience and insight at the levels that it was coming coming down. And I was fortunate enough to have that insight and therefore I didn't have problems with the debate and I didn't have problem with the verbal dialogue against the nonbelievers because that change was good. I, I, I am convinced and still am convinced to this day that those were the right kinds of goals that NASA should establish. We should establish an OPS contract, and we should take and have performance base, and we should have metrics that are for the contractor to do his work, those metrics should make his performance be an objective appraisal rather than be a subjective appraisal. If I do all of those things that you ask me to do then I should get an award fee score which is high and that should be an objective evaluation against performance based metrics. And because you have an opinion over here and you didn't like some of the things that went on you take those subjective opinions and you throw them into the mix of my award fee and my award fee score goes down. And I'm sitting there saying wait a minute, I did everything that you asked me to do in an objective environment of performance based and you throw this subjective stuff in there and I can't counteract your subjective evaluation. But in a performance based totally subjective evaluation I can take and grade you. And Jay Honeycut and the Shuttle Processing Contract, gave Lockheed martin a hundred percent one time award fee score. And that sent ripples through government, NASA, because we had never given a one hundred percent

award fee score to any contractor in the history. And it also sent ripples through industry saying wait a minute we do the same kind of things so why don't we get a hundred percent award fee? And we we deliberated a long time before we made the recommendation to the award fee board for that hundred. And so I have a lot of perspective on what the government should be doing and what the industry should be doing and like you say that debate is still a debate.

**Dr. Butler:** And it is a crucial one here

**Mr. Tharpe:** It is a crucial one here, but because of space presence and how much it means to America, Industry wants to be a part of space. It is a high profile. It is the high road of any any industry that you can be a part of. And if you can be a part of it, then you have done well for your company. And like I say, it is not the high dollar of profit margin that industry looks at. It is the idea that I want to be a part of it because it is important for America and so therefore you want to be a part of it. Its like when you go off and tell somebody, I work for NASA. Well everybody has that brand of NASA, Apollo, high tech, let me shake your hand.

**Dr. Butler:** Hm. Hm.

**Mr. Tharpe:** And so Industry wants the same kind of thing, you know. Boeing wants to be known for the International Space Station, that hardware that their the integrator of, their provider of software, their provider of some of the elements that was built. You know, here we have hardware that are thousands of miles apart, have never seen each other, they never were mated together on the ground and all of the parts fit together, and they fit together, 240 miles up in orbit. Amazing, I mean that is truly amazing and so you want to be associated with it. And so if you step back and say well I've got a highly competent company like a Boeing, a Lockheed Martin, a JPL team, If I have those teams, let me do what they do best and let me do what I do

best and it takes both industry and government working together to ensure that we have a successful space program.

**Dr. Butler:** Some would argue that in order for the civil service to do what they do best, that in order for them to be the truly informed customer that they too need to have some hands on experience. That uh you don't really know, this this is part of the design engineer field engineer debate. The design engineer may know how to design, but it's the field engineer that knows how it works. Uh and the feedback from the field engineer to the design engineer is what enables the design engineer to design better. And some have argued, for instance tip talone makes the argument that we need to have someone with hands on experience in order to really be able to train the the contractors who who paly an equally important role. He's not saying we don't need to have the contractors. We need to have the touchy feely in order to be able to do the design uh at the level that we do it best.

**Mr. Tharpe:** Well, I've got a lot of respect for Tip and I understand where he's coming from and that's what makes this center a unique center because this Center for Apollo it had a huge design component. When your designing a huge vehicle assembly building and your designing a launch pad and your designing a crawler transporter and a mobile launcher or a launch umbilical tower, you look at those things and you have a launch vehicle set of folks, you have a spacecraft set of folks and you have a technical support set of folks and these are government organizations in Apollo Tip was a launch vehicle person. Isn't it ironic that now you have a launch vehicle person who in his early years was launch vehicle, then he was shuttle, he ws always booster or get the payload to orbit and now he's a payload person with the International Space Station. What NASA did in those sixties and seventies, in those sixties and seventies they had a huge design set of smart people; they had a flight element set of flight

people and for shuttle what did they do? They flip flopped them. They said ok you operators, you complained all about those designers, I am now putting you in the design organization and your going to design the right kind of things fir shuttle and shuttle processing. And you designers who think you knew everything your now going to go out and be a operator and your going to see why that stuff in the field, why the field guys complained about the things you designed for them. So KSC has a natural head butting counter culture to each other.

**Dr. Butler:** Which forces the best out of both.

**Mr. Tharpe:** Which was the best thing for what we needed in the eighties and the nineties and today. Because now you had designers who were field folks and field folks who were designers and you had elevated the smarts within NASA. What happened on the industry side. The industry smart people for the designers in the Shuttle world did not transition in the flip flop and the contractors went away. We did not capture the knowledge of those folks at that time. And a lot of the people post Apollo moved out of the area. And so we lost a lot of that. Now industry, under Goldin and I respect him for taking the courage to set up USA because he took the best of the Lockheed Martins, he took the best of the Boeings, the Rockwells, the Rocketdynes, he took all of that and that melded into an industry team that has a corporate memory. They now know more than the NASA and they should. They should be tasked to do the kinds of things to process the orbiter. And where I differ a little bit about you need touchy feely. You need, if you're a NASA person, I need to know that that valve is there, that it is there for this reason and that when it is tested it performs within the specs. Now if we get into a, an interim problem report an IPR condition when we're testing it, you let the technical experts test that thing until it is right and the NASA does not need to be involved in that. Now if it becomes an out of family condition where that valve is not perform the way we contracted to have it

perform, than the NASA needs to be involved. And they need to use their knowledge in to how to manage a problem because they should be managing all kinds of problems and the way you manage a valve problem is no different than the way you manage an organizational problem. If you have project management skills, you can go in and do both of those. And NASA should be able to jump in and do it from that standpoint using the cerebral part than from the touchy feely part. And that's where I get in my debate with the cultures.

**Dr. Butler:** And again I'm picking up a lot of things are coming here. Your talking about projects management that comes out of the Air Force that was really ingrained at Johnson. The opposition comes out of the Army ordinance tradition, the German engineering tradition that comes through the Von Braun organization.

**Mr. Tharpe:** Hm hm. Yep, and Tip was raised under Dr. Gruene, who was a very respected German under the Von Braun team, and I was raised by Dr. Bruins [phonetic] in the computer application world and Mr. Sandler and and so you just have a little different perspective and I believe that NASA because they are the brightest of the bright, and we hire the best that they get touchy feely, they get the expertise, they can develop the skills without having to be out there watching the grass grow in the VAB during a stacking operation. And so its just a difference in concept. One big thing that has changed, I think today NASA must trust that contractor to do what they are contracted to do. And we have seen that trust go way up. In the sixties it was not. It was confrontational. NASA was out there doing certain things, the contractor was doing certain things and then NASA was told we've got a mission contract so you don't do these kinds of things and you let the contractor do it and then NASA was on top of that contractor saying your doing all of that wrong rather than helping the contractor do all of that right. In today's environment we're there together to make sure we do it all right. And let me

tell you there is no doubt from the industry team and from the NASA team that those three orbiters that we have sitting out in the processing facilities today the goal is to whenever they are retired, they're going to be retired in pristine fashion. That the safety of the hardware, the safety of the crew and the safety of that team processing it is paramount. It is number one and that hardware will be just as good in 2015 or 2010 as it will be when we return it to flight next year. And so that trust element has got to stay high for government with industry and the respect from industry to the government. It goes both ways. And that's what you've got to have and Tip have seen that trust. A couple of reasons 1) Good NASA folks have gone to industry, good industry folks have gone to NASA. And the turnover from a corporate memory standpoint is a lot less and people who have been in the space business are in the space business because they love it and they truly appreciate what it has done for America.

**Dr. Butler:** Lets talk about this corporate memory for a little bit.

**Mr. Tharpe:** Ok

**Dr. Butler:** Because I think it is a crucial issue.

**Mr. Tharpe:** yes it is

**Dr. Butler:** uh into understanding uh Kennedy and the Kennedy contractor relationship.

**Mr. Tharpe:** Huh hm.

**Dr. Butler:** If I can summarize and then you tell me where I've gone wrong. It seems to me that in the 1980s with the development of SPC the corporate memory is virtually all NASA and Lockheed as the contractor is the student so to speak.

**Mr. Tharpe:** Hm. Hm.

**Dr. Butler:** That over the time of the SPC contract, Lockheed advances as student, maybe hasn't gotten there yet, but they had advanced to the point where a lot of the corporate memory had transitioned, maybe not necessarily left NASA but also resided in the contractor. And that under the SFOC you had a continuation of that with the exception that NASA does not have now all the corporate memory anymore. They handle the metrics but they don't know the details of what is going on any more. The contractor has added those things. So they still have the management skills but they don't necessarily have the technical skills anymore.

**Mr. Tharpe:** Right.

**Dr. Butler:** And so that's one reason why the trust relationship that you know NASA may still be be the training institution, but they are managing their former doctoral students.

**Mr. Tharpe:** That's an excellent analogy and the way I put it is that the doctoral students are the industry plus those key government, that key government team that are responsible to be part of the thesis that those doctoral students are those doctors are professing. And that NASA has moved up to, they are the department head of the University and that they take and manage all aspects of the program whether it is somebody working on their bachelors degree, somebody working on their master's degree or somebody working on their Ph.D. And they've got to ensure from the head of the department they've got to ensure that we've got a constant stream of bachelor's to master's to Ph.D.'s

**Dr. Butler:** and that the quality of the education, no matter whose doing the teaching

**Mr. Tharpe:** absolutely

**Dr. Butler:** remains the same.

**Mr. Tharpe:** absolutely and that's what you've got to establish because if you don't have that and we're going to do exploration, the exploration is not going to happen in the next eight years. The exploration is going to happen in the next ten to twenty years. The SFOC is going to go away and a new generation of booster is going to come in and it may not be a new generation of booster's that is controlled by NASA like it always has been in the past. It could be a booster that is controlled by the military. Or it could be a booster that is controlled by Europeans. So NASA needs to step back and develop what this architecture is going to be to accomplish a vision that is going to go for the next forty years. So it is, and its hard, because everybody wants to be the touchy feely guy. Let them design that hardware, they know how to do that. Let them design it and let NASA take that step back and run that whole thing and ensure that we have a knowledge management system. They don't have to be down here doing the interview and talking to those experts, but they have a product that is given to them that says this is the best your going to get from an interview of that person and I have captured all of their knowledge. And if one of them says, I have just read this and I know Tip Talone and I know that this is not right and they can drill down and say Dr. Butler I've talked to Tip and you misrepresented him.

**Dr. Butler:** And I probably have too.

**Mr. Tharpe:** Well, but I mean that's just an analogy that I'm talking about that if we get into a valve problem and we've got an IPR and that the NASA person is sitting over here and if the NASA person wants to put their fingers in there and try and find out. They may realize, wait a minute, this stuff is way over my head. Let the industry team do what they said and let them dispo that problem let me read it then and then I take and go in and ask my

questions before the final disposition. So that way then I know I've got a good valve. That way then I know that Dr. Butler has captured the right thing about Tip Talone. So I trust you in doing what we've asked you to go do

**Dr. Butler:** Hm hm.

**Mr. Tharpe:** And that's where I think NASA needs to elevate itself and I think Shawn O'Keefe the new NASA administrator, he's not an engineer, but he is a process oriented person and he can take and say, I have no problems stepping back and we should step back and we should let Industry do what industry needs to do and we should take and devise a scheme that develops a strategy that gets us into an exploration type environment with fifteen, sixteen billion dollars a year. I don't need an extra billion dollars a year, I can do it in my wisdom of a couple hundred more million a year for the next five to six years. And let me devise that scheme and I trust industry to give me the best product to get us there. And that's where when I start to look at this where are we going and how do we get there and we need to have folks who are touchy feely, sometimes I feel they want to get too low a level and to get too touchy feely and they can get that same respect and that same understanding at one step higher or one step removed. And you know I can see I know the independent assessment group, they're struggling on how can I interject myself in to this processing machine that's been going on. They don't want me here but I need to do an independent assessment. If I look at the new F&MA world, how do they put themselves in the right place to make sure that industry has done what they told me they did. Very tough. It is tough, but I believe the trust word is the balance. The contractor has the knowledge and NASA has the trust and respect for each other on both sides and that way then we're going to have a successful return to flight, we're going to finish the international Space Station, go back to the moon and we're going to go on to Mars and then humans are

headed for the cosmos. That's the way you got to look at it. Each one has a role and the role is defined a little bit different.

**Dr. Butler:** Sounds good. Are there any other issues in the 1990s that you see playing a defining role in the development of Kennedy.

**Mr. Tharpe:** Well lets see we uh, uh. Yes, I think another stroke of change was we tried in the 90s to look at the base, at the contract structure and with the SPC and the Base Ops Contract and the Cargo Processing Contract those are the big contracts that started in the '80s and went into the '90s. The uh, we had a large involvement with the range, with the eastern test range and they supported a lot of our missions and the support since we were processing some DOD classified payloads, the DOD on the range was very interested in what we did on the Cape side and we started to have infrastructure breakdowns on the Cape side and NASA was saying the range needs to upgrade the Cape systems and that the relationship contractually needs to be smoothed out. And one of the thins that was done was we narrowed the gap of the Banana river with our contractor Base Ops contractor and the Range Contractor where we had the Joint Base Ops Support Contractor. That to me, when I looked at that was something that was overdue and if we're going to have a space port, a true space port then we needed to take and come up with similar goals, similar contracts to take and keep the interfaces down. And that's another one, I guarantee you if you were to talk to the senior management of the Base Ops contract, they're not going to tell you much on the NASA side about that new Range Ops control center. In the old days, we put, in Apollo and early Shuttle we put a NASA person inside the range Opes control center. We had the battle ship man their station so that we knew what the range was doing and be sure that they would take and be supporting our activities. So we trust the range, the range trusts NASA and the Air Force, the government on both the Air Force and

the NASA side has gotten a much much better relationship and that makes for a better industry. And the contractors, we work very close, close with the base ops support contractor, SGS and we team on a lot of things and we take and work out some things. So to me that was another big one and it was glad Roy Bridges pulled that off and narrowed the Banana River. The other thing was the visitors' Center. The things that we're doing with Delaware North at the Visitors Center. NASA became very innovative in setting out a contract that had the company put money into the infrastructure to make it better and then they shared in a higher revenue. So I mean those are creative kind of things that NASA needs to be bold and go off and do. And it will all work out, it will all work out. That was the thing of the nineties and I'm proud of the NASA family, I'm proud to be a part of a NASA retiree and I may finish my Boeing career and come back as a NASA person, I don't know. Its been exciting

**Dr. Butler:** There have been people that have made that circle.

**Mr. Tharpe:** It is, its exciting and I'm very proud to have worn the Boeing brand and I'm proud to have been a NASA employee. So, that's my story and I'm sticking to it.

**Dr. Butler:** Very good. Well we thank you for your time. You've you've certainly helped us out a lot especially with some of those examples of innovations in Shuttle processing technology that we can toss into the book now that we didn't really have a grasp of before.

**Mr. Tharpe:** Good. Ok.

**Dr. Butler:** And then you provide some great examples in terms of the administrative transition that that uh enable us to better state the debate that went on here.

**Mr. Tharpe:** (laughter) Ok, Thanks.