HUBBLE SPACE TELESCOPE OPERATIONAL ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

RAYMOND VILLARD
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The questions in this transcript were asked during an oral history session with Raymond Villard. The text has been amended for clarification and for publication on this website.

GAINOR: It's October 30th, 2015, and I'm in sunny downtown Space Telescope Science Institute [STScI] with Ray Villard, the News Chief and Public Information Manager for Hubble [Space Telescope] since day one, practically. I'll start off by asking you to talk about when you came here, and what you were doing back in those days preparing for the launch.

VILLARD: You know, the whole Hubble plays out like a movie script. You couldn't write a script better. It plays out like "Perils of Pauline," where you're on the verge of disaster, and then we come back. We're always tied to the railroad tracks, and then we come back. And that began when I started, when I interviewed for the PR [public relations] job at STScI. And I thought the interview went well, and I went home and I said, "Well, you know, I did everything right, I'll just have to see."

And then a few days later, after my interview, the *Challenger* space shuttle exploded, and I was dumbfounded. I went home and looked at the cover of *Time* magazine, and I said, obviously they're not going to launch Hubble. Hubble was scheduled to go on the *Challenger*, the next launch, after the one with the teacher. And I said, "This is going to shut down the space program. And I'm sure there'll be a hiring freeze at STScI." But there wasn't. They kept hiring. But I was totally knocked out for a couple days. But they hired me.

So the question is, what did we do in the years before launch? There were lots of activities trying to pull together, figuring out how we would run a news operation. It was a very small office back then. It was just me, there was a general outreach manager, our secretary, couple other outreach people. But we didn't have hard news to deal with.

GAINOR: Right.

VILLARD: But in those early years, we were talking about Voyager, from '86 up until '90, a lot of the effort and thought was in how are we going to handle the news media? We did prepare some informational materials. But I went to Voyager to see how you handle a big news event, and that was an eye opener. We talked about people fighting over the pictures. I said, "My office is not going to do that. We have a more civilized way to get pictures to the public."

And JPL [Jet Propulsion Laboratory, Pasadena, California] had a very fiery photo manager [Jurrie van der Woude]. He was an ex-Dutch fighter pilot, and those pictures were like he was handing out gold bars at Fort Knox. And he said, "I don't give museums anything. That just throw that all over the dome." But the funniest thing from that Neptune encounter—those fly-bys were like a space Woodstock; it was a big lovefest.

GAINOR: That's right.

VILLARD: Reporters came, and they were dazzled and awed by seeing these fly-by pictures in real time.

GAINOR: And it being in California, there are all sorts of celebrities who showed up.

VILLARD: There were. In fact when I was there, Angie Dickinson showed up at the front door, trying to get in. And you know, I remember going, driving up the night of the close fly-by—

GAINOR: And this was—

VILLARD: '89.

GAINOR: It was—

VILLARD: Voyager.

GAINOR: Neptune?

VILLARD: Neptune. I remember walking through the parking lot and seeing the Moon up in the sky and thinking, "We're going to be looking at a moon three billion miles away," which I did, seeing the first images in real time.

GAINOR: And nobody'd seen the moon Triton that close-up before.

VILLARD: It was electrifying, seducing. And then there was a big reception, celebration in the news area. I was thinking, what did I learn from here that I can apply to Hubble? And then, after

having a few drinks, Dennis Overbye, the reporter for the *New York Times*, came up to me. And he was kind of smirky and a little sarcastic. And I'll quote him, he said, "Ray, I guess you guys on Hubble aren't happy, because you'll never have a news event like this, with Hubble, because Hubble doesn't do fly-bys. It's just going to take pictures of things." He said, "You can't compete with this." [laughs]

And I thought about it. It was new territory, and I'm like, well, I guess he's got a point there; we're not going to have these spikes, but I remember thinking, Hubble's going to be different, and it may be a challenge. Anyway, to make a long story short, we did have that Voyager moment when [Comet] Shoemaker-Levy [9] slammed into Jupiter, and reporters were camped out here. So I did have a JPL moment, and that was fun. That was one of the most exciting weeks I had on the job here.

Before Hubble's launch there were endless meetings with NASA Marshall [Space Flight Center, Huntsville, Alabama], and NASA Goddard [Space Flight Center, Greenbelt, Maryland]. We have always been kind of a stepchild to Goddard. If you know the history of the Institute, the astronomy community lobbied for the Institute not to be at a NASA Center. They wanted it to be on a university campus. They thought it could draw the best of the world's astronomers. The top astronomers are not going to work at a NASA Center.

GAINOR: Right.

VILLARD: It was a different way to do astronomy. It wasn't a PI [principal investigator] driven mission, it was general observatory. So this Institute is, as any observatory building would be, running a telescope. So that decision was made in the 70s, but Goddard was never happy with

that, and of course we had a very, extraordinary, fiery, visionary, powerful director, Riccardo Giacconi, and Riccardo would go rogue. And NASA thought the press office existed just to promote Riccardo. It was tremendous distrust of why we were here, and what we were doing here. But being a good soldier, I tried to hit it off as best as I could with Goddard PR [public relations] folks, but they really watched us. They watched us closely.

And we developed materials to try to explain the kind of science Hubble was going to do, and with Goddard and Marshall in the driver's seat, describing the telescope as a piece of hardware, what it was going to do. So, I was kind of caught in the crossfire between Riccardo and scientists here, often wanting to thumb their nose at NASA for things which they thought NASA was doing that was silly. Then NASA coming down on us, reminding us that we're contractors, and we were told along, especially when it comes to the public outreach and public affairs.

Speaking of reporters, a very accomplished science writer, reporter, Mitch Waldrop, who I think was writing for *Science*. I was at a meeting, and the great godfather of Hubble was John Bahcall.

GAINOR: Right.

VILLARD: And John Bahcall wrote a paper speculating that Hubble would see at high red shift, at great distances. And the feeling was the galaxies, their light may be so spread out that Hubble wouldn't see much of anything. And Waldrop pulled me aside and said, "You know," he says, "You guys, all you, all the materials from NASA say how Hubble is going to see so much farther, and it's going to see so much," he said, "you guys may be hyping that. When and if you do those deep exposures, they may come up empty, and you're going to look silly. You may not be able to

see distant galaxies, based on Bahcall's own predictions, you may not be able to see what you think you're going to see." And then I'm thinking, oh great!

GAINOR: Yeah, I talked to Bob Williams about that a little.

VILLARD: Yeah, because they told him not to do the Hubble Deep Field, the publicity would backfire.

GAINOR: Why don't you walk me through the whole business of releasing images back in 1990, and the reluctance of some people.

VILLARD: Oh yeah, now that program, as I mentioned, Eric Chaisson came up with the idea that there should be an early release program, dubbed ERO [Early Release Observation Program]. Now, it was his idea, but I got clued into this many years earlier. In the 70s, I was working for *Astronomy* magazine. And the newly opened Cerro Tololo Observatory was putting out gorgeous color pictures. They were the best of the time. And my editor, Terry Dickinson said, "You know, they're only taking these pretty pictures because they're doing engineering tests on the telescope." He said, "Once the astronomers get hold of it, you're not going to see anything but black and white pictures of boring-looking targets." Because Chaisson was a scientist, I think he felt he had more credibility with the PIs on different instruments than I would, as just as a PR guy.

The other side of that was that Eric was worried about preserving his relationship with astronomers, so he was a bit deferential, but he did do a presentation, coming up with targets, which he thought that Hubble should look at these targets. Like taking lunar samples just after a

Moon landing. That was the analogy that Eric used. As soon as you open it up, grab a few things.

And at STScI there was a legendary presentation, which I think is in his book, in the auditorium here with PIs all lined up. And it wasn't a hard sell, because he knew there were sensitivities, so he kind of deferred to them, and he said, "We'd like to look at this and that." And these instrument scientists would have nothing to do with it. They thought the public could wait for months. They had no idea of the demand that there would be to see Hubble images early on. And to me it was intimidating. These are all the big, powerful astronomers that built the instruments. But again, in the very narrow perception, all they were worried about was getting scooped. They devoted a big chunk of their career to preparing for this telescope. They were called guaranteed time observers. They had orbits given to them early on. They were going to get the lowest hanging fruit. They were going to publish all kinds of cool stuff. They were going to get famous.

So, as I mentioned, (I keep laughing about it) the core of M15, and other globular clusters are very crowded. They look fuzzy from the ground. Hubble might unveil extraordinary phenomena, and Eric thought that would make a fantastic first-light picture, and that's when Bahcall stood up, wagged his finger, and said, "I will kill you if you look at that." And he was so angry at that.

And this was a different meeting. I was told that at a different meeting, he actually put his fist through an overhead projector. But I was scared. It was so intimidating that these guys didn't really want to have much to do with it. I mentioned that Jim Westphal said, "Yeah, if you publish a picture, you know, it might be on the cover of *Time* magazine, someone's going to take a ruler to it, measure something about a galaxy, or something." So the paranoia was, when you have that much better resolution, people may be able to scoop you as the story.

Apparently when the Io pictures were published during the first Voyager flyby, somebody immediately wrote a paper about shield volcanoes on the Moon. They were not a part of the Voyager team. So astronomers kept invoking that story. And then Bahcall, being as powerful as he was, lobbied with Charlie Pellerin, head of NASA astrophysics, and there was another meeting (I wasn't in that meeting, but I heard about it) but Bahcall and Charlie had rehearsed how to say that any early pictures could wait. There was no rush on getting any early pictures out. That would be done in due course. So that whole program was scuttled by the guaranteed time observers, and Bahcall, politicking with Charlie Pellerin.

Now, that changed when aberration came out. And all of a sudden, they realized that the images were better than what you could see from the ground. Again, you're losing most of the light in the skirt, but about 15 percent of the starlight was in a very narrow cone that was sharper than what you could see from the ground. And then they scrambled to—we were doing a press conference in late July to roll out these pictures, and the reporting on them was, "Well, Hubble, it may be broken, but it still takes cool pictures." So the media and science media, who were always good to us said, "Yeah, Hubble pictures still look good, and they're going to make them better." And then of course back then they said, "Yeah, and we can use image processing to sharpen the pictures even more."

I did explain to you how Len Fisk got ganged up on in the L-2 press conference.

GAINOR: Right.

VILLARD: I know, you've probably got the transcript of that. Because every time he tried to brush off reporters, they kept coming back to him, saying, "Look, you've touted this billion-dollar

observatory as the best thing that's ever been done. We believe you, but we want to see evidence; we want to see the first thing that Hubble looks at. And you're telling us, you don't know what it's going to look at?"

And Fisk said, "I'm sure somebody told me; I don't remember it." But Fisk finally, in real time at the press event, he collapsed and said, "Okay, when we see the photons, you'll see the photons." So they had to scramble to do a live TV event at Goddard the day that the first engineering field came down with an open star cluster that's commonly used as a calibration field. And I remember seeing the funny little tentacles in the first publicly released photo From Hubble of a pair of stars on May 20, 1990. So did astronomer Chris Burrows. And I thought that's kind of weird, but then I thought, well, no, the detectors maybe are funny, there's so much that's got to be tightened up and focused on the telescope, that's going to be kind of fun. But I think Burrows immediately began to recognize that as spherical aberration.

The news media were kind about this release because it was a sharper image than the ground-based that they had compared it to. And although the image was pretty deadly looking (just a few stars) they said, "Oh look at the Hubble! It's sharper than the ground." Then, what was even stranger was that a few weeks later, Duccio Macchetto, on the Faint Object Camera had to put out its own "first light" image. (The initial pictures from the Wide Field Planetary Camera.) So then, the Faint Object Camera, Duccio Macchetto had to put out a picture through ESA [European Space Agency], and that was two stars, and then next to it were two blobs from the ground based, and the two little point stars. Now, what the release didn't say was the light represented only 15 percent of the light from the mirror, and those two little stars had these big skirts of the unfocused light.

In image processing, you can just knock those out. So, Riccardo Giacconi shook his head,

he said, "Oh, this is so dishonest." But ESA touted that the Faint Object Camera was 10 times better, even though they knew they were throwing out 85 percent of the light to get that image. So, this was a little fast and loose.

Those came out before the aberration was announced. There was a meeting in Albuquerque just before the aberration was announced. It was an AAS meeting, and Riccardo gave a very dour description of the situation. Light was being lost from the mirror; he wasn't sure if that could be fully recovered. And it was all explained. And I said, "Wow! This is really serious." And there were a bunch of reporters attending the meeting, but nobody sat in the talk or picked up that presentation.

GAINOR: Is there a copy of it around somewhere?

VILLARD: I doubt it.

GAINOR: Or was it just off the cuff.

VILLARD: It was to an audience in the auditorium. He was giving an update on Hubble Telescope status to his colleagues, but it didn't sound good at all. And I said, "Wow. I hope they can fix it." But that would have been the time for a scoop, if there had been a clever reporter attending that, but it kind of got lost.

GAINOR: Yeah, because the one thing I picked up from the Chaisson book, was that even without the spherical aberration, there's all sorts of problems, like the jitter and various other things.

VILLARD: Oh, well, it was funny, I'll tell you about that. After it launched, it was like watching a patient recovering from an operation. You know, every little funny thing, the media reported on it. It really got silly. But I was taken aback by—there was negative reporting, like the jitter caused by going in and out of Earth's shadow. And actually when it was being deployed it was scary, because remember the software stopped the panels from opening up fully.

GAINOR: Yeah.

VILLARD: And they were ready to go EVA [extravehicular activity] to hand crank the solar panel. After a successful deployment I was kind of annoyed that the media reported every little hiccup. "Hubble was shaking." "Hubble is jittering." These were all little baby growing pains of trying to understand how this would behave up in space. If I remember, the gyros went offline, and then they came back online.

GAINOR: Oh yeah, there were safing events, and things like that.

VILLARD: And there were safing events, and safing is a good thing.

GAINOR: Yes.

VILLARD: But it sounded like the telescope is just kind of messed up. That was annoying. But my favorite anecdote about that is that somebody from the public calls here one evening, and

coincidentally, there was a reception going on in the cafeteria. And their call came into the guard desk, and the guard said, "Well, nobody's here right now; can I help you?"

And he said, "I want to know about the status of Hubble. I've read about all this stuff going on. Can you give me the status of Hubble?" He says, "For example, what about the gyros?"

And the guard paused, and he said, "I don't think they're serving those tonight."

GAINOR: You want to describe to me what happened, how did you find out about the spherical aberration?

VILLARD: Oh yeah.

GAINOR: I think you found out very shortly before it was announced.

VILLARD: Very shortly. I'd heard all the rumors, but Chris Burrows came to me and described it the day before [Edward J.] Weiler went public. But NASA Public Affairs was completely dysfunctional. We had no telecons, no meetings, no attempt at PR damage control. Nothing at all. And Chris warned me this was coming, and then Weiler came out, and laid it all out to the news reporter. He talked about Hubble having an insurance policy, and that's because of Hubble's servicing, they had a back-up camera, WFPC2 [Wide Field Planetary Camera 2], which they could take up there. But there was no thought about the COSTAR [Corrective Optics Space Telescope Axial Replacement]. That came out of an Institute study inaugurated by Giacconi. That came out later. And there's a funny story about that, which I'll come back to.

So then we were flooded. I told you the *New York Times* called and wanted the Institute's

opinion. And I hadn't had any communication with NASA. So I had to make up a quote off the top of my head, and that was one of the scariest moments on the job. And I had to walk the tightrope between, obviously we have to acknowledge this is a serious hit to science, but we have full confidence in NASA, as Weiler expressed that they were going to fix it, thanks to servicing, they were going to come up with a way to repair the telescope.

But we got flooded with negative reporting. But science media were always good to us, and they were very disappointed that Hubble was not living up to expectations, so they didn't want to trash us. But there were other, investigative reporters that were thrown into the mix. And they were very obnoxious. And then you had Senator [Barbara] Mikulski calling Hubble a techno-turkey.

GAINOR: Yeah.

VILLARD: What I found annoying, my friends, who didn't express much interest in my job, all of a sudden called me. They said, "What's going on?" And we were the brunt of all the late-night talk show jokes. I was sort of in denial. I didn't go home ripping my hair out or crying or anything. I fully believed that NASA would figure out something. But it was incredibly embarrassing, what we had touted as the most powerful telescope ever had blurry vision. You could not imagine anything just more humiliating than that.

We and NASA persevered, first in honestly telling the whole story, no spin control. Being a bit self-deprecating about it. We openly acknowledged a mistake. I give great credit to NASA for that. NASA Public Affairs was still catatonic, and Eric Chaisson wrote a scathing memo he sent to NASA in July, saying, "You know, the pictures we're seeing aren't that bad. And we need

to pull together a press conference and release them with positive spin." And he pumped it up as this PR spin control thing, and he did this on his own.

I looked over it; I said, "This sounds like we're in some kind of PR damage control thing." The trouble was that memo was leaked to Sandy Faber (I believe Sandy Faber) at UC Santa Cruz. And she gave it to a reporter from the *San José Mercury*. So she wrote up this big article: "NASA's getting ready to announce pretty pictures with spin control." And they quoted from this horrible memo. And oh, that really got me upset.

One problem I faced on this, early on was astronomers really looking down their nose on the idea of a press operation, and that this was all glamor and glitz, and we'd never get the facts straight, and they really couldn't trust us. And a lot of them had a very arrogant attitude toward the media and the press.

I had given a talk, but a few years later, to the scientific staff, explaining how we prepare what we do, and how we reach our audience. And one of our scientists said to me, "You mean, you pander to the lowest common denominator?" I said, "Yeah, it's the public."

And this gets back to the provincialism of some of the scientists. On the last servicing mission, they were going to pull out WFPC2, which was the real workhorse for a long time, and put in WFPC3. But the people on WFPC2 got extremely jealous, because there were a number of new reports that explained how the COSTAR saved Hubble. And, who's the PI on WFPC2? John Trauger. He was so jealous. So he teamed up with Weiler, and they had this big press event at Kennedy [Space Center, Florida]. WFPC2 billed as " the camera that saved Hubble."

And there's a funny little jealousy and combativeness that they didn't like it that COSTAR grabbed all the attention and they were going to try to kind of counterbalance that. And I thought he was so provincial, and so silly and so childish. Who in the public knows one instrument from

another instrument on a spacecraft? Really? You've seen all the pictures from Cassini? Can you tell me what cameras are on Cassini?

GAINOR: No.

VILLARD: I just look at the pictures, and go, "That's really cool. Look what Cassini did." So there was a pettiness. COSTAR was a very clever idea, and it retrofit the first-generation instruments. But why get jealous? Some NASA person was complaining to me that an article was all about COSTAR and not WFPC2. And I said, "The problem is COSTAR is an interesting story, that you build this Rube Goldberg device. The designer, Jim Crocker, got inspired to build it playing in with a European showerhead, which is a true story. It's the quintessential American Can-Do thing.

When he first described the concept to me, I thought Jim Crocker was crazy. I really thought he went off the deep end. "We have to build these little precise mirrors and put them into the optical path." It essentially was a deployable optical bench placed deep inside the guts of Hubble. And so it's a wonderful success story. It's a much more interesting story than saying you put corrective lenses or some kind of optics on the second-generation instrument. It's like, okay, did that. But the COSTAR has sex appeal. They made a big deal out of it on the last servicing mission, as if anybody really cared. You put out a press release "WFPC2, the camera that saved Hubble."

I'll tell you another anecdote which was very funny. So we photographed Jupiter, and at the time I thought it was great. Now the pictures today with Hubble's new cameras are incredibly better than those WFPC1 pictures. And unlike today, we did not have Photoshop; we didn't do any of the processing up here in the news office. They would get data from the PI, and the photo

lab would expose and print the picture, accordingly.

So I went down to the photo lab. They were printing out pictures of Jupiter, but Jupiter was green. It looked like a melon, and I'm like, "What is this? We can't put this out. The planet looks sick. Jupiter, you know, you can look at it though a telescope with your eye, and you can see it's the wrong color, in the Hubble picture, right? So we'd look pretty stupid putting out a picture that doesn't match the color of Jupiter." And then, being a scientist, Chaisson says, "Well, if that's what the numbers say, that's what the numbers say. If that's what it is, that's what it is." And I'm like, "No. It really looks bad." So then I went to the PI on WFPC1.

GAINOR: [James] Westphal.

VILLARD: Yeah, Westphal. I went to Westphal, and Westphal says, "Ray, print it any color you want." He says, "I'm color blind." He says, "Whatever you think looks good. Just do it." So we got rid of the green Jupiter.

GAINOR: Was that an artifact of maybe some UV or infrared—

VILLARD: I don't know. It came from some filter. Balance just wasn't right. But, if it was a nebula, what do I know what a nebula looks like. But Jupiter, I know what Jupiter looks like.

So, planets, we had Mars (you can look at some of the early releases) a lot of them were pretty crummy.

GAINOR: Saturn?

VILLARD: We had a storm on Saturn; we worked very hard to show how the storm was changing. And the continuous coverage showed that Hubble was at least operating, and people liked the pictures. But I'm telling you, the fall of '93, NASA was in real trouble. This was a few months before the servicing mission. NASA was having trouble with leaky propulsion tanks on the shuttle. I believe they had screwed up an interplanetary probe.

GAINOR: Mars Observer.

VILLARD: Yeah, you know all this. It's the metrics problem?

GAINOR: No, Mars Observer was the one they did the last correction before they went into orbit around Mars, and it just disappears off the screen.

VILLARD: So there's an editorial saying, NASA was warned, if you screw up the Hubble servicing mission, you're really going to change as an agency if you can't get this Hubble problem corrected. So the fall of '93 was really scary. And of course Chaisson had left because Giacconi had left, who was sort of his guardian.

GAINOR: So, do you want to maybe tell me about some of the work you did, or were you elbowed out of the way by NASA when in the aftermath of the servicing mission, and perhaps also the Shoemaker-Levy 9?

VILLARD: Oh, yeah, those were great times. Certainly the early release program, which we did for the servicing mission, that paid off beautifully. And we killed ourselves putting out a bunch of pictures.

GAINOR: And you had Mikulski there, and all that.

VILLARD: She had pictures that she held up, and I wrote little captions she could read off the back. You know, "The trouble with Hubble is over. This is from the Wide Field Planetary Camera." One of the targets was M-100, and it's funny; we were talking about it today.

GAINOR: Yeah.

VILLARD: And one of the scientists here, Bill [William] Sparks, he was our hero scientist; he picked targets. And I said, "You know Bill, we don't have any pre images of M-100, so we can do the Nutrisystem comparison." I said, "Bill got orbits to photograph it, the core and M-100." And I went to his office, and you know, the picture looked good, actually. It looked good. And I looked at him, and I said, "Oh my God, I don't think this is that bad. What's the improvement going to show us?"

GAINOR: These orbits were before the serving mission?

VILLARD: Yeah, yeah. But of course, the new picture was much better.

GAINOR: Did you do the press conference, or did NASA do it?

VILLARD: It was a big press conference. We supported it; we did all the work, but it was a big press conference at the AAS [American Astronomical Society], and it was a love fest. Everything was in late December; the first corrected images were coming down. I stayed late one night in late December 1993 to see the first the picture of M100 come out and everything was crystal clear, and I said, "Oh, we're out of the woods. It really works."

That was an early image, but then we planned to videotape another image coming down. That's that footage with Ed Weiler, and a bunch of people in the room, and the image comes up. That was the one that played on all the TV networks. So that was the money shot. And that replayed many times.

But then we pulled together a big press package for the AAS in January, '94. We didn't have a lot coming out after that event. Scientists were taking data. I really didn't have peer-reviewed science papers with results that I could show to the public yet. There was a time lag before we actually began to get some science results we can show. In the meantime, a researcher came to me with a false-colored picture he took of Titan with Hubble. The fact that you could see anything on Titan was kind of interesting. And he false-colored it, and it looked like one of the Walmart smiley faces. So I thought that was cute, and I said, "We'll put it out as a photo release. 'Hubble photographs Titan and it looks like a smiley face,'" I thought it was cute. David Leckrone exploded. He said we could not put that picture up. People would laugh at Hubble.

Now, Shoemaker-Levy was fun, because I wanted to have an aggressive program of getting the first image out from [Comet] Shoemaker-Levy 9. Almost everybody, including Weiler and Leckrone [did not want] to publicize this because [they were not sure] Hubble was going to see

anything, and people would think Hubble wasn't working if you have nothing to show from the collision. So they were very down on us doing anything.

Fortunately, I was dealing with the big NASA public affairs person, Don [Donald] Savage. We met each other and teamed up and said, "You know, this could be important. We have to be ready. It's like the fire alarm practice, you've just got to be ready to go." And we teamed up and pushed to have a press event here for the release of the first image. But it was a real uphill battle.

GAINOR: And weren't there films of people receiving, sitting at the monitor when the pictures came in?

VILLARD: Well, I'll tell you a funny story. We had a photographer down there in the control room to film the first image. We had an auditorium full of reporters, and Don Savage was hosting that event, while I ran around to see what was going on in the control room. As part of our public affairs planning, we had hooked up a ceiling monitor to look down on the control room, thinking, not just for this event, but for public affairs in general. We could provide a live feed from the control room.

We had a bunch of news video crews here, but we would not let them downstairs. But, to help out one of the crews, the video engineer turned on that little monitor in the PAO office that was connected to the camera, and it was on a little tiny television screen we had in the other room, and he left the monitor on. I had Miles O'Brien from CNN camped out across the hall, giving hourly reports. "Here we are at the Space Telescope Institute waiting for the first impact. We're told, that within an hour after the first impact, we'll see the image—" la, la, la. Then Miles realized this little, tiny monitor was actually a live shot from the control room.

So I'm downstairs, and I realized, and the images were getting ready to come down. The image did come down, and I realized, "That monitor's on up there." So I run upstairs and Miles is just 30 seconds from going live. And he says, like he's going live, look, it's okay, it's okay, it's okay. And he goes on, and says, "Well, here we are at the Space Telescope Institute, and they have definitely seen something, because we're seeing all this excitement down in the control room, so we really think something's going on."

And my heart just stopped, I'm going to get reamed, because CNN got a scoop, right? They're over here; they see what's happening; I've got an auditorium full of reporters with no idea what's happening, and so there's going to be reports streaming out that says, "CNN reports that Hubble has seen an impact," while everybody over here is clueless. And I thought that was going to be the death of me.

And then I went back downstairs and saw Heidi Hammel. She said, "Oh wow! Oh my God!" So we had this whole thing planned that about an hour after the impact, we'd have pictures to hand out. And Heidi goes, "Oh, Ray, can't we show it to them now?"

And I'm like "Hell yeah!" That'll get me off the hook. So she pulled a hardcopy print out, and we gate-crashed the event in the auditorium that Don Savage was running, the press event, and Heidi's walking, showing the picture [clapping] and everybody's clapping. And so when I do see Miles, I joke, "Yeah, remember me? I gave you that scoop."

GAINOR: So we were just talking a little bit about you put up those pictures at the AAS, and then not much for a while.

VILLARD: Yeah.

GAINOR: Was that still kind of an artifact of the people being reluctant to share their data?

VILLARD: Not that I'm aware of. You know, there was a flurry of pretty pictures.

GAINOR: Well, how, how in your view did it happen that they went from being reluctant to just accepting it? Was it because they had enough data to work on, even with the aberration?

VILLARD: We had been putting out science results in the three years after the aberration. So nobody was reluctant, and of course nobody, nobody blocked the idea of an early release program after the servicing mission. In fact there was a lively debate over what targets we should look at. So this idea that somebody's going to steal your science, that evaporated after the aberration was announced. I thought this was ironic, and it was karma for these people to take a multi-billion-dollar government observatory and treat it like their own little thing. No, any debate over pictures, over the public scooping, that all went away. One top astronomer said it was like fighting over the deck chairs on the Titanic.

The thing that I found annoying was when the telescope was broken, everyone would come to my office. They would say, "Glad I don't have your job." And me and Cheryl [Gundy] were just kind of left floating. And after Hubble was successful, everybody came into the office; they wanted to run the place. They wanted to tell me we had to put people on the Johnny Carson Show, and we had to write articles; we had to get NOVA. It was like flies on horse manure. Everybody wanted a piece of the action.

And it was so funny. Now, there was a very colorful writer from the Toronto Globe, and

I've got the article buried somewhere, and I forgot the writer's name. In the early 90s he came and interviewed me. "Well, what do you do about this terrible PR?" And he says, it was a wonderful article. He says, "Ray Villard has the world's best crummy job." He sailed resolutely—

GAINOR: Is that Stephen Strauss?

VILLARD: Yes, "He sailed resolutely into PR hell when the aberration with Hubble was announced."

GAINOR: Okay.

VILLARD: The important thing about Shoemaker-Levy was that the news that did go out in those first six months, they all would say the "repaired Hubble." The repaired Hubble. After Shoemaker-Levy and all the daily pictures we put out from Hubble, nobody qualified it. They just said, "Hubble."

GAINOR: Yeah. No longer the "troubled Hubble."

VILLARD: It was all gone. So that was a turning point. It was funny, too, because we had the teams here at STScI taking pictures, and sometimes it was hard to find—they were being protective. They gave us some crummy picture to publish, and I'm asking, "Don't you have anything better than that?" And I went into their office rifling through the prints on the desk, and there's a gorgeous picture there. I said, "Let's do this one!" So, I got a little paranoid that they

were being a little protective. But I had to go hunting for good pictures.

GAINOR: Did you want to tell me about the first color picture you put up?

VILLARD: Oh yeah. That was, you know, we had monochrome pictures that were false-colored. They were orange, there was orange tinting. And Chaisson said, "We need a color picture. We need a color picture." Well, the data at that time did not have multi-filter data, and he got together with Duccio Macchetto, the Faint Object Camera [FOC] PI, to prepare and FOC image of Supernova 1987A. He worked with our artist, Dana Barry, to artificially color it, like you touch up old black and white movies. They knew the heart of explosion was largely hydrogen, so they made that pink. The ring that was flash illuminated (photo-flashed) by the explosion. They knew that had maybe sodium lines, so they made that yellow. And they knew that two of the background stars, they colored those blue. I don't know why. So it was pink, yellow—it was your primary, subtractive colors.

And I was dead set against it. I thought that was horrendous. And Chaisson was like, "Look, it's okay with the scientists; everybody thinks it's okay." But I thought it was really bad. But it got picked up, and it got reprinted. But I find it very amusing today, because, you know, there is, as I said, there is this urban legend that we just artificially color stuff.

GAINOR: Yeah.

VILLARD: And we did. The first picture we—but now, it's much more of a religion with our imaging people, the data are sacred. But that was Chaisson just trying to do his own PR thing. It's

something that I would have never done.

GAINOR: A little earlier on in this interview, you talked about Bahcall and what became the Deep Field. Do you want to just tell me about the release of the Deep Field, when you heard what had happened.

VILLARD: Well, the whole Deep Field was amazing. I remember being up in a room with a bunch of monitors, and I did feel like I was on the deck of the Santa Maria, because there were these incredible galaxies. Everyone's kind of looking at them, and I think people are forgetting how momentous the thing was.

We released it at a AAS meeting in San Antonio, Texas. And so we made a big, ten-foot poster of it, and we were going to unveil it. Now the poster and the support grid got lost on the plane. And we're running around. It finally got delivered, and we set that up, and put a big black curtain over it. And so we did the unveiling; the media loved it. The trouble we had was there was no scientific analysis. It was just the cool picture. We had nothing, very little to say about it scientifically.

So as I remember, in that information vacuum, John Wilford from the *New York Times* had misinterpreted some number of galaxies, and then the astronomers got all upset about that. And I'm like, "Oh yeah, that happens, because we wanted to show that we did it, but there wasn't enough time to digest scientifically.

GAINOR: The idea there was just to do it. Then just hand it out.

VILLARD: It was such a momentous thing. I ran across an article on the internet last night that said this is the most important picture ever from Hubble.

GAINOR: That, in my recollection, might be one of the first ones where I heard about it and ran down to look at it on the internet and downloaded it.

VILLARD: Yes. And that was a huge deal. It's funny, years later, when Steven Beckwith was here, they were debating whether to do the Ultra Deep Field, or to use those same orbits, and do multiple fields that aren't as deep. For the first time, Beckwith had the forethought to say, "Gee, I think I'll ask my PR guy." So he came to me. He brought me into a meeting with astronomers and said, "Okay Ray, from the point of PR, should we do multiple fields, or should we do the Ultra Deep Field." And I was like, "C'mon, this is a no-brainer."

But it gets better. I can't make this stuff up. So NASA at that time had (and they still have it) what they call the Advisory Committee on PR. If you want to do a big NASA televised event, you have to pitch your story to the committee. So I went down. I wanted to do a press conference at NASA Headquarters where we unveil the Ultra Deep Field. And to me, this was a no-brainer. This was the deepest view ever of the Universe. So I go down to NASA with Weiler and this committee of astronomers. I said, "Well, here we are, the Ultra Deep Field." Anne Kinney goes, "Ray, it's just more galaxies." [laughs] I was dumbfounded. "Why should we publicize this?"

I can't make this stuff up. And they turned it down. And I went to my colleague, Don Savage, and I said, "Well, if NASA doesn't want to do it, we can do it at the Institute." And he says, "Yeah, why don't you go ahead." So we had a press conference here, which Senator Mikulski came to. So they handed this to me on a silver platter. And I was never more delighted that they

had no vision.

But one of our big stories the past few years was the determination that Andromeda and our Milky Way were going to collide, because there's next to no tangential motion. So Andromeda galaxy, here we are. And you know, is it going to go like this, or is it going to go like this? And astronomically, we figured out it's a head-on collision. So I presented that to NASA. And some of the scientists said, "Well, I don't know what the story is." And then they told me five different ways the story should be told, and some of them said, "I don't think this is a big story." And I'm like, "C'mon, c'mon. It's the collision—it's pending—but it's the eventual collision of two galaxies."

GAINOR: One of them being our own.

VILLARD: And it will fundamentally change. It's a simple story. It's a dramatic story. It's a no-brainer story. So that committee is ridiculous in its skepticism. I went back and had to pitch it again. But this time I was better prepped by getting Ed Weiler on my side. When he walked into the follow-up meeting, he was the alpha-dog. The other branch chiefs groveled at his feet. Whatever Ed said, goes!

There was another time that we had some finding about dark matter. One of these geniuses says, "Well, we've known about dark matter for 50 years." So the senior STScI scientist who was with me, said, "Oh great. We can all go home now because we've known about dark matter for 50 years. Never mind that we don't know what it is." So that's one of the biggest dysfunctionalities in the NASA process, but it doesn't keep us from running out good news.

GAINOR: Maybe just one more question about this stuff, and we'll talk again about some of the other stuff later on. But we talked a little bit about that color picture, but, because you're using a wider set of wavelengths than what most people look at, and determinations are made: "well, we're going to show this in a certain color, like hydrogen, etc."

VILLARD: Yeah.

GAINOR: Was that just sort of something that just kind of happened over time, or did you sit down with somebody like Zolt [Levay], or somebody like that?

VILLARD: Zolt's good because he's religious about how the colors are handled. He's hypersensitive to critiques that we fake-up the colors. I did get me burned once, though. On one of the servicing missions, we photographed the cone nebula, and the emission was in hydrogen, but a hydrogen emission can be blue, or can be red. You've got some freedom there.

So Zolt and I were playing with it, and we had a green and we had a blue and we had a red. And I was just feeling cocky, and a reporter called me and said, "Well, tell me about that picture."

I said, "Well, first we made it green, and I wanted to puke," and then I said, "it looked like puke." And then I said, "We turned it red." And it was a true description, but it sounded horrible. It sounded like we were really playing. And we were just tuning how we could show the hydrogen.

I'll tell you something that's unique that is not reported. When you say true color, you have to say what is truth.

GAINOR: Exactly.

VILLARD: That gets tricky. Now the problem with some of the objects, and M-16 is a classic case, that Eagle Nebula. It was photographed in three narrow-band filters, and I forget which ones, but you can look that up. But two of the filters are red, and the other one is green, I think. So if you put it together with the true colors of those filters, it looks like Milk of Magnesia. I mean, it's this pink thing.

And so what Jeff Hester did was what he called representative color. He took the longest wavelength filter and made it red. The shortest wavelength filter and made it blue, and those in fact corresponded to the actual emission. But the third filter that wasn't as long wavelength as the redder filter, he arbitrarily colored green, to fill in the additive color. So you throw the green in, and it gets very punchy. But that picture, if you notice, has pink stars.

GAINOR: You get it right in that version you put out this year?

VILLARD: Yes, we do the same thing. If you do, two of the filters are pretty close in color, then you say, "I'm going to stretch this, where I'm going to arbitrarily take the mid-range frequency and make that green."

So, I don't know what you call that. I don't like calling it representative color. It's not absolutely faithful to the filters that were used. But the argument is that a full-spectral range color picture gives you more information about the object than just having the compression of those two colors. That the full-color picture is intrinsically more informative than trying to be super tight to the actual. So we do what we call representative color. And the new Eagle Nebula is the same formula.

GAINOR: Right.

VILLARD: But Jeff Hester thought this up. He invented it. We kept using it.

GAINOR: Oh, I'll have to give him a shout out.

VILLARD: Are you going to talk to him?

GAINOR: Oh yeah.

[*End of recording*]