NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
VOICES ORAL HISTORY ARCHIVES

IN PARTNERSHIP WITH
NOAA HERITAGE AND THE NATIONAL WEATHER SERVICE

AN INTERVIEW WITH DR. ELBERT "JOE" FRIDAY
FOR THE
NOAA 50th ORAL HISTORY PROJECT

INTERVIEW CONDUCTED BY
MOLLY GRAHAM

EDMOND, OKLAHOMA
OCTOBER 30, 2020

TRANSCRIPT BY
MOLLY GRAHAM

Molly Graham: This is an oral history interview with Dr. Joe Friday for the NOAA 50th Oral History Project. The interview is taking place on Friday, October 30, 2020. The interviewer is Molly Graham. It's a remote interview with Dr. Friday in Edmond, Oklahoma, and I'm in Scarborough, Maine. What I wanted to start with was, how did you start to learn about the National Weather Service, its history and origins?

Joe Friday: Well, being in meteorology in the Air Force, I knew quite a bit about the Weather Service. We used some of their information, of course, in the Air Force, and we would be associated with each other for other reasons. I would visit Washington, DC, for example, fairly often. We used the Weather Bureau computer out at [now Joint Base] Andrews to do some of our work. They had the latest generation computer at the time, which, by today's standards, is very low power. It was an IBM 7090. I would go to Andrews Air Force Base and then and then out to the Weather Bureau in Suitland, Maryland, and use their computer at night when they weren't using it to do some of the work that we were doing in support of our classified operations. I got to know quite a few people in the Weather Bureau at that time. But my real association with the National Weather Service started when I was in the Pentagon, my Air Force assignment in the Pentagon. It turned out that I was the senior representative for the DOD [United States Department of Defense] on quite a few of the interagency committees. As such, one of the committee members was usually Dick Hallgren, who, at that time, was the director of the National Weather Service. That's when I got to know him very well and get to understand what was going on in the business by working in that interagency community. There was a natural inclination to try to understand the history of the Weather Bureau and National Weather Service associated with that. So I did a fair amount of reading on some of the history books, the history of the National Weather Service, to try to understand its early days and how it worked. But mainly, it was just a natural interest from being associated with meteorology and interested in it from that perspective. Then, of course, I got very interested in it when Dick Hallgren asked if I would consider running for the senior position when I retired from the Air Force. So I learned more about what was going on, how things worked a little better. Then, having been selected then from the deputy, I went from there.

MG: Before we get back into the Modernization and Associated Restructuring [MAR], I wanted to ask if there's anything in that pre-MAR period that I forgot to ask about?

JF: I don't really think so. We'll talk a little bit about the technology upgrades in the discussion of the MAR, but I don't think so at this time.

MG: Yes. My next question was about the technologies that emerged during the MAR, such as ASOS [Automated Surface Observing System], NEXRAD [Next-Generation Radar], which you've talked a bit about already, GOES [Geostationary Operational Environmental Satellite] and AWIPS [Advanced Weather Interactive Processing System].

JF: Yes. We were in a period of time, in the early '80s, in which technology was changing considerably. Obviously, the addition of the Doppler capabilities on the radar was a major input. The new generation of satellites was coming along, which provided much better data capabilities than the older generation, much more precise information, and a much larger volume of that information. That was a critical point. In order to handle all of that, we started to look at the capability of small-scale computers, not the big massive supercomputers that we were using for numerical models, but the type of workstations that we could use to bring all of the data together. In the older offices, we would have a display for the satellite data. We'd have the display for the

radar data. They would be in different locations frequently, and then we would have our weather maps, which were frequently paper copies. So with the forecaster trying to bring all this together, particularly as more and more data occurred, it was a difficult task for them. So what we wanted to do is to develop a system that would bring together all of the various information sets that the forecasters needed in producing their products. So we used that technology of the small-scale workstations so that we would have, at the fingertips of the forecaster, not only the weather maps, the basic weather information from the computer systems, but we would also have the radar data, we'd have the satellite data, we could animate that data, we could overlay that data so that we could see how they how the datasets interacted with each other, the various elements in the atmosphere. That gave us, for the first time, the ability to really look at the atmosphere altogether and look at it in various ways, and that was our AWIPS system. The ASOS system, of course, was a way of 24-hour a day weather observations at a very large number of places across the country. So those were the technologies that we were trying to use. The automated observing systems gave us minute by minute data as opposed to the observations that were taken every hour or so. The radar gave us much more high precision data than ever before. The satellites gave us many different looks at the atmosphere in various frequencies so that we would be able to identify, for example, fog from snow, snow from clouds, fog from clouds. By looking at various spectral intervals, we could tell the difference. We were also able to look at the temperature of the atmosphere from the satellites at various locations, various heights in the atmosphere. So all of that was giving us more information than we had ever had before. I recall, the *American Scientist* magazine, which is a magazine published by the Sigma Xi Society, in 1959, had an article that I always found quite amusing. It was an editorial comment, lamenting the status of American science. It indicated--this is 1959, mind you-- by the end of this century, by the beginning of the 21st century, American scientists could look back, and there would only be three things to celebrate. One was drilling a hole to the center of the earth, which was the old Project Mohole, going through the Mohorovičić discontinuity out in the Pacific Ocean, so that we could go through to the mantle and sample. That project never finished, by the way, although it was started. The second one was to send syphilis to the moon, and I don't know which astronaut they were talking about. But that was the second challenge. The third accomplishment of modern science would be to drown the world in a dense dust of digits, and that one, we have succeeded. We are certainly drowned with information. Our difficulty now that we have to do is to be able to take that dense dust of digits and sort out the useful information. That's the sort of thing that AWIPS gave us, to be able to, depending on the weather situation, look at just that sort of weather data sets that we needed to try to help us understand what was going on.

MG: How were you managing the hydrology side of the office during the MAR?

JF: The hydrology side of the office was obviously another issue entirely. Although there was a great deal of connections, the hydrological models, at that time, were getting better and better about being able to integrate the meteorology directly with the hydrology so that we could set up streamflow models that would take into consideration not only the precipitation that had already occurred but the precipitation that was forecast to occur. We stressed that we really are dealing with a hydrometeorological system, not just a hydrology system, not just a meteorological system, but it was really one system that blended together. Our trained hydrologists were positioned at thirteen different locations across the country associated with major river basins. That was the way that it had been organized from the very beginning. The hydrological

functions were associated with the river basins, but you needed a lot of information for that. You needed to know what the shape of the rivers was, how deep they were, how wide they were, their characteristics. You needed to put together the type of data that would give you the flow characteristics of that under various rainfall conditions under the various volume of flow conditions. So that information was something, again, that we needed to be able to provide the hydrologist with the same sort of way of integrating the data that we did with the meteorologist. So even though their workstation might have different algorithms associated with it, it was the same sort of capability that they had to bring all of these data together, and not have them in all different varied instruments and data sets and all that--paper and computer and the like.

MG: I meant to ask more follow-ups about the technology we talked about. Were those technologies, the NEXRAD, AWIPS, GOES, and ASOS, all part of the initial MAR plan or things that developed over time?

JF: Those were all part of the initial plan. As I mentioned before, I think that plan was really based on a study done by the National Academy of Sciences, talking about technological opportunities for the coming decade. It talked about the fact that we needed to specialize in smaller-scale meteorology, that we needed to be able to bring together all of those data sources so that they could be viewed simultaneously by the forecasters. It was kind of the model that we were following. There was quite a bit of development work to be done. Bringing together an operational Doppler weather radar took quite an effort. Getting automated observing systems that would perform at the quality needed was quite an effort. Being able to get instrumentation to be able to differentiate fog and snow and rain and to measure visibility, all of these things presented quite a challenge. So it wasn't an easy task to do this, but it was in the plan from the very beginning, being able to do those observations, take those measurements, and bring them all together.

MG: Did any of those technologies have unexpected uses or benefits? Maybe not weather-related?

JF: Well, yes. Curiously enough, the NEXRAD data suddenly found a use from the biologists because they found that they could track birds. They could track bats coming in and out of caves. They could track insects in heavy concentrations of insects. Particularly, the FAA[Federal Aviation Administration] was very interested in being able to track bird flocks around airports. But a lot of biologists, in general, were interested in the migratory habits of birds that can be tracked by NEXRAD radar. The ASOS system was kind of interesting because, in addition to providing the standard type of weather information that we ordinarily think of as a weather observation, by looking at the data on a one-minute interval, you could actually see small scale waves in the atmosphere that we knew existed, but we didn't have direct evidence of before unless we were doing a very detailed scientific evaluation. But now we can see these so-called gravity waves all over the whole country. Those have provided quite a bit of useful information for the research community. The data that were available from the NEXRAD radar and from the higher resolution GOES allowed us to move forward the science of small-scale mesoscale meteorology a great deal because with the data that we now had, we were able to see the smaller-scale features in the atmosphere. We were able to animate them. We were able to see the motions directly and understand, for the first time, what was really going on in some cases.

MG: I think I read that the MAR originally intended to address and prevent marine-related deaths. How would it have done that? What would the technological changes be that would impact that?

JF: Well, as far as the marine environment was concerned, we were putting in, at the time, a series of marine buoy observations along the coast of the United States. That was not directly a part of the ASOS system, but it was a similar system that was associated with our whole modernization effort. In addition to that, our hydrometeorologists were developing better models for storm surge so that they could better predict what kind of surge would occur from storms, hurricanes, and other coastal storms that were going ahead. Then again, the radar network, when we put the radar network in, we started along the coast so that we could cover all of the coastal regions of the United States reaching out about a hundred-and-fifty miles into the ocean areas, better able to cover the small-scale storms and major storms that were coming on board following the thunderstorms. So the entire operation, the entire MAR, contributed better information along the marine areas.

MG: Were those data buoys, the smart buoy system?

JF: No, that's something else. I'm trying to think of the exact name. C-MAN [Coastal-Marine Automated Network] was the name of it. Coastal marine observing network, or coastal marine observation network.

MG: Did other countries or weather organizations turn to this MAR as a model to restructure and modernize their own weather organizations or agencies?

JF: There was quite a bit of effort along that line. We were sharing all of the data. We were sharing our technology. I recall, specifically, the Chinese Meteorological Administration developed a radar network pattern very, very closely with our NEXRAD radar. They call it CINRAD [China Next Generation Weather Radar], "cino" meeting Chinese. Basically, it was the same sort of ten-centimeter Doppler radar network that we were going with. (Unisys?) entered into a contract with China to help build their network when they installed about a hundred-and-fifty-plus if I recall the number correctly, radars across there to help with their forecast problems for heavy rains. The radar network we were putting in was really very good at identifying thunderstorms, heavy rainstorms, and that is the major weather situation, the major weather threat that China has. They don't have as many tornadoes, but they have as many thunderstorms. So this worked out very well for them. Other countries use some of the technology as well, and it gave an opportunity for several of the companies to market their products and services as a result of what we were doing here.

MG: The National Weather Service teamed up with the FAA and DOD initially. Did that relationship continue throughout the MAR?

JF: Yes, it did. This was particularly with the NEXRAD radar program, and, as a matter of fact, the RADAR program is managed by a council from all three agencies. I had mentioned earlier that the Office of Management and Budget brought us all together and said it was time that we got weather services right, and basically directed the fact that we work together on that. That was a very effective activity. That was a very effective program with all three agencies working together to make sure the needs were met. Even though the ASOS technology was implemented at several airports around the country, it was more of a National Weather Service program than a joint

program. AWIPS was designed specifically for the Weather Service activities. I don't recall that there was any direct feedback to other agencies along that one. But the tri-agency NEXRAD program was very, very successful.

MG: Did anyone ever suggest bringing NASA [National Aeronautics and Space Administration] into the conversation or involving them at all?

JF: Well, NASA, of course, was involved with the satellite activities. They were actually developing the satellite program that we would be flying. But they were not involved in the radar programs or observing programs per se.

MG: Did your background in the Air Force play a role in your being hired, or in these conversations, developing connections and relationships?

JF: My role in the Air Force, of course, put me in a position in the Pentagon to work in the interagency arena to get to know all the players, get to understand what the various programs in the various organizations were doing. So I think that gave me an advantage because of that breadth. When I applied for the job of Deputy Director of the weather service, I had that experience. Being a senior military officer, at least a full colonel gives you a broad breadth of experience as well.

MG: You were also working across line officers at NOAA [National Oceanic and Atmospheric Administration], with OAR [Oceanic and Atmospheric Research] and NESDIS [National Environmental Satellite, Data, and Information Service].

JF: OAR was vital to the modernization of the Weather Service. It was OAR that really did the development work that eventually went into the AWIPS system, providing all the algorithms, the data handling systems. The private industry built the system, but the software that went into it was primarily developed by OAR, the Forecast Systems Lab out of Boulder, Colorado. NESDIS, of course, was developing, along with NASA, the satellite capability that we would be using, and we were working together on that. The modernization paid attention to other needs, such as the National Ocean Service, and what kind of marine type of support that we would be able to deliver in association with the National Ocean Service, along the line. So about the only line office that we weren't directly dealing with was the National Marine Fisheries Service. Theirs was much more of a regulatory function than a forecasting function. So although we sat together on the same council at NOAA, we weren't directly associated with too many activities.

MG: One of the last times we spoke, you talked about the public-private partnership. I think I read that in the 1980s, there was talk of privatizing some elements of the National Weather Service. What were those conversations born out of? What was the argument, and who was making it?

JF: Well, during the [President Ronald] Reagan Administration, there was a strong feeling by the administration that the government should get out of non-governmental business. Now, there's an argument on what's governmental business. There are various philosophies, some politically-based, others economically-based, that indicates that the government should limit its scope, that it should deal with things that are only public good, common good. Some of those views go to the extreme that the only thing that the federal government should be doing is the judicial system, and perhaps,

the Department of Defense. But we had one individual in NOAA senior management, whose views were so far extreme that he felt that even the Department of Defense was questionable as to whether it should be a government function. I think most of us, even conservative folks, would believe that the Department of Defense is a major element important to the safety of this nation. To an extent, the Weather Service is in exactly the same fashion. Instead of dealing with human enemies, we're dealing with the natural hazards that affect and life-saving information, property-saving information. But that caused a great deal of concern in the '80s because there was a feeling that we should end up privatizing many elements, and, in some cases, even not producing any Weather Service products other than weather warnings. "Don't produce forecasts. Let the private sector produce the forecasts." The only thing that the Weather Service would do is produce the weather warnings. Well, you can't produce a weather warning without making a forecast. Once you've made the forecast, it doesn't make a lot of sense to keep it secret and not go ahead and provide that. That weather information then – I think the model the United States has is probably one of the best ones possible in the world. We take the basic information that we have – all of those satellite data, the surface observations, the radar data, and all of that. We run computer models to bring all that information together and make forecasts. We take all the information and make specific forecasts for local areas, and we make weather warnings. We share all that data, but we provide it for general public information. We do not make specific forecasts for each individual industry, each individual business. That kind of tailored activity is more likely appropriate to the private sector. By doing so, we have provided solid information for just general life and property, for health and safety. We have provided information to the private sector so they can do specific tailoring for individual companies. They make a lot of money that way, and it benefits those industries to take that information. The better our basic forecasts become, the better that information can serve the private sector, and the better the private sector can serve their individual clients. As weather accuracies improve, then businesses can make better economic decisions based on that. This cooperation between the public and private sectors is basic, I think, to the way that we have done our business in the past. I think it probably will continue to be in the future. Right now, we probably have more people working in the private sector than we have in the National Weather Service. I think that trend will continue into the future. I think, however, that we should always have a base product suite out of the National Weather Service that will provide information for certainly the emergency managers across the country, for the general government structure across the country, state and local governments, federal governments, and the like. But we should not be, in the National Weather Service, involved in explicit information sets and forecasts for individual companies, industries, and the like. We obviously provide information for the aviation industry because, again, the safety features, but we don't do all the detailed flight planning for them. That's done by the private sector. We provide some basic information to the agricultural community, but we don't do farm by farm type of analysis and forecasting. We provide basic information to the marine community, again, for life and property information. But we don't provide basic route forecasting for each individual ship that's crossing the ocean. That's a private sector function. So it's that kind of synergy that provides a very robust weather system in the United States.

MG: I was wondering how this talk of privatizing manifested itself. Was it conversations in the hallway, something in the news? Where was it coming from, and how serious were folks taking it?

JF: Well, it got very hot and heavy there for a while. Dick Hallgren, my boss, had just gone on vacation in Colorado, skiing. He basically said, "Don't bother me. I'm going to go away and have

fun." The next morning, I go out and pick up the newspaper, *The Washington Post*. I open the paper up, and the headlines say, "Reagan to privatize the National Weather Service." I go into my wife, and I say, "This is going to be one heck of a day." The reporter had picked up some discussions of privatizing the weather satellites and letting the private sector run the weather satellite program and had misinterpreted that quite frankly, as privatizing the entire Weather Service. Within no time, there were editorials across the country asking, "How much are you going to charge for tornado forecasts or a tornado warning? What kind of billing are you going to do for hurricane forecasts?" and all of this. Editorials that supported what the Weather Service was doing for supporting the public for life and property abounded. There was absolutely nobody that agreed with that concept. We had a press conference at one o'clock that afternoon, in the Department of Commerce, in which the head of NOAA – I was standing in for Dick Hallgren, who wasn't there, as the Deputy Director of the National Weather Service – and the Secretary of Commerce all avowed that the government was not intending to get rid of the Weather Service or privatized it or anything of that nature, that they were looking at certain functions in NOAA that could be better handled by the private sector. I think that this inadvertent understanding of what happened that resulted in that newspaper probably stopped everything in its tracks because it had such a negative reception. Now, that didn't mean that the pressure to privatize various functions wouldn't continue. One of the things that we did is that many, many places across the country for years and years, the local weather stations would go online and talk to one of the forecasters at the National Weather Service office nearby. They would basically give a broadcast of what the weather was going to be. That was viewed by the administration being something that shouldn't be done by the government that should be done by the private sector. Now, it's curious, when TV first started, NBC wanted to do exactly that same thing with National Weather Service forecasters: go on television and give the morning forecast on the *Today* show. The head of the Weather Bureau, and it was the Weather Bureau at that time, Francis Reichelderfer said, "No, we really shouldn't do that. Otherwise, we're going to be spread this across the entire country as television spreads along that line, and this is something that the organizations themselves should take care of, not us." And although he made that decision for television, they never eliminated the radio broadcast automatically. Slowly, but surely, it faded away over the years, as more and more broadcast stations--the television arms, for example, would have their own weathercasters, and they would be used for the radio broadcast as well. But at that time, in the '80s, we were still doing that probably over a thousand times a day across the country, not in every place. But the scheduled broadcasts that we had totaled over a thousand a day. A lot of them in the St. Louis area, curiously enough, and I have no idea why, except that it had been done for a long time. But the largest radio station in St. Louis was still using the National Weather Service forecasters to broadcast their weather over the radio, which frankly, didn't make any sense. So we stopped that as a concession of what the public and private sector should be doing. But, as a result of that, there was a great deal of concern about exactly what the role of the public sector should be. That resulted in a study eventually by the National Academy of Sciences, which was called *Fair Weather: [Effective Partnerships in Weather and Climate Services]*. The *Fair Weather* report came to the conclusion that the United States had a very good system of providing weather information to all users, and that that combination of the public and private sector was an excellent one for doing so. At the same time, it was impossible to draw a fine line between what precisely was a public sector activity and what precisely was a private sector activity. You couldn't make that line write down the middle, separating them. It was fuzzy. It was clear some things should be public, and some things should be private. But exactly how that line was drawn was always going to be fuzzy, and it would probably cause some concern occasionally one way or the other. But the success [of] making this thing work

was conversation between the two organizations. They recommended an organization, such as the American Meteorological Society, create a forum for communication between the sectors, and indeed it did. As a matter of fact, I happened to be president of the American Meteorological Society the year that we generated the Commission on the Weather, [Water, and Climate] Enterprise [CWWCE], which is still going on today, and it's very successful. A commission is composed of members of the public, private, and academic sectors, and they basically get together once a year for a major meeting to discuss the various issues facing the enterprise and how we can work better together. Are there issues or areas of friction? Are there areas that need to be improved? The fact that we can have a very candid, open discussion has been very, very successful in understanding each other's situation, understanding the position, and being able to continue what I think is the best weather system in the world, as far as this public-private partnership is concerned.

MG: Do you want to take a five-minute break or keep on going?

JF: I think it's probably a pretty good thing if I do. So I'll be right back in about five minutes.

[Tape paused.]

MG: Are you all set, Dr. Friday?

JF: I believe so, Molly. Thank you.

MG: You mentioned the different administrators. I just was curious if you could say, for the record, who you worked under during your time at the National Weather Service.

JF: My first job was as Deputy Director of the National Weather Service. At that time, I worked under Dick Hallgren, who was the director.

MG: I'm sorry. NOAA's administrators.

JF: NOAA as an agency. There were several administrators of NOAA during the time that I spent there. The first administrator of NOAA that I worked under was John Byrne, who was an oceanographer. Following that was Tony Calio, who was an engineer from NASA. Now, this is embarrassing. I'm trying to remember. Those were probably the most memorable because it was during that time when Tony was there that the administration was really trying to reduce the size of the Weather Service significantly and privatize as much as they could. The person that was really pushing that was a gentleman by the name of James Winchester, who was the associate administrator of NOAA. He had been in the weather business before, and he felt that it was very important for the Weather Service to basically be totally privatized, and he pushed that to a great extent. Of course, the Reagan administration was also very much associated with reducing the size of the government. So the overall philosophy was to do that. Part of the reason for the modernization was to reduce the size of the Weather Service. That's one of the reasons we went with the Automated Observing System so that we could have weather observations without having people there. We did indeed reduce considerably the number of weather offices that we had. When I first got there, we had over three-hundred-and-fifty weather offices across the country. A lot of them were understaffed and underequipped. But reducing those to the hundred-and-twenty-three in that final mode was one way

of reducing the overall cost of the Weather Service. We were ordered, at one time, to basically cut it in half. It couldn't be done and still have a reasonable Weather Service. I think I mentioned this to you before. The administrators of NOAA during my time there were John Byrne (1981-1984), an oceanographer; Tony Calio (1984-1987), an engineer from NASA; Bill Evans (1988-1989), a fisheries oceanographer; John Knauss (1989-1993), an oceanographer; and Jim Baker (1993-2001), an oceanographer.

MG: That's okay. We can fill it in the transcript later.

JF: I'll fill it in later on. I'll take that one for the record, as I used to say when I was testifying on the Hill.

MG: In one of our earlier sessions, you talked about managing the personnel issues when offices and staff were being relocated. Did you work with the NWSEO [National Weather Service Employees Organization]? Forgive me if you've mentioned this.

JF: No, we have not talked about it. The Weather Service had a union form during a previous reorganization, in which many of the employees of the Weather Service didn't like what Bob White was doing, as a matter of fact, at the time, when Bob White was the head of the Weather Service, and eventually became, of course, head of NOAA. So they basically formed a federal agency union, the NWSEO, the National Weather Service Employees Organization. As you could probably understand when you're involved with closing a very large number of offices and causing a relocation, that causes a great deal of concern. We worked with the union as much as we possibly could to try to have them understand that we're really trying to look out for the best interest of the employees, that we need to make these changes because the modernization is meeting the goal of providing better weather services for the country. But in doing so, we want to do the best we possibly can with employees. For the most part, they understood. But there were quite a few issues associated with that. We worked with them to make sure that they understood the educational programs that we had set up, that they understood the priorities, wish list, if you would, for people to be reassigned, even though they might not want to be reassigned. But if I've got to be reassigned, this is where I would like to go sort of thing. We were not permitted by the Office of Management and Budget to provide the unions with all of the detailed planning that we were doing, the number of offices that would be closed, and all of that, while we were trying to put together that strategic plan. That was a mistake because in the void of information, that vacuum is filled by something else, and that's something else is usually bad information. It's the worst possible information you could have because they made the assumption that we were really going to decimate the organization, and we had no intention of doing that. Now, admittedly, we did try to keep them informed under the table as much as possible. But as far as formal communications, it was limited to what we can do. The National Weather Service modernization committee at the National Academy of Sciences, I mentioned before, had to have union representation on it. That was a good thing because they were there, and we could work with them as we were going through to provide the information necessary to close weather stations, to make sure that there was no degradation of services, and all of these various factors. They served as a very good source of questions to make sure that we weren't taking shortcuts. I think that was important. It was also a pain in the neck, but that's part of that pressure to make sure that we're doing the right thing and make sure that we're not trying to falsify the data. We're not trying to generate "fake news." When the [President Bill] Clinton administration came in,

their approach to the labor unions was quite different. They wanted to have management be much more interacting with the union and much more transparent to what was going on. They wanted labor union-management partnerships if you would. So the first thing I did was invite the union president and vice president into our next directors' conference, in which we went over OMB's direction for the next budget cycle, and OMB's direction for budget cycles is always bad. As you can imagine, the pressure to reduce the budget. In this particular case, we were told that we had to cut several millions of dollars more than made sense out of the organization. So, after that meeting, the union president and vice president realized that we weren't bad guys after all. That "bad guy" stuff was coming from other places, and we started to be much more cooperative. That partnership worked, I think, very effectively. It was working with the union, at that time, to try to move forward, as well as we could, under the pressures that we had and under the budget that we had. They started to be much more effective. Also, needless to say, they were not prohibited by the Hatch Act from voicing their opinions to their congressmen and various things of that nature. [Editor's Note: The Hatch Act of 1939 prohibited federal employees in the executive branch from engaging in some forms of political activity, including involvement in political campaigns.] By keeping them informed on really what was going on, it made them much more effective as far as their own political lobbying was concerned and made my job somewhat easier because I really had somebody up there trying to defend what was going on, and basically explaining what the real situation was to members of Congress. I don't know if that's still going on today. I just have not kept up with it that much. But the union had always been aggressive, sometimes irrationally so, but they were very dedicated to the employees of the Weather Service and to their best interest. From that standpoint, I always respected them for it.

MG: I read somewhere that the MAR was originally proposed to be completed in 1994. Who thought that was possible?

JF: You know, it's kind of interesting. Someone once said that it is amazing how much you think you can do in a year, but how much you can really do in a decade. So one always underestimates the length of time it's going to take to do something. We had technology problems. When you're making major technological changes, that's not infrequent. We were moving forward with state-of-the-art in radar, which hadn't been done before. We ran into some problems doing so. We ran into some budget problems as well, with pressures put on with the budget. One of the things that the budgeteers fail to take into account sometimes is that even though they may find that they want to save a small percentage of the overall budget in the near term, by introducing delays early on, it really costs more in the long term. That's what happened. That's what generates cost growth in a lot of these situations. That certainly was the case in some of our programs. AWIPS was the biggest cost growth issue because it was trying to pull together all of this dense dust of digits I talked about into something that could be used by the everyday forecasting activities of the National Weather Service. A very difficult problem. NEXRAD had some cost growth only because we increased the number of radars from what we were originally anticipating; ASOS the same way. It cost more than originally programmed, again, because we increased the number of sites more than what we were originally anticipating. So there were problems. It took longer. We used to call it AWIPS-90. It became really, I think, about AWIPS-96 because we expected that AWIPS would be able to be put into the field in 1990. Obviously, that was very badly estimated.

MG: How did it work, and what was your experience with contracting staff?

JF: Well, certainly, we went with contractors for the technology, all the technology. We went with contractors for the new building structure, programming. We hired people to do a lot of the programming for our systems so that the basic size of the government force didn't change very much. As a matter of fact, it dropped a little bit. The contractors were very responsive. We went through processes with the major technologies called (A109?). I forget what the A stood for, but basically, that was a procurement directive that we had to follow, which talked about major product acquisitions, major project acquisitions, where you would start with two or three or four companies to develop the concept. You would take those concepts and pick out the best two or three to build prototypes, and then choose, and finally, which one would win, and so forth. We had two very good companies in that second phase, generating radar prototypes, and either one of those prototypes would have worked, I think, very well for us. By having that kind of competition, you really did develop very good ideas, very good capabilities. We started out with three companies. We went to two and then finally to one. I tell you, it's really difficult because I had good friends working for all three of those companies to start with. The very idea that we had to downselect to two was really agonizing because one of my very close friends was involved with that third company that didn't make it. And of course, I had to be very careful that I didn't influence the decision process, that even though I might make the final decision, that I wanted the data presented in such a way that it became obvious what the decision should be, that I was really looking objectively at the information. Then again, the downselect from those two to one was the same thing. Of course, that was the one that was really the money shot because that was the one where the production was going to go online. It was important not only for our own radar system but as I mentioned, that same company went to work for the Chinese government, as well, making a very large number of radars for China. One interesting side on that, as you know, even today, there's pluses and minuses in the relationship with China. They've been our enemy. They've been problems for us internationally for a long time. They don't always do things the way we think things should be done. And, at the same time, meteorologically-speaking, we've been working very closely together in the science and technology exchange. After [Richard] Nixon opened up relations with China, the first scientific team that went over there was a meteorology team with the American Meteorological Society and representatives from the National Weather Service. We were one of the first of the technology transfer groups to start there. I had the privilege of being the US co-chair for that group for several years when I was the director of the Weather Service. I remember when we were making arrangements for them to develop the radar program; some of the people in either State or Defense--I can't remember which--at the time, said, "Wait a minute. We don't want to give them that latest technology because of our human rights issues with them." My response to that was the fact that "Yes, I'm very concerned about human rights issues. But bear in mind, the Chinese nation loses thousands and thousands of people a year to flash floods and to weather hazards. One of the ways that we can help human rights is to provide better information to reduce that number." And indeed, when that greater network went in, the number of deaths that resulted from these kinds of flash floods--because most of them went undetected before the new systems when in--was reduced significantly. Even though some of the guys in state and defense didn't want to go along with it, I think it was the right thing to do, making that technology available. But let's face it; the technology wasn't that unique. It certainly didn't have military applications. But one of the things that I felt very good about working internationally in the weather business was that this was an area that impacted everybody. Weather knows no national boundaries. It's important that every nation have access to weather information for the protection of their own citizens. It turns out you can show mathematically that even weather in

Australia, on the other side of the globe in the southern hemisphere, a week from now is going to affect what happens in the United States. So it's important that we gather those data from around the globe, and we make them available for all users so that everybody can benefit from that. Of course, that's one of the major activities of the World Meteorological Organization of the United Nations is to do that. The director of the Weather Service has historically been the US permanent representative to the World Meteorological Organization. And that's one of the jobs I thoroughly enjoyed.

MG: The National Academy of Sciences eventually published a report that summarized and assessed the success of the MAR. I feel like this point, the international relationships and implications, was left out of that document.

JF: I think you're right. I think it was left out. They were concentrating on: did it accomplish what it set out to do as far as the United States was concerned. And indeed, it did. I think I think the MAR got pretty good marks overall for what was going on. I think the men and women that worked on it, and there were many, many of us--but I think the men and women that worked on it still take pride when they look at what's going on in the National Weather Service and see how it's working. Because I look at those radar data--I look at those radar data almost daily. I have the application on my phone and on my iPad. If there's any weather in the area, I take a look at that to see what's going on. My wife can now read the app very well. When we were driving across the country on our road trips, she would guide me in and around thunderstorms. So looking back, I take just a great deal of satisfaction in what we were able to accomplish.

MG: Could you reflect a little bit on what you mentioned earlier, those three big things that society had hoped to accomplish by the end of the century. What does it mean to you to be a major part of one of those things, the thing that actually got done?

JF: Well, as I said, when I look at what's going on in the Weather Service today, I see the results of our modernization activity activities. I see the results of the datasets made available. It is extremely satisfying to be able to say I had a part. When I say I had a part in that, I had a lot of good people that did a lot of hard work. What I was able to do, I think at times, was to shelter them from some of the political turmoil that occurred. One of the things that happens – the director of the National Weather Service is a career civil servant. At least, it has been. I'm not sure what's going to happen under this new administrative order that's come out recently about generating different policy level structure, changing the civil service code. I doubt if that's going to go anywhere because I think there's a lot of people opposed to that. The fact that it is a career civil servant [position], but all the bosses have been political appointees. When an administration changes, there's this turbulence that occurs. But by having the goal of the MAR, having the goal of the overall modernization, to get all this better technology, to get better science involved in all of this, and holding to that, that gave us a lighthouse, if you would, during all the turbulent transitions. So I think what I was able to accomplish during that time period was to be able to keep that in mind and keep moving forward with it. All the guys and the gals that were working on the MAR didn't have to worry [about] that kind of interaction. All they had to worry about was taking care of all of those activities that had to be done to make it a success.

MG: My questions for our next session will be reflections on the MAR and looking back on your career with the National Weather Service. Then we'll get into your life and career following that chapter.

JF: Okay. Very good. I appreciate it.

----------END OF INTERVIEW----------

Reviewed by Molly Graham 11/6/2020
Reviewed by Joe Friday 12/3/2020
Reviewed by Molly Graham 12/19/2020