

History of the Electronic Warfare Integrated Reprogramming Data Base

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In August 1976, I was the technical advisor in the Electronic Systems Division of the Foreign Technology Division (FTD). It was lunchtime and I was eating my lunch while reviewing a report, when a telephone call came in from a Lt Col Pat Kelly at Air Staff in the Pentagon. I listened with interest while another individual in the office told in several different ways why we could not do what the caller wanted. I picked up the phone and introduced myself to Lt Col Pat Kelly, and asked what he needed. Lt Col Kelly said that the Air Force had what was called the Electronic Warfare Integrated Reprogramming program (EWIR), which needed a data base containing assessed information related to likely modes of foreign radars that were to be used only in wartime.

The EWIR program supported the development of automatic signal recognition equipment that informed pilots of the radars that were illuminating the aircraft, and alerted them if threat-associated radars, such as surface-to-air missile radars were tracking the aircraft. The data base of assessed information was needed to permit the "Reprogramming community" to program likely parameters of the suspected but undetected wartime-only signal modes into the automatic signal recognizers of the Air Force's radar warning receivers. Because these receivers were installed in every combat and combat-support aircraft in the United States Air Force (USAF) inventory, it was imperative that they contain the best possible information to permit unflinching recognition—during combat—of all modes of threat radar signals.

I indicated that the reason my office colleague had said that we could not do the job was that it was a very extensive task, and we had very limited resources. However, to determine the amount of effort that would be required to do the job, it would be necessary for me to meet with Lt Col Kelly and others who were knowledgeable of the EWIR program to determine what systems and what parameters of each of those systems would be encompassed in the program scope.

I met with Lt Col Kelly at the Pentagon in late August 1976. We discussed an approach I'd conceived for displaying both observed and assessed data in an existing data base product format. This was an important consideration because the reprogramming activities of the Services were based on having data available in that well-established format. We agreed on the display approach and proceeded

to discuss how to limit the number of individual parameters to be considered for each threat system. I proposed visiting the Air Force Avionics Laboratory at Wright-Patterson Air Force Base (AFB); the Tactical Air Warfare Center at Eglin AFB, FL; Headquarters (HQ) Strategic Air Command (SAC) at Omaha, NB; Warner Robins AFB, GA; and HQ Tactical Air Command at Langley AFB, VA to discuss the proposed program with experts in reprogramming at each of these organizations, and to determine data base content required for reprogramming. Lt Col Kelly agreed on this approach.

I prepared a matrix of parameter elements to be discussed at each of the aforementioned organizations. The idea was to assemble the experts at each location and ask them to indicate which of the parameter elements they actually *needed* for reprogramming, eliminating those that they indicated they merely *wanted* or *might need* at some future time and those that were not applicable. During September of 1976, I visited with each of the organizations and discussed the detailed requirements of each to support their reprogramming efforts.

As a result of these visits, I was able to construct a revised matrix containing a set of parameters that was significantly smaller than the original matrix. I then sent copies of this new matrix to each of the organizations I'd visited, with the request that they verify that the list contained all the parameters *needed* for reprogramming, and further requested that they prioritize the parameter elements in the matrix from most needed to least needed. This was done and the results were incorporated into a prioritized final matrix. This final matrix subsequently was discussed at a meeting at SAC HQ, in which all the reprogramming centers and several other organizations were represented. The matrix and the priority of elements were finalized at that meeting.

What remained was to establish a program to develop the necessary data base, and to get concurrence for needed support of the other scientific and technical intelligence centers (Missile Intelligence Agency, Foreign Science and Technology Center, and the Naval Intelligence Support Center; these later became the Missile and Space Intelligence Center [MSIC], National Ground Intelligence Center [NGIC], and National Maritime Intelligence Center [NMIC], respectively, when FTD evolved to the National Air Intelligence



Russian 36D6 Radar



Russian P-18-2 Radar



Center [NAIC]) because many of the threat systems were the responsibility of these organizations. The necessary concurrence was obtained when I visited each of these affected organizations.

The program was formalized at FTD under the administrative supervision of Col James Owens, while I was technical lead. Through Mr. Don Quigly of the Computer Systems Directorate, Rome Laboratory was contacted and it assigned Mr. King to develop the necessary contract vehicle and assist in developing initial costing information. At this time, the core team at FTD consisted of Capt Ed Serine, Capt Keith (?), and Maj John Wood, all working directly under me in the program office, with Ms Susanne Barber of the Computer Systems Directorate as the lead data base person. We determined the amount of funding and additional resources needed to develop the data base system and to load and verify the data in the data base. With this information, I was able to prepare a briefing for Maj General Brown, the USAF Assistant Chief of Staff for Intelligence. The purpose of the briefing was to obtain the necessary funding and personnel to build and execute the program.

I briefed General Brown, who asked a few questions, liked the answers he received, and literally grabbed me by the arm and marched me up to the office of Lt General Creech/USAF/CVAII (who shortly thereafter became the Commander of Tactical Air Command). General Creech listened to the briefing after first telling me that he only wanted to hear about something that was going to work, and that if it wouldn't work, I could leave now. I immediately showed him a slide, which I'd planned to hold for backup, that listed the places I'd visited to get expert inputs on what was needed to form the goals for the project, and he became an ally for the remainder of the briefing.

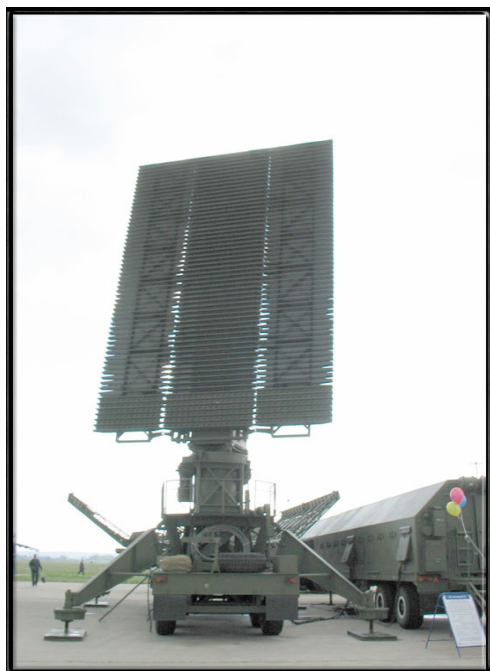
When I got to a slide that showed in matrix form what we needed to get the program underway, he went to the bottom line and said, "So you need \$1 million and eight people?" I affirmed this. He turned to General Brown and said, "Let's find the money and get started." My fond recollection of what followed is that General Brown had a broad grin as he said, "Thank you, sir." He was one happy man as we left General Creech's office. General Brown gave directions to Lt Col Kelly and some of the intelligence staff to follow up and find the money and personnel slots to see that the project got underway.

Using the funding subsequently provided by the Air Staff, Rome Laboratory let a development contract to Planning Research Corporation (now Northrup Grumman Mission Systems), and the program got underway. The funding was applied to an existing Rome Laboratory contract that was managed by the FTD Computer Systems Directorate in the data base and systems development division headed by Mr. Don Quigly. This initial software development program was directed by Ms Susanne Barber, and later by Ms Sharon Cain.

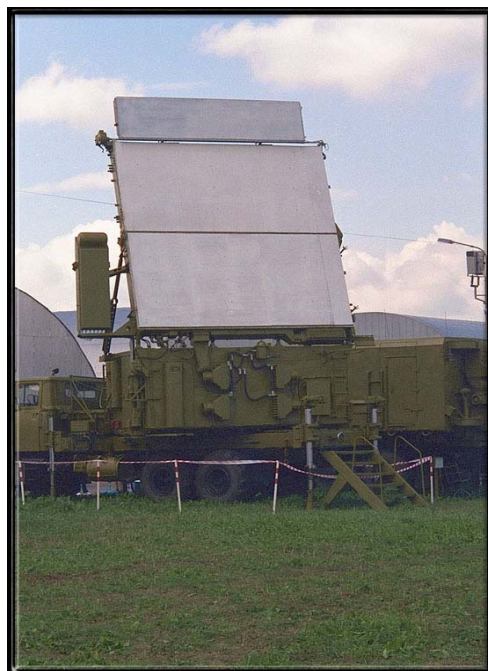
EWIR achieved initial operational capability in October 1978, and the Electronic Warfare Integrated Reprogramming Data Base (EWIRDB) has become one of the most widely used combat support products in the Department of Defense, supporting the electronic warfare reprogramming activities of all three services. In addition to its combat support role, the EWIRDB is also used throughout the development community; the policymaking community; research, development, test and evaluation; and foreign military sales. Although there is no way to tell how many lives have been saved by using the information from the EWIRDB, many combat pilots have come through NASIC and have extolled the virtues of the EWIRDB.

The EWIR development program has been a worthy example of the success that can be achieved by cooperation between the analysis and the computer systems elements of NASIC. Technical direction was actually shared during program development by Ms Susanne Barber and Capt Ed Serine. That spirit of cooperation has persisted throughout the operational phase and into the Next-Generation EWIRDB development phase, with Mrs. Sharon Cain directing the IT functions and Mr. Donald Chrapko directing the analytic and overall program management functions.

The EWIRDB has survived in nearly its original form for 27 years—a testament to the viability of the original concept. In about 1996, I saw the need to initiate an effort to update EWIRDB, because the data base format on which it is built was to be discontinued by the agency that owns it. I submitted an initiative requesting funding to support the development of a modernized EWIRDB. This initiative submission resulted in funding for the EWIRDB replacement: the Next-Generation EWIRDB. That program very recently became operational and is now known as the Next-Generation EWIRDB System, or NGES. But that remains for another story.



Russian Protivnik-GE Radar



Russian Gamma-S1E Radar



Russian 76N6 Radar