

Mr. Roy Bridges'
Oral History
Kennedy Space Center
Held on July 17, 2001

Interviewers: Dr. Henry Dethloff,

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1 Henry Dethloff: Today is July 17th, Tuesday. We're in the offices of Roy Bridges, Director of
2 Kennedy Space Center. At this point we're conducting an Oral History, an interview, with Mr.
3 Bridges. Roy to start the interview would you please give us your full name, date and place of birth,
4 and then maybe some information about your early childhood, upbringing and experiences, if you
5 will sir.

6
7 Roy Bridges: OK. My name is Roy Dubard Bridges, Jr. The middle name is d-u-b-a-r-d. I was born
8 in Atlanta, Georgia. I actually claim Gainesville, Georgia as my hometown, which is where I
9 graduated from high school. My father was basically in the retail business, primarily hardware and
10 building supplies. My mother was a nurse. I had two sisters younger than me, one by 2½ years,
11 one by 7 years. Basically, my father contracted a chronic lung disease from living in the city.
12 Apparently he was allergic to coal dust. They had a lot of that in Atlanta in those days. So early in
13 my childhood we moved to a family farm in Jackson County Georgia, which is near Gainesville,
14 between Gainesville and Jefferson on the road that goes to Athens. It's about a 300-acre farm. And
15 so I actually started the third grade there.

16
17 Dethloff: Raising what, may I ask?

18
19 Bridges: We had a small dairy and you know all of the feed stock that goes with that. Actually
20 during my second grade, I lived with my grandparents in south Georgia where my mother grew up.
21 My grandfather ran a subsistence 80-acre farm so he had all he needed to live on. But of course
22 never made any money.

23

1 Dethloff: Incidentally, what was your date of birth?

2

3 Bridges: OK. I was born in 19 July 1943. And actually the year I lived with my grandparents
4 they had no electricity. So . . .

5

6 Dethloff: Well that was a pioneering experience.

7

8 Bridges: . . . second grade I went through the year with a kerosene lantern for doing homework.

9

10 Dethloff: You and Abraham Lincoln.

11

12 Bridges: Yeah. Right. Right. Well you know the Rural Electric Administration (REA) hadn't
13 quite gotten there. They got there about a year later.

14

15 Dethloff: My wife grew up without electricity for the first few, a number of years of her life in
16 Louisiana.

17

18 Bridges: Well, the bottom line I was poor, living on the farm. And eventually, because of a long
19 drought, we pretty much gave it up and my dad went to town again. He had recovered from his
20 illness.

21

22 Dethloff: I was wondering how that came out.

23

1 Bridges: So he went back to work in town. We moved to Gainesville. I went to high school
2 there. Basically I was always interested in Science in school. My dad had gotten me a chemistry
3 set and I probably got every doo-dad that goes with it. I had an uncle who was an engineer for
4 Hamilton-Standard working on the B-58. We went to visit them once and that seemed kind of
5 exciting but I was probably headed off to be a Chemical Engineer probably working in the chemical
6 industry, textile industry, or something like that. I had an application in to Georgia Tech. and in fact
7 had been accepted by Georgia Tech. and had paid for a dorm room deposit. But I had also read
8 some articles on the new Air Force Academy in Colorado, which of course the first class was 1959,
9 the first graduating class. And there were some articles about it in National Geographic. And I
10 remember as a Sophomore in high school I came in after reading that article and told my dad that I
11 thought this was really what I wanted to do. He kind of chuckled and said, "Well there's a lot more
12 to it than just wanting to go there. You have to get a Congressional Appointment and you have to
13 have top grades, a lot of extra-curricular activities, etc." And so I tried to meet all of those
14 requirements. And my dad used to find out any time our Congressman would be coming to town
15 and he would drop me off at the hotel and say, "Well go in and knock on his door and let him know
16 what you want to do." So I used to knock on the door and say, "Congressman Landrum, remember
17 me? I'm the kid that wants to go to the Air Force Academy."

18
19 Dethloff: Well I'll be. That's great.

20
21 Bridges: And sure enough I got a registered letter I had to pick up at the Post Office. I drove up
22 there and picked it up and opened it and it said that I'd been accepted into the class of 1965. Of

1 course reporting in June of 1961 right after I graduated from high school. So my big adventure got
2 off to a good start.

3
4 Dethloff: It sure did. That's amazing.

5
6 Bridges: And of course as you all know, Shepard had made his flight in May of 1961 just before
7 my graduation from high school. So in going through the Academy all during those years we were
8 flying Mercury, Gemini, and talking about going to the moon within a decade. Aviation was in a
9 golden age of X-airplanes and things like that.

10
11 Dethloff: Did you have any sensation of Sputnik or the Organization of NASA?

12
13 Bridges: Oh yeah. I remember the day Sputnik went up as clear as day. I was riding in my
14 folk's '54 Ford Custom. Sitting in the front seat going to visit relatives in Atlanta and the radio came
15 on with this special broadcast that the Russians had orbited a satellite. And I felt a little chill kind of
16 go up my back because I thought wow this is an exciting time to be alive. A lot of new things are
17 going to happen now.

18
19 Dethloff: We started building bomb shelters in Macadus, Louisiana where I was incidentally. So
20 that was a moving moment. And NASA, when NASA was organized did that hit you at all?

21
22 Bridges: You know the actual hoopla that went with the organizing didn't really hit me. But of
23 course all the space activity of getting our first satellite into orbit, the Mercury Program that kicked

1 off, and picking the first astronauts. And all of the things in between I did try to stay up with them as
2 best I could. Of course going to the Academy was a full-time job.

3

4 Dethloff: Had you any thoughts about being an astronaut in those earlier times?

5

6 Bridges: Well I thought wouldn't that be exciting to kind of be on the cutting edge of this. And of
7 course being at the Academy I knew that I was kind of destined to go to pilot training. And of course
8 that was the first step in a route of becoming an astronaut. So, yes, I was very intrigued by it and in
9 fact I got into a program at the Academy called a "Cooperative Astronautics Masters Degree"
10 Program with Purdue University. It was a competitive program and if you could get into it they would
11 send you immediately for a Technical Masters Degree in Astronautics to Purdue which you would
12 finish in 9 months and then go immediately to pilot training. So this combined the best of both
13 worlds of getting a good solid technical degree at the Masters level and still being able to go to pilot
14 training. Now normally in the Air Force if you got a Masters Degree you would have to go off and
15 serve a directed duty assignment in engineering for 3 or 4 years before you could go back and do
16 something else like pilot training. And of course you never know how long your good health and
17 eyesight will last. Some other physical problem might come up which would bar you from pilot
18 training. So that was a real barrier to anyone who wanted to be a pilot volunteering to go in and get
19 a technical degree. So this became very important later on because to be an astronaut you needed
20 to be a test pilot. And because of the war in Vietnam and my Technical Masters Degree, I actually
21 got into Test Pilot School early. I was the youngest person to ever go to Test Pilot School (at the
22 time I entered ... there have been younger people since then).

1 Dethloff: Is that right? Well that really worked well. And you were physically at Purdue for
2 those 9 months?

3

4 Bridges: Yeah. We went for both summer sessions and the fall session. And we also
5 transferred 2 Masters courses. So we basically got full course requirements for a Masters Degree in
6 what amounts to really just a half a year. OK.

7

8 Dethloff: Right. Yeah. That's a nice program.

9

10 Bridges: So I was in pilot training by March 1966. Graduated in June (from the AF Academy)
11 and was in pilot training in March. And in between went to Purdue and got a Masters Degree. It
12 almost killed me, but I mean . . .

13

14 Dethloff: I can imagine. Now where were you for pilot's training?

15

16 Bridges: I went to Williams Air Force Base. That was in Mesa Arizona.

17

18 Dethloff: Yeah. OK. I thought that's . . .

19

20 Bridges: It has since closed. But it was probably the best of the pilot training bases. Really a
21 gorgeous place to live.

22

23 Dethloff: Is that near Williams Arizona or . . .

1 Bridges: Well it's actually in Mesa which is just on the east side of Phoenix. You know it's all
2 been kind of absorbed in that megaplex now. Used to be a separate little town there on the east
3 side of Phoenix.

4

5 Dethloff: And when you finished training, got your pilot's license, etc.

6

7 Bridges: Then I went to Advanced Training in the F-100 fighters at Cannon Air Force Base,
8 New Mexico.

9

10 Dethloff: In what year are we in right now?

11

12 Bridges: I graduated from pilot training in March of 1967. And then went to Cannon
13 immediately. Got married the day after graduation. My wife and I went to Cannon. And then
14 finished that school in November and then went to Vietnam.

15

16 Dethloff: I figured you were on your way. That's what I was wondering.

17

18 Bridges: Actually I went to Vietnam right after Christmas. In fact I spent New Year's Eve in the
19 Philippines. So I arrived in Vietnam right after the first of the year in 1968. So I was there during the
20 Tet offensive stationed at Phu Cat Air Base which was near Qui Nhon in the middle part of Vietnam
21 if you're familiar with that country. And I flew a lot of missions. That was a very active year in the
22 war. I flew an awful lot of F-100 missions, both in the fighter squadron and during the middle of the
23 year they had a special operations unit there called "Commando Saber Operations" which is more

1 affectionately known by its nickname or call sign "Misty." All the people that flew in that had a
2 "Misty" call sign. And they flew a 2-seat F-100 and did what we call fast-forward air control in North
3 Vietnam where we looked for missile sites. We also participated in Search and Rescue Missions
4 and did Intelligence work about what the North Vietnamese were bringing down the "trail." And
5 basically we put or controlled fighter strikes. And those missions were very long. They typically
6 averaged 4-6 hours in length, which is very long for a fighter. Lots of refueling. So bottom line is I
7 came out of Vietnam with an awful lot of flying time because of all that. And then I went to Vance Air
8 Force Base in Oklahoma where I taught pilot training in the T-37. And again got an awful lot of
9 flying time. And so I had applied to Test Pilot School before leaving Vietnam which is kind of weird
10 since I'd really only been flying you know out of training for the one year. But I had so much time
11 that I got selected to enter in July of 1970 and graduated from the school at Edwards in July of
12 1971. And actually the school was known by the name of "Aerospace Research Pilot School" and
13 they did a lot of space training at that time. They had a curriculum for getting you ready to go into
14 the Space Program in addition to the aeronautical training.

15
16 Dethloff: Was the orbital vehicle still . . .

17
18 Bridges: No. The Manned Orbital Laboratory had been canceled by then. But they still had
19 elements of the training and they still had some of the simulators and things like that there. Plus
20 they had the rocket powered F-104's that could zoom up to over 100,000 feet. Of course we had to
21 wear pressure suits. So there was a component of kind of getting you ready to fly things like X-15's
22 and lifting bodies and space vehicles.

23

1 Dethloff: And so you're out there is '71. . .

2

3 Bridges: Yeah. July '71 I graduated first in the class and decided to stay at Edwards AFB. First
4 in class you kind of get your pick of assignments, so I decided to stay at Edwards because I thought
5 we were getting ready to develop a lot of new airplanes which is what I really wanted to do.

6

7 Dethloff: You wanted to do that as a test pilot?

8

9 Bridges: Yeah. And so I stayed at Edwards and got to participate in the A-10 development
10 program. I don't know if you're familiar with it.

11

12 Dethloff: I know the name, but I'd have to go research it.

13

14 Bridges: It has the big 30 mm gun. It's the tank killer airplane. So that was really a very
15 interesting program. I was one of the first Air Force test pilots on that program. They had a fly-off
16 between the YA-10 and the YA-9 and then the A-10 won and I stayed on and was Air Force test
17 pilot and the OPS Officer for the test force for the early part of that program. So in total spent about
18 5 years at Edwards and went off to Command and Staff College at Maxwell Air Force Base. And
19 then I had an assignment at the Pentagon where I worked in what used to be known as the Deputy
20 Chief of Staff of Research, Development and Acquisition. There I did what they called PEM Duty,
21 which was Program Element Monitor, and those were really the Headquarters Staff Officers for
22 Acquisition Programs. And I worked on the F-15 Program and the A-10 Program while I was there

1 and was in fact in charge of the A-10 Program at the Headquarters level, Staff level. And toward the
2 latter part of that. . .

3

4 Dethloff: Were you still flying much? Or are you kind of getting over that?

5

6 Bridges: Well I flew right up until going to Command and Staff College and then of course you
7 didn't fly at that time in the Pentagon or at Command and Staff so I took a break from flying. But
8 toward the last part of that time the Three-Star General was General Tom Stafford who of course
9 was on Apollo 10. And I got selected in a process unknown to me to be his Special Assistant. And
10 so I got to you know write all of his speeches and travel with him.

11

12 Dethloff: I bet that was quite an adventure.

13

14 Bridges: That was very much an adventure, quite a surprise for me. And after that time came
15 another exciting period. I got assigned to a special unit, a secret unit which was involved in
16 developing the Stealth Fighter. So I spent a lot of time . . .

17

18 Dethloff: Now are you still in DC with that?

19

20 Bridges: No. For that one I was living in Las Vegas, Nevada. It eventually became the F-117.
21 I was there during all the flight control development. I spent a lot of time in the simulators flying all
22 types of profiles developing the flight control system. And before the first flight though I had gotten
23 selected as an astronaut.

1 Dethloff: That's what I want to know. How did that come to be? Were you pushing for that or is
2 that something Stafford just kind of hand-picked you for?

3

4 Bridges: Well you know they didn't have any astronaut selections after the Apollo Program
5 ended. So there was this long drought from the time of Apollo 17 until the Shuttle Program got
6 started. It was kind of depressing because you know I was getting older and older and the Shuttle
7 Program was slipping and slipping. It looked like I was going to be out [of] the window before they
8 would have a selection.

9

10 Dethloff: So you were basically the second selection?

11

12 Bridges: Yeah. I applied for the first one. Went down for an interview at Johnson but did not
13 get selected which was a real disappointment. And as a matter of fact I'd almost decided not . . .

14

15 Dethloff: Who was doing the interview, may I ask?

16

17 Bridges: Well they had, it's a standard program. They bring you down to Johnson Space
18 Center for a week and there's a team of astronauts and directors there at Johnson Space Center.
19 And of course George Abbey was the Director of Flight Crew Operations and he was on the
20 committee. Let's see, I mean the first interview committee I think Vance Brand was on it and John
21 Young and George Abbey. Others I can't recall.

22

23 Dethloff: So then you get on the second group and you're admitted in 1980?

1 Bridges: Yeah. Went down in July of '80 to Houston and I spent 6 years there.

2

3 Dethloff: Where did you all live may I ask?

4

5 Bridges: Clearlake Forest, a little subdivision just on the other side of a little lake there. Just go
6 across the Causeway out towards the bay and it's only a couple of miles from the Space Center.

7

8 Dethloff: Were you flying?

9

10 Bridges: Oh yeah. I was flying from the time I left the Pentagon the whole time up until then
11 and flew the rest of my career until I basically had to go back to the Headquarters again after
12 making General.

13

14 Dethloff: That worked both ways. Did....I don't want to belabor this because we need to get to
15 KSC I know. Any highlights of your astronaut training experiences before your flight I guess?

16

17 Bridges: Well I got to be a CapCom on the first landing on the runway. That was STS-4. First
18 female in space, STS-7, that was Sally Ride. When Sally Ride said, "Hey, this is an E-Ticket ride"
19 she was talking to me as the CapCom. And you know my time there was you might say remarkable.
20 It was very exciting, the early days of the Shuttle Program. Of course the flight rate was very low
21 but all the missions were I thought very, very significant, very exciting. It was just great to be a part
22 of that and it's a great team down there at Johnson. I thoroughly enjoyed the entire time. All of my
23 extra duty jobs, which I don't know if it's all that important for you to go over right here, but it led up

1 to getting selected to fly as the first pilot in my class. Mainly because I wasn't the first one selected
2 to fly but I was the first one to actually fly. Because another astronaut who had been assigned to
3 this particular mission which turned out to be the Spacelab II mission, STS-51F, had a schedule
4 conflict....had gotten too close to the previous mission he was flying. So they needed a
5 replacement. And because of some of the jobs that I had been doing I was very familiar with all the
6 procedures and the software and things like that. So I was able to step right into training at kind of a
7 late date. So I got to fly this mission. It was 8 days. It was a Scientific Mission; we did astronomy,
8 all different types of telescopes. It was characterized by a launch abort on July the 12th at T-2.8
9 seconds and then when we actually launched on July the 29th. We were the only Shuttle in the
10 history of the Program to lose an engine going to orbit. So right after the "Press-to-MECO" call and
11 about 5 minutes and 45 seconds into the 8½ minute ascent we lost an engine. And I joke with
12 people and say we missed setting a transatlantic speed record by 30 seconds because if we had
13 lost the engine 30 seconds sooner . . .

14

15 Dethloff: You would've landed.

16

17 Bridges: . . . we would have landed in Spain. And been the fastest people to go from Florida to
18 Spain. It would've taken. . .

19

20 Dethloff: That might have been a record to have.

21

22 Bridges: it would have been 37 minutes. I think I'd rather have 8 days in space.

23

1 Dethloff: Has that happened?

2

3 Bridges: No. It's the only engine that we've lost to date.

4

5 Dethloff: And you made it into orbit, and any special . . .

6

7 Bridges: There is a documentary on this. It was a PBS Front-line program that came out in
8 1986, late '86, where they went over all the, in fact they interviewed me on camera, and all the other
9 people that were involved with this particular mission. It was very well done and really played up on
10 you know how . . .

11

12 Dethloff: Who made the final call on going for it or landing? I don't know if that's the call that
13 was really made.

14

15 Bridges: Well it was pretty automatic. I mean once you cross these different boundaries . . .

16

17 Dethloff: You go?

18

19 Bridges: Yeah. But the Flight Control Team makes the call. They call abort to orbit.

20

21 Dethloff: Who was the Director there?

22

1 Bridges: Cleon Lacefield was the Flight Director. And actually we almost lost the second
2 engine for the same problem so that would have been a bad day.

3

4 Dethloff: That would not have been good. That's quite a story.

5

6 Bridges: So that was quite an exciting mission.

7

8 Dethloff: I can imagine.

9

10 Bridges: The rest of the mission went fairly well.

11

12 Dethloff: What did your wife think about all of this?

13

14 Bridges: Well of course she was a little anxious for a moment, but my wife has always been
15 very supportive of my particular career goals and been very supportive of the Space Program and
16 Aviation Research and has been a real team player with me.

17

18 Dethloff: Yeah. You need that. Especially an astronaut would need that I think. So, OK, you're
19 back from Space. . .

20

21 Bridges: Yeah. And of course after that I did some other things for a while but of course the
22 Challenger accident kept me from having my second flight. I was supposed to fly the Challenger
23 again in May of '86 on the, what was known as the Centaur Ulysses Mission (STS 61F). It was

1 going to be the first mission with the Centaur to deploy this probe that went around the sun. It had a
2 sister mission that was going to do Galileo Centaur that Dave Walker was Commanding. My
3 Commander was going to be Rick Hauck. These are all veteran crews. This was a very difficult
4 mission with the Centaur, very heavy, carrying liquid oxygen and hydrogen in the payload bay. So a
5 very difficult dump sequence if you had an abort to get all that hydrogen out of there, which you
6 know otherwise would be a bomb on the ground. The essence of it was that this was an ill-
7 conceived payload. Never was well integrated into the Orbiter and after the Challenger accident we
8 basically were able to get the mission of the Centaurs killed as far as a Shuttle upper stage.

9

10 Dethloff: Yeah. That Centaur was a humongous problem up there.

11

12 Bridges: Yeah. It was not. . . it's worked well in the unmanned program but it just was not well
13 suited for the payload bay of the Orbiter because of having to get rid of these cryogenics if you ever
14 had an abort. You know if you land with a payload bay full of hydrogen, you've got a real problem
15 there of how to safe the vehicle.

16

17 Dethloff: Had you had any contacts, well you had, but what was the nature let's say of your
18 contacts? You're involvement with KSC in these years? You spent some time here I understand.

19

20 Bridges: Well actually I only came down here to KSC for the odd trip down to bring somebody
21 else down and of course for my training before launch. And the training is, we came down several
22 times to look at the payload and interface with the people doing the payload tests and also to do the,
23 what we call the Terminal Countdown Demonstration Test, TCDT. And it was always great fun to

1 come down here. You know this is where the real hardware was. There were no simulators here. It
2 was the real thing.

3

4 Dethloff: Yeah. This is real. This is it. OK.

5

6 Bridges: And it's really kind of an awe inspiring place given the scope of the facilities, how big
7 things are. And in fact one of my first duties as an astronaut was to organize the Astronaut
8 Candidates ("ASCANS") orientation trip to KSC. So I got to set up to all the initial visits and then we
9 came down here in 1980 when we first got on board to look around. And it was pretty awesome to
10 come down and see KSC. But I didn't have a tour down here on a support crew. I did other things
11 that were primarily focused on JSC so I didn't have the privilege. It would have been a real privilege
12 to come down and work on that team. So my impressions were KSC is a place where . . .

13

14 Dethloff: Where it happens.

15

16 Bridges: . . . the moment of truth happens and people down here were very good, very
17 serious, very professional, and they could do some really amazing things in terms of facilities and
18 things. And I had a very high regard for the people down here. I thought they did a very, very good
19 job.

20

21 Dethloff: I'm just wondering how your perception changes over time from these early contacts.
22 So then in '86, when are you going to leave the astronauts and when are you going to get to . . .

23

1 Bridges: Well see May of '86 I went back to the Air Force. Was not something I looked to do. I
2 was surprised when they wanted somebody back. I thought they had the wrong person. I tried to
3 get out of it. In essence though, they wanted somebody to come back and be Wing Commander at
4 Edwards to run the Test Wing, which is really a great job. And given that the Challenger accident
5 had you know put a halt to flying for several years, my boss said, "Hey, you know they want you. I
6 got a hundred plus astronauts. No vehicles to fly. No prospects of flying for a couple of years. It's
7 kind of hard to tell them that you're the indispensable person. So how about getting your tail back
8 there and doing what they want." So that's what I did. Actually it was a great job. . .

9

10 Dethloff: I can imagine.

11

12 Bridges: . . . being the boss of the Test Pilot School and all the test programs out there. Of
13 course this was another golden era of test flying.

14

15 Dethloff: What are they running in tests? What are they flying?

16

17 Bridges: Well I mean they just had an awful lot of things going on at the time with lots of the
18 later F-15 tests, F-16 you know later models F-16's and they had B1's in test at that time and other
19 things, other classified programs. So there was an awful lot of missions. In fact we were flying so
20 many missions that, you know this was the Reagan defense build up with all of that hardware was
21 starting to come into the test program. So we had to struggle to find enough test pilots and
22 resources to keep everything going. And I was there until 1989. Then I had an opportunity to go

1 down and be the boss at, let's see, '89, wait a minute. . . losing track here. . . maybe '90 I guess.

2 Nope.

3

4 Dethloff: I can check that out.

5

6 Bridges: No, no, no, no, no. '89. OK. Went down in March of '89 to be the boss of the Eastern

7 Space and Missile Center at Patrick. Which was another really great job because of course the Air

8 Force was getting back into Space after having been forced to get out of running Space [Launch]

9 Programs and putting everything on the Shuttle. Now the policy had changed and if it didn't require

10 human interface then we were going to go back and use expendable launch vehicles. So the Delta,

11 the Atlas, the Titan Programs were all going full speed ahead during that period of time.

12

13 Dethloff: Now was this really your first contact with expendable launch vehicle type operations?

14

15 Bridges: Yeah. Pretty much the first contact.

16

17 Dethloff: And this was your first advent into Patrick and Florida?

18

19 Bridges: Yeah, other than flying down to Patrick when I would come to the Cape.

20

21 Dethloff: Now. Ok, you're there at Patrick. You get there in '89 and Kennedy is right here.

22

23 Bridges: Yeah. Forrest McCartney is the boss up here at Kennedy.

1 Dethloff: Did you have any interaction with him?

2

3 Bridges: Oh yeah. I was the Range Commander, or you know the decision authority for the
4 Range, so I would come up to all the Flight Readiness Reviews to represent the Range and had a
5 number of . . .

6

7 Dethloff: Now the Range again, that's Downrange, the missile . . .

8

9 Bridges: Air Force. Yeah. They own . . .

10

11 Dethloff: Eleuthera, Turks, Bahamas, . . .

12

13 Bridges: Well at the time we only had Ascension [Island] and one other place.

14

15 Dethloff: Grand Bahamas. I don't know. That's all right, I'll check that out.

16

17 Bridges: It'll come to me in a minute. It's one of the little Caribbean Islands there. It starts with
18 an "a".

19

20 Dethloff: Ascension? No we already said that.

21

22 Bridges: I'll think of it in a minute. A senior moment here. It is Antigua.

23

1 {laughter}

2

3 Dethloff: Yeah. I have those too. I think I mentioned anyway that I used to fly that Downrange
4 courier flight back in the old days, dark days I guess.

5

6 Bridges: Yeah. Well I went down to Ascension and Antigua once. Ascension Island is really an
7 interesting place to say the least.

8

9 Dethloff: I remember I got caught on Turks Island one time for 4 or 5 days and that was an
10 adventure too.

11

12 Bridges: Right.

13

14 Dethloff: So McCartney was here and you're at Patrick and what is the relationship, the
15 interface?

16

17 Bridges: Well actually you know NASA it was kind of an interesting relationship with the Range.
18 The astronauts don't like the Range because the Range had their finger on the red-button, which
19 blow up Shuttles if they go off course. And so there's a little bit of a strained relationship because of
20 that. And of course they want to make sure everybody is certified and doing the right thing to
21 protect the astronauts. But . . .

22

1 Dethloff: So you're a good guy to be there and that's probably why you were picked. Because
2 you were an astronaut and you knew what the prerequisites were.

3

4 Bridges: So I used to come up and meet with Bob Sieck and go over any kind of you know
5 problems we would have in supporting their launches. We had a great relationship. I always felt
6 very comfortable in dealing with the people at KSC and with General McCartney up here and they
7 treated me very good.

8

9 Dethloff: We just did an interview with McCartney and it was great.

10

11 Bridges: Yeah.

12

13 Dethloff: He's a good guy. So . . .

14

15 Bridges: Matter of fact, you know the honest truth is I thought previous Commanders at Patrick
16 had not paid enough personal attention to some of the concerns with regard to NASA. And they
17 used to just send low-level people up to the Flight Readiness Reviews and things. I told my people,
18 I said, "Go up and look in the room," and I said, "I'll promise you I'm the lowest paid person in the
19 room as the Commander of the Eastern Space and Missile Center. And so if we want people to
20 think that we're paying attention to what we're doing, maybe we should go up there and understand
21 more of their concerns and be there in case things come up that we need to take action on." And of
22 course this is being right after Challenger and the Return-to-Flight people were still pretty nervous
23 about things. OK.

1 Dethloff: I think that's important too. And when I walked in over here to start exploring KSC
2 history, my first thought was there must be tremendous tension between the Air Force and NASA
3 here. That hasn't borne out at all you know. And that's kind of what I'm probing a little bit, is why
4 hasn't it? And it's because apparently there has been some pretty good interface. Probably
5 because, in fact Air Force personnel involved and headed up NASA, KSC activities and so forth.
6 And you and McCartney would be a good example of that.

7

8 Bridges: Yes. I mean most of the tension between Air Force and NASA has to do with higher
9 level space policy. The policy that said everything was going to be on the Shuttle and the Air Force
10 had to get out of expendable launch vehicles. Obviously there's some bad blood over that decision,
11 which was made at very, very high levels. And of course the Air Force spent a lot of money building
12 a Shuttle launch site on the West Coast that was never used. So there's some justification for some
13 bad feelings there.

14

15 Dethloff: Well and I was interested too I guess and I forget what year now but I attended a big
16 Air Force Conference in Boulder, Colorado on Space Programs and Activities. It was history
17 oriented but it was really interesting. And the Air Force was very clear that they needed a larger role
18 in this business.

19

20 Bridges: Well they have some very important missions that go up. They would like to be more
21 in control of their own destiny. Rather than you know being given a launch opportunity that may or
22 may not meet their needs. OK. And basically having no insurance policy, which was the situation

1 with the Shuttle. OK. So that particular Space policy has been I think well explored. I'm not going
2 to get into it anymore.

3
4 Dethloff: No. I don't want to do that.

5
6 Bridges: It was bad policy. OK. It was a very unwise thing to do to try to think we could do
7 everything on a brand new piece of technology like the Shuttle and do it as fast as we said we were
8 going to do it. This was incredible. OK.

9
10 Dethloff: OK. Yeah. I understand.

11
12 Bridges: And a matter of fact, that's one of the reasons for all the schedule pressure in the
13 program that led to maybe this feeling that we needed to get launches off on time on the Shuttle.
14 And we didn't really have time to mature the technology that kind of laid the foundation for the
15 Challenger mishap.

16
17 Dethloff: The pressures were intense.

18
19 Bridges: That's right. There was a lot of schedule pressure back then.

20
21 Dethloff: So you're at the Flight Test Center at Edwards from '89 until . . .

22

1 Bridges: From '86 to '89. Then I came down here in March of '89 until I got promoted to
2 General in January of 1990. And I got reassigned to Andrews Air Force Base in Systems Command
3 Headquarters running all the test ranges and some other functions for the Command. They actually
4 had kind of a conglomerate of things that I ran. I ran all the civil engineering, supply, manpower,
5 and all the test ranges and the test wings were part of my responsibilities as a One-Star.

6

7 Dethloff: There, now, are you having any involvement with NASA?

8

9 Bridges: Well all the ranges are under my responsibility. And as a matter of fact, one of the
10 jobs I had was to transfer the Space Ranges from the Systems Command to the Space Command.
11 The new Space Command was going to get those Ranges and Patrick Air Force Base, Vandenberg
12 Air Force Base, and the stuff up at Sunnyvale got transferred to . . .

13

14 Dethloff: So there's a lot going on inside the Air Force; they are restructuring.

15

16 Bridges: Um-huh. Then after that I went out to be the boss of the Flight Test Center at Edwards
17 and got promoted to Two-Stars there. Did that I guess from '91 through '93. And then my final
18 assignment in the Air Force was as Director of Requirements at, now the Materiel Command
19 Headquarters, because Systems Command and Logistics Command had combined into Materiel
20 Command and moved the Headquarters to Wright-Patterson. So basically I had all of the program
21 management staff responsibilities at that Command. That's what the Director of Requirements
22 basically did. Interfaced with all the operating commands over how we executed their requirements
23 for new aircraft, munitions, anything that you know we were buying for them.

1 Dethloff: And then you come to Kennedy?
2

3 Bridges: Well then I retired and moved out to Colorado. Took a sabbatical for 9 months.
4

5 Dethloff: OK. So this was not part of . . . all right.
6

7 Bridges: So we just retired for about 9 months and during that time I was of course planning on
8 looking for a job. George Abbey called me up early in that sabbatical and said would I be interested
9 in this job down here. I said, "Well I promised my wife and family a few months off to do some
10 traveling and get reacquainted. And that if he'd call me back in October when I was ready to start
11 looking for a job, if it was still open that I would certainly be interested in talking to him." And it
12 basically took them from October until March to get the machinery going as far as hiring me to do
13 the job.
14

15 Dethloff: Now when Abbey called did he point out any special circumstances, situations,
16 interests that were on his mind, or should I ask?
17

18 Bridges: Well actually I don't think there's anything particularly secret about the call. George
19 had called me several times over the years to see if I was interested in coming back to NASA. And
20 of course he knew me from being in the Astronaut Corps. And the other times he'd called, I had
21 either just moved somewhere in the Air Force or had just been promoted and I really wasn't
22 available. But this time I obviously was available and he said that Jay Honeycutt had some health
23 problems and was looking to retire. And that they were starting to put together a list of people that

1 might be interested in it and he wanted to see if I was interested in being on the list. And you know
2 eventually I got interviewed by Dan Goldin and others at Headquarters and was offered the job.

3

4 Dethloff: I still think that's kind of an interesting transition.

5

6 Bridges: Well I called some people about the job because they had, they were going through
7 this, well you might say rethinking about what NASA does and what the support contractors do. And
8 they had come up with this Space Flight Operations Contract where USA was going to take over a
9 lot more of the routine Shuttle duties. And so I was quite concerned about that and so I talked to a
10 lot of people that were involved in that before actually agreeing to take the job. Forrest McCartney
11 was one. I talked to Bob Sieck and several other people in NASA Headquarters that were, and of
12 course George Abbey. I had several more conversations with George about it with regard to
13 whether or not we thought this was safe and doable.

14

15 Dethloff: Yeah. I felt you know this is a critical moment in NASA history I think.

16

17 Bridges: It really was and I didn't want to come down here and be in charge of a mission
18 impossible; of trying to launch missions and keep them safe with people that would be bailing out
19 because they had philosophical disagreements with doing it. But to make a long story short on this
20 when I talked to Bob Sieck of course who probably launched over 50 Shuttle missions as a the
21 Launch Director . . .

22

23 Dethloff: 52, I think.

1 Bridges: . . . 52, and I have enormous respect for Bob. And Bob said that he thought it could be
2 done and that he and guys had come up with a plan for doing it and he felt it could be done safely.
3 It would involve a cultural change. It would be difficult but he thought we could make it happen. OK.

4

5 Dethloff: OK.

6

7 Bridges: And so after a lot more discussion with other people I decided to take it on. Now the
8 biggest, the biggest problem here at KSC was not the fact that we were doing that and making the
9 cultural change; it basically was about how it had been communicated to the workforce. The
10 workforce had been very surprised by this turn of events. And NASA Headquarters had run an
11 exercise that they call a Zero Base Review, ZBR, that had basically told the people here at KSC that
12 they were not value added and that all their contributions had basically
13 been a waste of money. And that they could let private industry do all this work with a significantly
14 reduced workforce. And as I said, it had been done in a kind of a rough sort of way. And had left
15 the workforce down here somewhat demoralized and not certain that they had any real future in
16 NASA. So that was the biggest problem is -- Why am I here? What is in my future? Why shouldn't
17 I just try to find something else to do?

18

19 Dethloff: And in some respects that's a lot like McCartney apparently walked into. He said you
20 know there really wasn't a problem when he got here in '86 (or whenever it was). But he said there
21 really wasn't anything that needed fixing. People needed to be reassured and their confidence
22 needed to be restored.

23

1 Bridges: Right. And he had a little different problem. It was almost 180 out of what I was doing.
2 McCartney came in here and took a demoralized workforce because they felt to whatever degree . .
3 .

4
5 Dethloff: That they had failed.

6
7 Bridges: . . . that they had failed.

8
9 Dethloff: That's right. Yeah.

10
11 Bridges: OK. And it caused a loss of life and it weighed on everybody very heavily. So he
12 restored their confidence and got us back in space again. But they had done a significant amount of
13 hiring and had basically shored up in all respects. So I think the hiring level, and you can actually
14 check the numbers, but went up to I believe as high as 2800 people.

15
16 Dethloff: Yeah. I think that sounds about right.

17
18 Bridges: When they had the ZBR they were actually down to around 2600 people in '93. They
19 had actually told them after the ZBR that Kennedy Space Center would come down to a number like
20 1127. Now you can imagine how long that would take you to do that without a reduction in force, an
21 actual RIF, which the Organization had gone through after Apollo once before.

22
23 Dethloff: Yeah. I remember that. I got a lot of that from Johnson Space Center.

1 Bridges: Right.

2

3 Dethloff: You know. They went through all of that.

4

5 Bridges: And it devastated the community. In fact Titusville has never recovered. So now they
6 have to go through the ZBR again and you know everybody was kind of waiting for the other shoe to
7 drop. I mean how are we going to get to this 1127? How are we going to do this safely? Was
8 pretty much when I walked in the door. Dan Goldin said, "Go down there and give these people a
9 vision and figure out what we need to do to make this transition and keep things safe."

10

11 Dethloff: Now when you came in, did your perception, your values or whatever, of KSC, your
12 understanding of KSC change markedly after those few months?

13

14 Bridges: No.

15

16 Dethloff: You pretty well knew what your walk would be.

17

18 Bridges: Actually, when I came down here I used to tell people, I said, "Every morning I get up
19 and I look out and say thank God for this job" because I found the job to be exhilarating. I felt that
20 this was a really great team and I certainly had not lost any of my respect for the team and what
21 they were doing. They continue to do a great job with launching Shuttles and expendable launch
22 vehicles and all the other things that the people do down here. And living here in Florida it's you

1 know bright sunny days and how could you, you know it's almost like going to Eden. You know,
2 living on the beach and launching rockets.

3

4 Dethloff: Not bad.

5

6 {laughter}

7

8 Bridges: That's not a bad life so. I was very refreshed and looking forward to the challenge of
9 being the leader down here, of course hoping that I would, my leadership would be accepted by a
10 very good team. So my perception in walking in the door down here was one of just being
11 exhilarated by having an opportunity to be here and work with this team. I actually was very
12 confident that after I got to know what things were really important to the team down here and to the
13 mission that we would be able to come up with a great vision. And that we would be able to turn this
14 corner and you know get the workforce confident in themselves, about their confidence in the future.
15 It's kind of like "a confidence squared" you might say. And so we set about doing that. And of
16 course my idea all along here was not to ride in here on a white horse and you know save the day.
17 What I wanted to do was to say, "Well I want to come in here and work with this team and we want
18 to do this together." And I told Dan that we're looking for a cultural change here and I did not think
19 that could be done overnight. So this is going to take several years to get this done. And at the end
20 of the time, whatever time they allow me to stay here, I wanted to make sure that anyone else could
21 come in here and step in as the leader of the team. And the team would have a great feeling about
22 who they were and where they were going to. And I think we've pretty much achieved that. I think if
23 I step out the door right now that the team does understand that they have something of great value

1 to offer the Agency regardless of what future program that the Agency wants to tie on that needs our
2 particular kind of expertise down here. And we could get into the details of that in a minute.

3

4 Dethloff: Yeah. OK. So the key problem when you came in was really morale

5

6 Bridges: Lack of vision.

7

8 Dethloff: . . . you needed a vision. That times were very misty for NASA and . . .

9

10 Bridges: And how to accommodate this down-sizing. You know going from I guess when I
11 walked in the door we were at, I'm trying to remember now, we were coming down from just less
12 than 2600 in '93. They had already had a couple years of down-sizing and I think we were right
13 around 2000 people when I walked in.

14

15 Dethloff: Yeah. I'm trying to remember.

16

17 Bridges: At the time I came in we were actually had a target of around 1600 in the out-years
18 and they had a budget exercise not long after I got here that took us down to 1422. So Jay
19 Honeycutt had been able to get it built up from this 1127 up to around 1600 and something, I can't
20 remember the exact number, by taking on some duties with regard to final test and integration of the
21 Space Station, Shuttle upgrades, . . .

22

23 Dethloff: Yeah. I guess the Station brought a new injection. OK.

1 Bridges: Right. And had talked them into adding some people for that, or not having to reduce
2 the people given that we would be doing these particular activities. But I found out shortly after I got
3 here that while they gave us the authorizations for the people, the money wasn't in the budget. So
4 all of those first years we did not have the money . . .

5

6 Dethloff: . . . to cover those. . .

7

8 Bridges: . . . to cover those people. So as a matter of fact it was difficult to get this corrected.

9 And this turned out to be one of the hardest jobs that I had to do was convincing NASA

10 Headquarters and Dan of what the minimum level of employment should be given the

11 responsibilities that we were doing at this time. And before we got that done we actually got as low

12 as around 1650 people. This was towards the end of 1999. And I was finally able to convince Dan

13 at that time that we had finished all of our transition activities. We had taken everybody out of

14 Shuttle that we could. We understood now fully how many people it would take us to get this initial

15 work on the Station done. And the expendable launch vehicle program had transferred down here

16 from the Glenn Research Center and Goddard and we had picked up some responsibilities there.

17

18 Dethloff: Did you actually get the employees from Goddard and Glenn to come with that?

19

20 Bridges: We hired a few. You know while we got some positions in terms that we wouldn't have

21 to down-size as much. We were still from . . .

22

23 Dethloff: Under, under.

1 Bridges: . . . '93 until the year 2000 we lost more people than we hired. And so the thing that
2 broke our back and the thing that finally convinced Dan is we, since we did not do a RIF and were
3 not able to have selective down-sizing, it was whoever was retirement eligible and then would take a
4 buy-out. We ended up with a lot of critical skills problems.

5

6 Dethloff: Was this down-sizing pretty pervasive throughout the NASA structure or . . .

7

8 Bridges: Oh yeah.

9

10 Dethloff: . . . were you taking more than your share?

11

12 Bridges: Well all the NASA Centers in the Office of Space Flight were down-sizing. So Marshall
13 was down-sizing. Johnson was down-sizing. But by far, we took the biggest hit in the ZBR.

14

15 Dethloff: Well that's what I'm wondering because everything again focuses, everything ends up
16 here.

17 [End of Part I]

18

19 [Part II]

20 Bridges: Well see they had this philosophy in NASA Headquarters that we would get out of
21 Operations and they regarded Kennedy as just Operations. And so the question was how much can
22 we get out Operations by going to this USA contract, etc. OK.

23

1 Dethloff: OK. All right. OK.

2

3 Bridges: So the real exercise was how do we know that you guys at Kennedy have really gotten
4 down as low as you can go? And as I mentioned one of the problems that hit us were the critical
5 skills problems. And we had basically done after, well in '99 I'd been here a couple of years, we had
6 been through and looked at everything we'd done. Moved people around, reorganized, had a
7 vision, had a strategic plan.

8

9 Dethloff: Yeah. Your road map you were going to take. That was good.

10

11 Bridges: All this stuff was done.

12

13 Dethloff: Yeah. You really did your homework.

14

15 Bridges: And we knew pretty much how many people we needed at that time. And the thing
16 that got us first was critical skills. So we got to the point where in some of our engineering
17 disciplines watching Shuttle we were one deep. So the next person that left in that skill we would be
18 zero. And at that point in time we would not really be able to assure technical oversight over those
19 particular functions. So I started telling this story to my boss, Joe Rothenberg, and others at NASA
20 Headquarters and we worked this very, very hard. And finally in December of 1999 we were able to
21 get the Headquarters to turn around and end the down-sizing and add people here. As I mentioned
22 we got as low as 1650. We were able to get back up to 1835.

23

1 Dethloff: Yeah. I saw that.

2

3 Bridges: So we came down from 2600 to 1650. And then we added back with these critical
4 skills hires in early, really FY-2000, to get us back up to this 1835. So we're very tight here right
5 now. But we are able to get the job done.

6

7 Dethloff: Um. OK.

8

9 Bridges: I'll keep going a little longer on that.

10

11 Dethloff: Yeah. I'm sorry.

12

13 Bridges: What time, when do you run out of time?

14

15 Dethloff: I'm with you. But there are a couple of points, I think this is the essence . . .

16

17 Bridges: I want to talk about the vision statement . . .

18

19 Dethloff: All right. Yeah, because that's really important. OK.

20 Bridges: . . . because really this became, we really had a clue early on that if NASA ever
21 wanted to go to Mars, to develop any other generation of reusable launch vehicle, the people at
22 Kennedy were the only people that had experience in processing this kind of a vehicle, you know
23 within the Government. Now there are design centers at Marshall and Johnson; have great design

1 engineers. But what was the real problem with the first generation reusable launch vehicle? It took
2 too long to go from one flight to another. There was too much maintenance that had to be done and
3 that drove the costs. That restricted the amount of flights per year you could fly on any one vehicle.
4 So if we were going to be successful with another vehicle, we had to take some of these lessons
5 learned, which is embodied in the Kennedy people, and get this into the design cycle for the next
6 generation. So we struggled with this for some time. And we had an off-site, which actually
7 happened in 1998, where we were struggling with this. And I actually went for a jog one morning on
8 the beach in the middle of this off-site and was wrestling with, how do we get over this hump of in a
9 few words in an easy concept convince the people that there is something here for us.

10

11 Dethloff: Yeah.

12

13 Bridges: It was more conceptual kind of thinking. We couldn't just quite get over the hump
14 there. We had all of the intellectual aspects of it. But we had not been able to pull it together in a
15 concept. So I got this revelation and went in and told people it was a divine revelation because I
16 wasn't smart enough to come up with it on my own.

17

18 {laughter}

19

20 Bridges: And the concept was is that we would be become a Spaceport Technology Center.
21 And the thought was that if future reusable launch vehicles could operate from other Spaceports
22 than just Kennedy, you know they don't have to be located on the water. At the time of course we
23 were playing around with a single stage to orbit vehicle. The X-33 was the demonstrator for that.

1 And the Venture Star is supposed to be the follow-on. So the thought is, some day that technology
2 will come to fruition. It didn't with the X-33. But the concept was there that, well theoretically if you
3 don't drop any stages you could launch from an interior launch site. And the thought was though
4 that we would have to, somebody has to have the technology to build a launch site with all the right
5 elements that can keep the costs down and could be very efficient at turning a vehicle. And we
6 were actually doing that on the X-33. We built all the umbilicals that connects the vehicle to the
7 launch stand, you know for fueling and testing. And a lot of other equipment I won't go into right
8 now. But this is really you know our forte down here.

9

10 Dethloff: That this is the launch technology is something unique.

11

12 Bridges: Right. It takes a vehicle and integrates it with whatever facilities that you have to have
13 at the launch site. And so the thought was, well let's assume that fifty years from now this
14 technology will be here and you will have space vehicles not only going back to the Moon and Mars,
15 but you'll also maybe be using them for domestic transportation. Much the same thought as my
16 flight you know where the engine went out and we were 37 minutes to Spain from Florida. OK.

17

18 Dethloff: OK. Yeah.

19

20 Bridges: Or less than an hour to Australia from Florida.

21

22 Dethloff: OK.

23

1 Bridges: So let's consider that well maybe Florida is still the intergalactic hub. OK. But you
2 have many Spaceports and so the technology customers are spread all around the domestic United
3 States and perhaps in friendly foreign countries. OK. And so we would be much like Langley is for
4 the aviation industry, you know serving Boeing, and providing technology for the second, third,
5 fourth generation vehicles and the Spaceports that go with them. OK. And it removes us from a
6 geographic point of view of just having to defend this launch site.

7

8 Dethloff: Yeah.

9

10 Bridges: The way we have customers that wherever Spaceports are . . .

11

12 Dethloff: You're defending the technology.

13

14 Bridges: We're technology focused.

15

16 Dethloff: Yeah.

17

18 Bridges: And we take the operational experience we have and we leverage that into a
19 technology development mission. And as we look back into our past, I mean the people here
20 developed the technology that went into this Spaceport. We were working on the X-33, X-34
21 programs. Had our hand in all of these for the same reason. And the things that our customers
22 valued was this experience of how to handle flight hardware and to integrate it, test it, and get it
23 launched.

1 Dethloff: One thing we picked up in almost all of the interviews we've gotten, Straiton I guess,
2 I'm trying to think, Sieck maybe, is the idea that when we got these payloads in or the launch
3 vehicles they weren't ready for flight. We had to make them ready.

4
5 Bridges: They were all a disaster.

6
7 Dethloff: That's right. And that's what we could do, is get those things ready, fix them, and get
8 them ready for flight.

9
10 Bridges: And our people down here are very expert at that as well as when you're coming up
11 with a design for a launch vehicle what type of ground facilities are you going to design. And
12 working on some of the technology problems with that design to make them more user friendly, less
13 maintenance intensive, and cheaper to use. OK.

14
15 Dethloff: That's interesting. Well that's good. That kind of puts the . . .

16
17 Bridges: So anyway, this was a hard sell. And I think the hard sell was and is that people still
18 making this cultural change wonder will the Headquarters really buy this. Will they give us the
19 mission statement? Well, they did. We have the new mission statement now. Our mission
20 statement used to just say, "Launch." It now says, "Space Launch Operations and Spaceport and
21 Range Technologies." Now this Range Technologies was a little bit of a surprise, but there was a
22 Whitehouse-led study, Interagency Working Group, that did a study of Space Launch Ranges. How
23 they should be managed and how they should be upgraded to support Space Launch. So out of

1 that study came a recommendation that some Center in either the Air Force or NASA should be a
2 lead center of excellence for range technology. Because nobody was working on how to upgrade
3 the Ranges to get them beyond the current state-of-the-art and invest in some technology that could
4 increase the through put, cut the costs on the Ranges. And right now, basically a Range can only
5 do one space launch operation. Then it takes them 48 hours to turn around. Now it turns out that
6 about 24 of that is needing a second shift crew. But it still was taking them at least a day even with
7 a second shift crew . . .

8
9 Dethloff: To get ready for another project.

10
11 Bridges: . . . to turn around. Rather than say being able to flick a switch and turn around from
12 one ops to another in an hour or two or less. So the thought is, who's going to invest in the
13 technology anyway? This Interagency Working Group came out with its recommendation that
14 Kennedy should be recognized as the Center of Excellence. And we had actually already kicked off
15 as part of our vision statement a road map of some investments in Range technology because we
16 recognized that this would be a component of a Spaceport Technology Center, was the Range
17 interface. And so it was actually our strategic planning in getting our foot in the door of being
18 recognized as the people to go do this.

19 Dethloff: Everything I see, that road map and your implementation plan really set you up for
20 being ready.

21
22 Bridges: Well, the strategic planning Dan Goldin told us to come down and do to get the people
23 over this transition actually led into everything else that's going on down here right now. And the

1 people have basically internalized this plan and now they're out there creating their own
2 opportunities, which I knew they would be able to do. There's a lot of very smart people down here.
3 They have a lot of passion about what they do. And if you can just get them convinced that they're
4 on the right track, they will just go off and make the future happen. OK.

5

6 Dethloff: Right.

7

8 Bridges: Now one other thing that we decided to do down here that is kind of significant is we
9 were looking. . . When I came down here the Air Force and NASA had something they called a
10 Partnership Council where Dan Goldin and the Head of the Air Force Space Command got together
11 every 6 months or so. And they had asked us to look for ways that we could cooperate better on
12 running the Base. Now NASA and the Air Force had had a system of what I call "tit for tat" things
13 we did for each other here in running the Spaceport, Cape Canaveral Air Force Station and
14 Kennedy. So for example NASA did a lot of the fuel support, provided that for the Air Force. The
15 Air Force provided us photography support and a lot of other things like that. But we basically had
16 our own Fire Departments, Police Departments, and a lot of other things that we did separately from
17 each other as two completely independent sites. And so people were looking at little things we
18 could do and they were doing things like well why couldn't we use the same guns in our Security
19 Police and only have to keep up one model of gun. Well there were a lot of arguments going on
20 about little things like that. NASA liked this kind of gun. The Air Force liked that kind of gun. And I
21 met with the Air Force Commander and I said, "You know . . .

22

23 Dethloff: Who was that?

1 Bridges: General Starbuck.

2

3 Dethloff: OK.

4

5 Bridges: Randy Starbuck. And I said, "Randy, it is going to take us an awful lot of energy to
6 work through all these arguments that our people have about why they would rather do things the
7 way they're doing it instead of the way you know the other person is doing it. And if you look at the
8 savings in this, our people have told us there's really no savings. Even if we agreed on every point."
9 And I said, "What if we got past all these arguments by just agreeing to run our Base Operations
10 jointly? You know it's all contracted out anyway, why don't we look for the next contract opportunity,
11 which is coming up for us at NASA, and we would jointly procure our Base Operations services." So
12 we had some people go off and do a savings estimate and they estimated we could save over 30%.
13 So we put together a joint team to go off and do this, which turned out to be the J-BOSC, Joint Base
14 Operations Support Contract, and also to come up with an innovative way of managing it, to
15 manage it jointly. Don't go back and manage it individually and separately, that is continue to have
16 two Police Departments, two Fire Departments. But actually just go off and manage it jointly and
17 have one Fire Department, one Police Department and try to merge as many of these activities as
18 we possibly could, because that's how we could get the most savings. So those two things kind of
19 went hand in hand in order to generate the savings. So we were successful in doing this. It was
20 very innovative. We got a Vice President Gore Hammer Award for doing this and NASA saved.
21 The savings estimates came true for us.

22

1 Dethloff: And it seems like I saw that there were 40 Civil Service positions in the Supervisory
2 alone that went out in one sweep.

3

4 Bridges: Yes. We decided to put into the direct contact with the contractor, a team we call the
5 Joint Performance Management Office. We decided to jointly man that and to only have about 40
6 people in it.

7

8 Dethloff: That's really remarkable. It makes good sense. You did not run into a lot . . .

9

10 Bridges: Oh, there's a huge cultural change and people fought this . . .

11

12 Dethloff: I can imagine.

13

14 Bridges: . . . down internally and they fought it at the functional level for months after it
15 happened; so another huge cultural change. But it's actually been very good at bringing the Air
16 Force and NASA together and over time while . . .

17

18 Dethloff: And what strikes me, excuse me, about this that this really begins to create that Space
19 Launch Community that had always been here but never really been integrated.

20

21 Bridges: Never really jelled.

22

23 Dethloff: You're integrating it.

1 Bridges: Right. And actually our vision our long-term vision is not just to have one Police
2 Department and one Fire Department, and one road crew, but it's to take this to its limit and have a
3 true National Spaceport here.

4

5 Dethloff: That's what I'm, I just sense that that you know makes good sense for you to do what
6 you've done. Yeah.

7

8 Bridges: And we can up with this, Randy and I came up with this vision early on and we actually
9 had some charts showing this migration to this eventual vision. It got a lot of people in the Air Force
10 nervous . . .

11

12 Dethloff: Yeah. I can imagine. And in NASA probably.

13

14 Bridges: . . . and backed away from it. And so we still have a concept out here, called this
15 National Spaceport concept where we would basically create some kind of an organization that
16 would run what now is Kennedy Space Center and Cape Canaveral Air Force Station. And NASA
17 would be a tenant unit here in much the same way the Navy is right now under their Naval
18 Ordinance Test Unit over there. And we would basically put all of the contracts together to be
19 managed, so not only the Base contract, but also the contracts that manage the Range and some of
20 the other Air Force support functions over there. And then we would separate out the Shuttle
21 Program and our Spaceport Technology Program, we would continue to do that . . .

22

23 Dethloff: Right. Within the NASA/KSC domain. Yeah.

1 Bridges: . . . but we would have some other authority that was basically responsible for
2 managing land and leasing land out to different people that want to use it, running the roads, having
3 the police and fire and all the basic services. Basically NASA would give this over to this National
4 Spaceport Authority, whatever its name is going to be. And this would allow us to step away from a
5 lot of this infrastructure that really we don't need. OK.

6
7 Dethloff: Yeah. That's really quite a vision.

8
9 Bridges: Well there would be provisions here for National Security or for some go to Mars
10 mission or exploration program. . .

11
12 Dethloff: And it's here for whatever purposes.

13
14 Bridges: . . . that we could come back and exercise some priority in getting a launch site to do
15 those kind of things. But in the mean time this National Spaceport Authority would you know run
16 this for both DOD, NASA, and commercial interests. OK. And if you could set this up as some kind
17 of a quasi-governmental corporation, say like ComSat, you could also allow it to get some private
18 investment in order to make some of the improvements that would support more of a commercial
19 operation here.

20
21 Dethloff: And also with the prospect for an International involvement in the Space Station,
22 because you're getting that anyway.

23

1 Bridges: Well in essence, now in order to get that we did another thing. We came up with this
2 idea that if we're going to make this transition to more of a Technology Development Center as well
3 as NASA's moving more into commercialization. We worked with the Spaceport Florida Authority
4 and the State of Florida to come up with how can we get the State University system more involved
5 in our operations out here? And we said, look if we have to compete it you know to get university
6 involvement out here, then for all I know it'll go to out-of-state university. And we said we have this
7 need for this replacement for what we call Hangar L, now where we do all of our biotech payload
8 processing for the Spacelab missions and eventually the Station. And we said we need a new one
9 because right now it's in a Korean War era hangar. How about if the State of Florida funds the
10 facility, then you can create an entity with a lead university to co-manage that with NASA. NASA will
11 lease it from you. You will own it. And that's where the idea of the SERPL came up.

12

13 Dethloff: OK. And so that's kind of lead into this broader . . .

14

15 Bridges: Right. And the State of Florida said well OK other than just getting to rub elbows with
16 you and running this, what do we get out of it? And then we said well I'll tell you what we'll do.
17 NASA's headed with the Station being more commercial, the space business is getting more
18 commercial, and we can see over the next 50 years we need to provide greater access out here for
19 commercial entities. So I tell you what we'll do, we've got 420 acres of orange groves out here that
20 Fish and Wildlife really doesn't want to use in their nature preserve, Wildlife Preserve. How about
21 we turn that into a Space Commerce Park? And the SERPL will be the magnet facility in that
22 Commerce Park. And so they came up with the money for a road to open the Center up 24 hours
23 day. And it kind of runs along the boundary of this Commerce Park and into our Visitor's Center and

1 so that will now provide for access for commercial development of this Commerce Park and also 24
2 hour a day public access to our Visitor's Center. Right now at night you know we close off our outer
3 gates and so that's closed down.

4

5 Dethloff: Well that should have a lot of promise.

6

7 Bridges: So this again was part of our vision of how do we make this transition to National
8 Spaceport, more of a technology focus, getting more university involvement in here, and getting
9 more commercial involvement.

10

11 Dethloff: And that's what's happening in well you know the North Carolina, A&M Texas A&M is
12 trying to do somewhat like that. But it makes good sense and it certainly fits your Spaceport . . .

13

14 Bridges: Well this opened up a lot of partnership discussions with the State of Florida. And
15 we've had a tremendous growth in their understanding of the importance of the Space Program to
16 the Florida economy as well as to our National economy. And they have stepped up to this and
17 appropriated thirty million dollars to this over the last 2 sessions.

18

19 Dethloff: And that really complements the transition to private other sectors and so forth that
20 you're doing.

21

1 Bridges: Absolutely. And now in this Commerce Park there may be other things that will come
2 in that will off-load some of our need for new infrastructure out here because if they build it in the
3 Commerce Park they can also bring in commercial business. And the International partners can . . .

4
5 Dethloff: Come in on that line. OK.

6
7 Bridges: . . . come in and have their own facility out here or probably lease facility you know if
8 they would make a commitment over the life of the Station in needing so much space, somebody
9 will probably build something out there for them and lease it to them. OK.

10
11 Dethloff: I'd sure like to talk to you more about this. We don't have time. But the Spaceport
12 Business is becoming an International phenomenon very clearly.

13
14 Bridges: Um-huh.

15
16 Dethloff: One thing that I guess is on my mind, is this changing role of the engineer at KSC and
17 it is relevant to what you're talking about too. The engineer started out as an arsenal producer,
18 developer, manufacturer, basically here at KSC and throughout the NASA system I guess. They
19 increasingly shift into a management role. Then I think from the management role into what might
20 be termed an oversight role. And I noticed the phrase you used maybe in the annual report that the
21 NASA manager provides more of an insight role.

22
23 Bridges: Yes.

1 Dethloff: Could you comment on that?

2

3 Bridges: Well actually if you put together what we call a surveillance plan of our Contractor's
4 activities, there's a wide variety of tools that we use for doing this surveillance to make sure that we
5 have, we're not going to be surprised and have a failure. OK. And you might say at the very most
6 stringent way of doing this is to actually have to have a NASA person, an inspector, there when a
7 particular activity is done. And we have some of those. They're called Government Mandatory
8 Inspection Points and basically the work stops until the Inspector shows up. Now we used to have
9 over 20,000 Government Mandatory Inspection Points in the Shuttle Program that KSC people did.
10 We have reduced that down to around 8,000. Now what we did is we put Government Mandatory
11 Inspection Points at very strategic places where there is no other test that can ascertain whether or
12 not the work has been done properly. And we backed off of those Mandatory Inspection Points for
13 other areas where we have test data that can show that the function has been done appropriately.
14 But nevertheless there are some other activities that are very critical. Even though we have test
15 data, it is still critical so in these we don't require the Contractor to stop, but we sample, we send
16 someone out to look over their shoulder for a sample of those activities to make sure that they are
17 being done well. And then other things you might do that are less intrusive than even that would be
18 looking at Contractor metric data, you know for trend analysis. Of course you have to have them
19 validate the data, but then you assess to see if you have any adverse trends looking at things like
20 incident and close call reports to see if there are things going on or maybe even just simple
21 customer feedback reports. OK. About how well things are working. And all of these things go into
22 this surveillance plan. So we have moved more toward doing insight than 100% oversight which is
23 where we were before.

1 Dethloff: OK. Well that's good and that needed explanation I think. The world of space, I'll try
2 to close this I know you have other things to do. But then we may come back to you later, if you
3 don't mind, some other day.

4

5 Bridges: No problem.

6

7 Dethloff: But the world of space exploration, discovery, development, and so on is changing
8 rapidly. The role of the engineer, NASA's changing in all of this. The Spaceport Concept is an
9 interesting concept. Where does the private sector you think eventually fit into the space future?

10

11 Bridges: Well actually I think you can see the direction we're headed. The Air Force recently
12 did some joint development with Lockheed-Martin and Boeing to come up with the Boeing Delta IV
13 and the Lockheed-Martin Atlas V. And the concept they've used is to lease, for example Lockheed-
14 Martin I'm more familiar with this because it's on KSC land is leasing Launch Complex 41 to do this
15 development of a new launch complex for the Atlas V. And the Air Force tried to draw a fence
16 around that and within that fence give Lockheed-Martin more authority for what they do.

17

18 Dethloff: OK. All right.

19

20 Bridges: Whereas before the Air Force like NASA was more intrusive on everything that went
21 on there. Now they have tried to give Lockheed-Martin more control over things that happen within
22 that fence.

23

1 Dethloff: OK.

2

3 Bridges: Less intrusive surveillance and mandatory inspections. So for example you know
4 Lockheed-Martin will be responsible for their Safety Program and there at least to some degree.
5 OK.

6

7 Dethloff: OK.

8

9 Bridges: And they will, within the fence, they provide more of their services and they have
10 options about where they want to buy those services. They may buy them from our contractor that's
11 resident out here, or they can bring in commercial business to do that if they so choose. It used to
12 be that we mandated a lot more of the services be obtained from Government Sources in the past.
13 But now we've moved to more of a commercial basis where we let them make the decision on what
14 to do. OK. And with USA on the Shuttle we've also done a lot more of that. So USA makes a lot
15 more of the make or buy decisions about whether they want to subcontractor to do it or whether they
16 want to take the work in-house. Does that make a little more sense?

17

18 Dethloff: Yeah. That helps. Yeah, that does.

19

20 Bridges: And for example we've done that here at KSC. When Boeing wanted to bring the
21 trusses for the Space Station down here for final assembly, but they did a lot of the basic structural
22 work at one of their manufacturing plants. But then to put all the electrical [and] fluid lines and

1 instrumentation on it they brought it down here, put it in the Operations and Checkout Building, the
2 O&C Building. And we actually built a fence inside the building . . .

3

4 Dethloff: And said, "That's yours."

5

6 Bridges: . . . and we said, "Inside the fence you're in charge." OK.

7

8 Dethloff: OK. Well that's . . .

9

10 Bridges: Now used to be we'd have Inspectors there making sure they're following all the NASA
11 work processes within the fence, but we regarded within the fence as manufacturing territory. When
12 it is time to come out from behind the fence to go into final test and all then we would impose KSC
13 work rules and things on them that were more stringent and intrusive.

14

15 Dethloff: I would think the complexity of managing a world like this are becoming interesting I
16 guess.

17

18 Bridges: Well we have a lot of good people here. And a lot of people that are willing to try some
19 new things and in general they have worked well. Our customers, Boeing for example with this
20 concept were a little skeptical that we would be able to live up to it. But basically they are pretty
21 happy with how we're doing things.

22

1 Dethloff: Well in the next 5 or 10 years whatever KSC is going to continue to be involved with
2 the Shuttle, Space Station obviously heavily I would expect . . .

3

4 Bridges: And expendable launch vehicles.

5

6 Dethloff: And expendable launch vehicles.

7

8 Bridges: As well as growing this Spaceport and Range Technology business. That is a very
9 important area.

10

11 Dethloff: And would you like to close with any final comments or anything as to where we go
12 from here?

13

14 Bridges: Well my final comment is that I think that the contribution that the KSC has made to
15 the Nation's Space Program over the first 40 years was absolutely crucial. And as you mentioned
16 once here, a lot of times when things show up down here they are not ready to fly. And the
17 environment that we've created here and the expertise that we have at KSC has made a lot of
18 things phenomenally successful. Now the challenges will be for KSC to continue this cultural
19 change to being more of a Technology Center and allow commercial operators to have more say in
20 their destiny. We need to bring this Spaceport and Technology Center to fruition and we need to
21 bring this National Spaceport to fruition if we are really to enable the country to make space all it
22 should be. And I think frankly, I'm very worried at some of the policies that are ongoing right now
23 because I hate to use analogies but, they're not always you know 100% accurate. But if you look at

1 the aviation model, aerospace right now is one of the biggest you know positive balance of trade
2 areas in our economy.

3

4 Dethloff: Right.

5

6 Bridges: And the reason is is because we made tremendous Government technology
7 investments in aviation and in aerospace in the past years. OK. You might say they've benefited
8 from World War I, World War II, and all the conflicts in between including the Cold War. And to
9 some degree space enjoyed some of that investment as well given the race to the moon and some
10 of the needs for National Security to have access to space. If we want space to be a strong
11 component of our balance of trade and National economy, we've got to continue to making Federal
12 investments in long-range R&D. If we don't then companies like Arianespace at Kourou or some of
13 the other foreign competitors maybe even the Russians because of some of the labor rates they
14 have and streamlining that they've done . . .

15

16 Dethloff: It's amazing what they've done.

17

18 Bridges: . . . they will take off some of the highest profit potential from the launch industry. OK.

19 Dethloff: China is sitting there waiting.

20

21 Bridges: China's waiting.

22

23 Dethloff: And Brazil is sitting there waiting apparently.

1 Bridges: Well you can just see. It's kind of like back in the, using another analogy, it's kind of
2 like back when ships were important to a nation's power. You know, at one time England was the
3 predominant power. Well eventually you know the US became a predominant Naval power. But
4 look at our commercial shipping industry.

5

6 Dethloff: Yeah. We're not . . .

7

8 Bridges: It's zero.

9

10 Dethloff: That's right.

11

12 Bridges: You know other than National Security we don't have a single yard that makes
13 commercial ships. And if we're not very careful, if we don't make continued Federal investments in
14 space, we will be going to space from some other . . .

15

16 Dethloff: Facility.

17

18 Bridges: . . . facility. OK. Now I don't know what implications that will have overall for our
19 National economy, but I think nations are going to need to be space-faring nations 50 years from
20 now. And we'd better make investments that will keep us competitive here or it will be a draw
21 instead of a positive component for our economy.

22

23 Dethloff: Boy, it would be. Wouldn't it?

1 Bridges: OK. I think the other final thing is I'd like to say is that I think KSC is well along in its
2 cultural change of moving from being dependent on the latest big program from NASA, such as the
3 Shuttle or Station, into a Center that can support numerous smaller programs. And I think that's
4 very important for us to ride through this period between the Shuttle and the Station and whatever
5 might come next in NASA's exploration program. What we want to do is to preserve an opportunity
6 to have some of this expertise on the Mars team when we decide to go there. And I think that will
7 be crucial for this particular exploration effort, whether it's Mars or going out to one of the libration
8 points for a big scientific research facility or back to the moon, whatever the Nation decides to do.
9 We're going to need some of this technical expertise from the KSC team and some of the culture
10 that they apply to getting these things ready to fly in order to be successful. So we're trying to set the
11 stage to survive these lean years until this next big program comes along.

12

13 Dethloff: And if the technology and expertise isn't there, you don't fly.

14

15 Bridges: Well we'll start over again. Now we did it once before. I guess we can start over. But
16 you know we made a lot of mistakes in those early days. It was very costly. And we had a lot of
17 money to throw at it back in the early days of the space program because of the Cold War. We
18 don't have those same conditions . . .

19

20 Dethloff: Yeah. The stimulus is not the same.

21

1 Bridges: . . . to go to Mars so we desperately need to find a way to keep some of this expertise
2 available and active in terms of staying on the cutting edge of technology. And I think the Spaceport
3 Technology Center idea can keep our people out there on the cutting edge.

4

5 Dethloff: Well that's interesting. It puts things in perspective and it's tough these days I think to
6 get a good perspective. Bridges thank you very much, sir.

7

8 Bridges: OK. My pleasure.

9

10 Dethloff: It's been an outstanding experience. Thank you Brian. We're off.

11

12 Bridges: OK.

13

14

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1

2 **This transcript was edited by Mr. Bridges and his changes were incorporated.**