

Honoring the Heritage of the National Environmental Satellite, Data, and Information Service

Tape 1: Introductions of attendees, opening remarks, presentations by Sigmund Fritz, Fred Singer, and Diana Josephson.

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G. Withee: I would like to introduce our honored guests -- [pointing to picture] -- one by one as you are looking at them. Dave Johnson. This is a picture of Tommy Austin. He is no longer with us but was the head of EDIS¹. John McElroy will be in by phone. Tom Pyke is with us today and Bob Winokur. We'll have plenty of time for introductions.

I am Greg Withee. In case you haven't guessed, I am the new you. I am now in charge of the Satellite and Information Service of NOAA, and it is my honor to welcome you to the new home of NESDIS in this building, Building 1 in Silver Spring. This is a day, not only for the people at the head table whom we will introduce, but also for many honored guests in the audience who came to help us celebrate us a little history, to see what we are doing now, and a little glimpse of the future. Without going too much further, let me give you at least some background and then we'll introduce ourselves.

We're here celebrating NESDIS and many of you were around in 1982. Some of you were working right in the NESS² facility at that time and at EDIS, the Environmental Data and Information Service. John Byrne, who was the NOAA Administrator at the time, got this idea that we should keep the satellites as an operational entity within NOAA and combine it with the Information Service -- with the data and archive services which are at the Climatic Data Center in Asheville, the Oceanographic Data Center here in Silver Spring, and the Geophysical Data Center in Boulder. Many people were surprised by that decision. But I am here to tell you that the marriage has worked, that satellites and information do go well together, and the challenge of putting a product and services part to the satellite instrumentation and systems has just been a wonderful thing to do. So we are celebrating the two pieces of NOAA coming together, and in the video³ that you saw at the beginning, a little bit on the data centers, and some of the data sets that we are looking at. And then you saw parts of the 40th anniversary of the satellite program.

So let's start. I want to make this more informal than not. So let's do some introductions and maybe I'll start with Sig Fritz. Just introduce yourself. This is not the ten minute speech, but just a little introductory remark. We'll go around the head table and then I'd like to go out and see who's ere.

¹ EDIS - Environmental Data and information Service.

² NESS – National Environmental Satellite Service and later renamed the National Earth Satellite Service in 1980.

³ **TIROS, 40 years of discovery [videorecording]. Silver Spring, MD; U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, & Information Service, 2000. 35.1 MB; 16 min., 3 sec.**
http://docs.lib.noaa.gov/noaa_documents/NESDIS/video/TL798M4T5752000.mov
http://docs.lib.noaa.gov/noaa_documents/NESDIS/video/TL798M4T5752000.mp4

Sigmund Fritz: So this is not my ten minute speech? Once you invite some to speak, you have no control anymore. So I will introduce myself, and when it is my turn I'll do my job.

Robert Winokur: I am Bob Winokur. I was the NESDIS Assistant Administrator here from 1993-1999. I've gone on to other things and I'll save my remarks for later.

Thomas Pyke: Tom Pyke. I was the Assistant Administrator from 1986 to 1992. I want to thank Greg for organizing this event. It is very timely and very appropriate. Considering all the remarks we have to make, I'll stop now. I'm off to other things too.

Dave Johnson: Dave Johnson. Went through the mill, and now retired.

Diana Josephson: I am Diana Josephson. I was Dave's last Deputy from 1980 through 1982. That's my era.

Fred Singer: I am Fred Singer. I was Director of the National Weather Satellite Center from 1962-1964. Actually, I was preceded by David Johnson who put everything together in one package. He served as my deputy, and then took over as the director when I left. Since then I have been involved in academic affairs and in various government jobs. So I keep alternating back and forth. I also want to thank Greg for organizing this very nice occasion.

G. Withee: We have guests from out of town and some people that are not working in NESDIS. Finally, I will introduce my staff that are here. George, why don't you start?

G. Ludwig: I am George Ludwig. I came into NESDIS/NESS [I still call it NESS] with the Data Systems side as the Director of Systems Integration in 1972; then as the Director of Operations and the Technical Director. I left in 1980 to go to Colorado. I retired for real in 1991. I am living now out in the Shenandoah Valley in a house that I built over about an 8-year period.

Am presently writing a book on the early satellite history that is the first satellite as well as one, two and three launched by the U.S. That book is about 2/3's along now.

G. Withee: Can we anticipate its arrival next year?

G. Ludwig: No -- sometime later. I am aiming for the upcoming 50th anniversary.

Jim Purdom: I am Jim Purdom. I came to NESDIS in 1968 as an Air Force liaison officer. In 1972, I went to work for Vince Oliver in the Applications Laboratory. NESDIS sent me to school to finish my Ph.D., which I was very grateful for at Colorado State University. I went out there in 1980, and helped form the Cooperative Institute for Research in the Atmosphere, CIRA. Then in 1998, I came back and led the Office of Research for 4 years before retiring and returning to Colorado State where I am still active in satellite meteorology, and just finished a paper on the future of environmental satellite monitoring, challenges and metamorphous.

Ann Fritz: I am the attachment to Sig Fritz. I've been interested in the satellite. I was there with Sig and our children on April 1, 1960 to see the first pictures that came off the satellite. So it is very dear to my heart.

Ken Hadeen: I am Ken Hadeen from Asheville, North Carolina. I ran the National Climatic Data Center down there for 13.5 years. I have been involved with the satellite data and in other data for many years.

John Hussey: I am John Hussey. I came to NESS, as it was called in those days, in 1966. I spent 31 years with NESS and NESDIS. I retired five years ago; my last 8 years with NESDIS as the Director of the Office of Systems Development. When I retired 5 years ago, I went to work for the Aerospace Corporation here in the Washington Office in Rosslyn. I have been there 5 years or so. I am glad to be here and thank you for putting this together -- very nice.

Krishna Rao: My name is Krishna Rao. I came to the Meteorological Satellite Laboratory – “MSL” as it used to be called. I came to the government and seen every one of the AA’s. After forty-two years with satellites, I called it quits. I retired on May 3. It is a wonderful thing to see all the people who made it. It wasn’t easy. I really congratulate you for putting this show on.

G. Withee: A lot of people helped and we’ll get to that.

Bruce Douglas: I am Bruce Douglas and I came to NOAA in 1974 with the National Ocean Service. Ran the National Oceanographic Data Center in 1992 when Greg moved up to NESDIS. I wasn’t there long but had a lot of fun because it was just at a time when computers were really coming affordable and all those insurmountable problems sort of went away. Greg had put out a compact disk, the first one of data. What a revolution. It became cheaper to give the data away rather than charge for it. Of course the revolution goes on and on. Since I retired in 1995, I spent 6 years at the University of Maryland in the Geography Department, and now I’m working half-time at the National Hurricane Center and at the University in Miami. So, it’s a lot of fun. It’s great to see everybody.

I do volunteer work for the Red Cross at the Clara Barton Historic Site. Just to give you an example, we recently did a presentation about the hundredth anniversary of the Galveston Hurricane. The Galveston Hurricane took everyone by surprise. Ten thousand people were killed. It was a mess because they didn’t have any satellites that knew where it was going. As we were putting on the show, we would say to the people, “Well, it can’t happen now, can it? You’ll never wonder where the hurricane is as you know.” It is a staggering achievement of 20th century engineering and science and why this is a great celebration.

Cliff Spohn: I joined NESS fairly early as the Director of Operations. Later became Deputy Director. Over time I became associated with a growing organization and a growing activity. I always considered it the highlight of my career.

Laura Spohn: He doesn’t drive anymore. So I’m his chauffeur.

Cliff Spohn: ...and also my caregiver.

G. Withee: Unless I missed somebody, I’d like to introduce my staff. I invited them to come because they can always learn something. Have them show up. Many of them you already know. We’ll start with Stan Wilson and go around.

Stan Wilson: I am Stan Wilson, the new Senior Scientist of NESDIS.

Marie Colton: I am Marie Colton. I am the present Director for the Office of Research and Applications here at NESDIS. I have been here a couple of years. One thing I noticed is there must be some kind of fountain of youth associated with satellites, because many of you go back to the 60's. It doesn't look like it in your faces. So I'm happy to be here.

Gary Davis: I am Gary Davis. I had the pleasure of working for just about everybody sitting in this room at some point or another. I started off right out of college; hired by Dave and Cliff to work as a satellite engineer. Went through and became the Director of Satellite Operations. Now I follow George and John in the Office of Systems Development.

G. Withee: Back to our CFO. I don't think we had a CFO when you were all in charge of NESDIS, but we have one now.

Warren Hall: Warren Hall. I am the CFO here. I have been here for a year and a half. Have 28 years working with financial operations for the Department of Defense. Before that I had experience working with federal budgets. This organization has such a wonderful mission and great people to work with. I am happy to be here.

Richard Barazotto: I am representing Helen Wood who is the Director of Satellite Data Processing and Distribution. I started out also at NESS in 1974 when Dave Johnson was the Assistant Administrator and I worked with a number of people in this room.

G. Withee: And then left us for a while and has come back.

Richard Barazotto: That's right.

Kathy Kelly: I am Kathy Kelly. I am the current Director of the Office of Satellite Operations which many of you preceded me in. I think I started a month before Gary did in 1975. Again, I had the pleasure of working with most of the people in this room as they came through the organization. This is my first and only job out of college. Luckily I've had many jobs on the way to here. It has been great over the years to see it grow to where we are today which is quite a bit different than it was in 1975. It's been a great thing to be a part of my whole career.

Robert Mairs: Rob Mairs. I am in a position that wasn't here before either, Chief Information Officer, CIO of NESDIS. I came here from Earth Satellite Corporation in 1974. I came to work for John Hussey in the Satellite Fuel Services Program.

Brent Smith: I am Brent Smith. I am the Chief of International and Interagency Affairs of which there are several, as you might imagine, in NESDIS. I came here from NASA in 1988; hired by Tom Pyke at that time.

G. Withee: My first thanks goes to Jane D'Aguanno. She helped us put this together.

Jane D'Aguanno: I am Jane D'Aguanno. I'm on staff here with the headquarters. I started in NESDIS as a graduate scientist to do hydrology and remote sensing in the Office of Research several years ago. Then I worked briefly for Dr. Hadeen as part of the National Climatic Data Center. Then Mr. Pyke hired me to be on the staff. I worked for Mr. Winokur, and Mr. Withee now. Thank you and welcome everyone.

G. Withee: Emily is hiding. She is another one who put this together.

Emily Bruchon: I have been on detail to Mr. Withee's office this summer which is why I have been involved in the organization of this event. But I have been working for NESDIS for a little less than a year as an International Relations Specialist in Brent Smith's office and also a Presidential Management Intern.

Chuck Wooldridge: I am Chuck Wooldridge. I am the Executive Officer here at NESDIS. I started in NESDIS in 1987. I was a Presidential Management Intern right out of graduate school and I stayed in NESDIS at NOAA. I've done International Affairs. I went downtown doing policy and strategic planning for a while, doing commercial remote sensing and licensing, and now working in the Assistant Administrator's Office here. As Greg has said, we certainly are blessed with a great legacy and a great foundation here.

Nancy Colleton: I am Nancy Colleton. I am with the Institute for Global Environmental Strategies (IGES), and am very pleased to be working with Greg and the staff on putting this together today.

G. Withee: Thanks for all your help. These are some of the people who helped to put this on. I want to get to the speeches.

Sigmund Fritz: I need to comment on what I just heard. People are saying they went way back to NESS in the 60's. Dave and I go back to 1958, when it was the Meteorological Satellite Section and I'll make some remarks about that if you let me.

G. Withee: I'll say a few words and then you'll have the floor. I just want to make sure that we are being videoed. We'll have whatever you say for the next generation who will come and meet. The other thing is that we have put some of what we consider some of the treasures of NESDIS, and our history of NESS, and EDIS around the room here, and outside in the hallways. Please look at them. Open the books. You will find many memories there, and you will also find a bit of the future, as well, with our new solid state TV and some videos that we are showing outside. George?

G. Ludwig: The pictures are great, but when are we going to see a book that outlines the history of satellite meteorology?

G. Withee: It is interesting you should say that. A number of people have come up to me and said that. Now Krishna has written the history part. So he started.

K. Rao: NOAA Technical Report NESDIS no. 101.⁴

G. Withee: The next step is to put these pictures and that history together and make a book out of it.

Sigmund Fritz: The trouble with a history before it is written, it becomes obsolete. So many advances are going on that you can't keep up with it.

⁴ Rao, P. Krishna. [Evolution of the Weather Satellite Program in the U.S. Department of Commerce: a Brief Outline](#). (Series: NOAA Technical Report NESDIS 101). Washington, DC. U.S. Dept of Commerce, NOAA, NESDIS, 2001. 37 pp.

G. Ludwig: It never is. Just set a date and say this is the history before such and such.

K. Rao: It was for the 25th anniversary book. We had a cut-off date. It was 5 years by the time we got it into print.

Diana Josephson: My suggestion is an oral history part of it, and talk to everybody and let us go around to share. It would be interesting to share everyone's observations.

G. Withee: Jim, and then we are going to go ahead.

J. Purdom: I was just going to mention for George. For the AMS 75th anniversary, they did a diamond jubilee book⁵. Paul Menzel and I wrote a chapter in that book. It was a history of environmental satellite monitoring up to that time. It was about 25 pages. It was very brief but it did give a synopsis and a snapshot as we went along.

G. Ludwig: I want to see something that is reasonably complete that goes back into the earliest days when the Air Force was mucking around in the very earliest satellite reconnaissance studies and include some of that background which is an important part of the antecedent to our organization today.

G. Withee: We have the Data Centers part too. NCDC just celebrated their 50th. There is a lot of work to be done. I've got the message and will try to carry on.

By way of introduction, we are standing on the shoulders of many giants of NESDIS. I want to concentrate on the leadership of NESS and EDIS, and NESDIS afterwards and hear from those people. They are the people that we will honor in terms of putting up pictures in our little gallery outside in the hallway here. There is also an additional award that we will talk about later. It is to you and to the people who have come here that we really owe our presence today. We are going to make this easy for you. So you can speak from your chair. I'll take them in order of the progression -- chronological order as you come up. There is some argument, perhaps, but Sig Fritz you are first. We will start with you.

S. Fritz: Ann already told you where I was on April 1, 1960. I was in Ft. Monmouth looking at the first TIROS-I pictures that came down. Dave was in Hawaii at a similar radar station there. I remember those first small pictures of clouds in them, and we didn't know where the clouds were. Then I marvel at the meteorological satellite program today. It is marvelous. I won't speculate about the future. I could. Maybe Fred Singer will do that. But I want to entertain you with a war story which will also illustrate the great importance of the satellite data for operation at sea.

I take you back to December 1944. I was a meteorologist, called a "weather guesser", on the aircraft carrier Independence in the third fleet under Admiral Halsey's command. Part of it was positioned off the North coast of the Philippines in the following type of formation. We had a number of carriers in the center of the formation, a couple of battleships, a few cruisers, and the whole thing was surrounded by a lot of destroyers. These destroyers were charged with the mission of keeping

⁵ Historical Essays on Meteorology, 1919-1995: the Diamond Anniversary History Volume of the American Meteorological Society. Boston, MA: American Meteorological Society, 1996. 617 pp.

their stations so they could keep the Japanese submarines from entering the center of the fleet and attacking the carriers. This order to maintain their positions turned out to be a very sad event, and many of us suffered from that. In this formation off the Philippines, Halsey's charge was to keep the Japanese from coming down from Formosa, which is now Taiwan, and helping their own forces in the Philippines. While he was doing this, he was being very successful as long as the seas stayed in their normal range. But gradually the skies thickened. The skies became chaotic. The seas increased in height. Before long, Halsey and his meteorologists realized they were in the grips of a major storm, not just a small tropical depression. They tried to wander around all over the sea trying to get the fleet away from the grip of the storm, but they were not successful. Don't forget they had no satellite data. They had no radar data. None of us had then. They had essentially no ship reports. They were blind as far as the storm was concerned. The typhoon had pretty disastrous results. Three destroyers turned over with heavy loss of life. The carriers were bobbing around the sea with very high amplitude --- pitching and rolling. As a result, a number of aircraft broke through on the hanger deck, battered both the aircraft itself and also the ships they were on, and other damages done to the fleet. Admiral Nimitz, who was the commander-in-charge of the whole Pacific war, was in Pearl Harbor and he was very displeased with what happened. Among other things, he issued a memorandum to all commanders telling them that in the grips of a storm like that they could not carry out their mission. Besides that, the storm could cause severe damage to our forces without compensatory damage to the enemy.

That was the situation then. Let's see what would have happened if we had superimposed on that whole event the present day satellite pictures. The commander would have known the whole history of the storm from the time it was a wave to the time it became a severe hurricane. He would know the speed of the storm, speed of the wind, tract of the storm. He would know a lot. So what would Admiral Halsey have done? He was a fearless commander. He certainly would have stayed around as long as he possibly could to carry out his mission, try to find somewhere on the sea where he could operate the aircraft. Failing that, he eventually would have withdrawn or repositioned the fleet to carry out his mission. With the knowledge he would have had with the satellite, he would easily find his way out of the storm, what direction to go, to travel thirty knots at least. He could get away from the storm easily. What I would do today if I were a computer artist, I would prepare an educational film showing the scene as it actually occurred, and then showing what might have happened had the satellite data been available. That's all the time I want to take. Now I hope this sea story has wetted your appetite for lunch.

G. Withee: We have changed a lot since those days. There is no question about it. So if we can move the microphone to Fred Singer.

F. Singer: As I mentioned earlier, I came aboard in 1962. I was then at the University of Maryland in the Physics Department and I just spent a year and at the Jet Propulsion Laboratory in sunny California studying planetary atmospheres. I found out that I was recruited for a specific purpose by Chief Reichelderfer of the Weather Bureau. [We never referred to him by his name. It was always "Chief".] [Actually Harry Wexler was the Chief Scientist who came out to recruit me.] They wanted somebody who knew something about satellite technology and the atmosphere and to be able to stand up to NASA. At that time NASA had an ambitious research program and it was anxious to keep the focus of weather satellites on research rather than operations. I remember distinctly being told by the Chief

and by Harry Wexler and by Dave Johnson that we wanted to keep an operational program once we had a satellite in orbit. The first satellite, of course, gave us pictures of hurricanes and it became obvious there was a customer out there who needed that kind of data. We hung on, even though we had only one satellite. We insisted that we must keep the operational program going and eventually we had a bit of a struggle. Eventually, we started the operational and it has kept going ever since. Let me skip rapidly over the intervening years.

We have progressed tremendously, of course, in terms of satellites and in terms of instrumentation. The amount of data that we are getting back now is just overwhelming. So it is very appropriate that we have NESDIS to handle the satellites which are the major source of data these days and the data service.

I want to make one remark about something we did not anticipate in those days 40 years ago. Those satellites and those instruments were designed for operational use. It was to do weather forecasting and to service customers who needed not only weather information, but also information about ice and snow, forest fires, volcanic eruptions and so on. We had all those things in place. We even thought of collecting data from buoys. Everything was thought about. Gradually these things developed. What we didn't think about and it came as a surprise just in the last few years is the fact that these weather satellites turn out to be the primary tool for long-term climatic studies. And the fact they are now being used for this purpose speaks very well for the people who are in the data analysis business, who are able to extract that kind of information from instrumentation that were not designed for this purpose. I want to tell you about two things that are important and are in the news.

Weather satellites are now the pre-eminent tool for studying climate change. It is something not known very widely. It is something that is not admitted to very widely, but it is true. The only truly global measurements of temperature that we have are now made on a routine basis by the weather satellites by microwave sounding units that measure the upcoming irradiation from oxygen molecules and thereby in the boud temperature of the troposphere. They have been doing this now for 22 years, and we have a data record that covers the whole earth from pole to pole, day in and day out. It is a superb record.

It has a surprising result. It shows that the atmosphere has not warmed perceptively or significantly. It could be essentially zero. The National Academy, two years ago, did a study to find out why it is that the weather satellites do not show a warming while the ground instruments do show a warming trend. They had not been able to resolve the disparity. They simply stopped at the point of endorsing all of the data. There are two schools of thought now. One is, try to explain why the surface data and atmospheric data disagree. That's one school of thought. The other school of thought, and I belong to that one, is to find out what is wrong with the surface data. Why don't they agree with the satellites, but I admit I am biased.

The other development, which I think is very exciting, is to find out why climate changes because climate changes on many time scales. But the one that is relevant to human beings is the time scale of decades, maybe century, not millions of years. Why these changes? It seems pretty sure now and the evidence has come in from various sources, that the sun is what determines the decadal and century type changes of climate --- subtle changes in the sun. Now geologic data have contributed to this a great deal and geology is very important. But I am happy to say that satellites have provided the main clue about the mechanisms. Investigators have been able to show that solar activity changes in the sun's ultraviolet radiation are connected to cosmic rays. They also show an 11-year cycle. And the cloudiness also shows an 11-year cycle. We didn't know this before. Had not suspected it. Had not even believed we could extract that kind of data from the cloud record of the satellites, but it's been done. It is very likely that in some way, that we have not quite yet understood, the sun can affect the cloudiness and thereby the climate. That's a piece of research that is still going on and we don't know where to lead to. But I am sure the satellites that will provide all of the necessary data, not only about

the clouds but also about solar activity because they are above the atmosphere and can look at the ultraviolet radiation.

So I would like to leave you with a thought about the future for weather satellites. I think it is bright not only from the operational point of view, but also from the research point of view.

D. Josephson: I am here to speak about my observations about Dave's contributions and all of your contributions. As we heard during the introductions, many of you started during the 1960's and 1970's when NESS was created. This was this great beginning that we've heard about from Sig and Fred, but Dave led the development of the whole agency, and he continued and made fully operational the polar orbiting satellite system.

We shouldn't forget all the other parts of it. There is the climatic control facilities in Building 4. There are the Wallops and Alaska stations. There was all the data processing. There was research which led to all the new applications that Fred mentioned. Dave put together a really good team that took this idea and made it real. So I think his major achievement is to create the foremost operational satellite service in the world. During his period as leader, this whole geostationary concept was developed and put into effect, this whole new way of remote sensing of the earth.

Also, from the Weather Service roots and the roots of everybody in the Service, there was this whole international component. These data were freely available to anybody around the world. For many this was the only source of weather data that they had. Also, there were the alliances with the other countries as they came on board with their satellite systems, with Europe and with the Japanese. So both in the polar orbiting and geostationary world, there were significant international informal agreements reached. This went on despite the Cold War. When I was there from 1980 to 1982, there were a number of Chinese meteorologists who were over as part of an exchange program that NESS had despite everything with the Chinese. They were learning how to do meteorology and how to do satellite applications.

There has been a reference to NASA. During this era, there was a very successful partnership with NASA in which they were interested in the R&D and NOAA and the Satellite Service fought mightily to get these operational instruments and to make the system operational. It was a very successful partnership.

Dave and all of you brought the Weather Service along --- struggling --- never ending. Satellite data has a contribution to make to weather forecasters. Use it. When I came here back in the 90's it was still an issue. Dave, you beat your head against the Weather Service wall to try to get them and others to use the data that you provide.

I was struck by a very successful partnership that Dave and the team had come up with to take the R&D which Krishna Rao's shop was doing. And they formed these teams over a three year period, a combination of more researchers at the beginning but always some operational types. Over a three-year period they shifted the personnel and then transitioned it into operations. All the investment of the R&D actually went to work which you can't say about many organizations today because the R&D tends to sit over there on the shelf.

The staff was excellent, but one of the things that struck me also was the "esprit de corps". When NESS had its annual lunch, everybody who was not on shift came. This is amazing when you consider the staff was about 500 people. Unless you were in Alaska or Wallops or actually operating a satellite or a computer system, you went to the lunch. That was real tribute to Dave and to all of you. And it was not small at the time I was there. There were probably about 500 employees and 250 contractors and a very large multi-million dollar budget. This was no small potatoes. This was a major, major operation.

So starting from the beginning and the first satellite, Dave, over some twenty years he was with the Satellite Service actually transformed this into a major force in the world. So many of you played major roles and contributed to this development. It wasn't easy at times. It was a lot of fun. I really enjoyed my time at NESS. But these kind of transformational events are not easy. So, Dave, I raise my hat to you for your significant contributions to remote sensing of the planet and to the National Environmental Satellite Data and Information Service.

[Clapping.]

G. Withee: We are going to go to the telephone.