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The VELA Incident: A Statement Written by Dr. Alan Berman

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Summary:

A statement written by Dr. Alan Berman about the 1979 VELA Incident.

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The VELA Incident

A Statement Written by Dr. Alan Berman

Director of Research at the Naval Research Laboratory (NRL) at the Time

On September 22, 1979, an aging U.S. surveillance satellite, part of the VELA nuclear detection system, detected what appeared to be the optical signature of a nuclear explosion in the air off the coast of South Africa.

Sometime after the event, I received a call from Frank Press (The president's Science Advisor) asking me to visit him at the White House. Frank provided me with background information about the Vela event. He said that since the optical signature reported by the VELA satellite was considered ambiguous and the United States Air Force air sampling efforts did not detect any radioactive material, he wanted the Naval Research Laboratory, to exploit all available space and terrestrial sensors and other geophysical measurements—including underwater acoustic data—to determine the geographic location of the signal's source. Hopefully, that exercise would resolve the existing ambiguities. This led to an investigation that I was directed to lead.

In response to the White House request, I put together a relatively large team composed of about 30 Ph.D. level scientists, i.e., Nuclear Physicists, Satellite engineers, Hydro Acoustic experts, Atmospheric Physicists, people familiar with all components and performance of the VELA network, and people who had been involved with US Nuclear tests. We were also supported by orbital and sunrise computations provided by the US Naval Observatory. We were given clearance and access to any and all relevant sensor systems of the US and some foreign nations that we requested. Most of these clearances were at the TS SI/TK code word level. Even today, I am not comfortable discussing, or alluding to them."

We looked at evidence from all over the world, including such exotic things as the levels of Radionuclides, (from fallout) in the thyroid glands of Australian sheep.

We found acoustic signals that were detected by many sensors of both the Air Force Missile Impact Location System (MILS) and the Navy's Sound Surveillance System (SOSUS). These sensors were located at various widely separated locations. Because Acoustic energy in the ocean propagates at roughly 5000 feet per second, two sensors that were located 1000 nautical miles apart had time differences of arrival of about 1200 seconds (~20 minutes) apart. We examined many hours of records at many sensors and recorded the time differences of arrival of a large signal that was similar to signals recorded in the Pacific resulting from US nuclear weapon tests. In the Atlantic we re-examined recordings from the 20-ton explosive Artemis test.

Our team examined the time history of every sensor in the MILS and SOSUS nets. All sensors that were not in the acoustic shadow of the Mid Atlantic or Iceland-Faeroes Ridges, reported detections. All sensors that were in the acoustic shadow of these under water mountain chains failed to report detections. There were no false alarms. Also, no detections were made in the wrong time sequence.

Knowing the location of our sensors and knowing the time differences of arrival of signals between them we were able to perform the equivalent of an inverse GPS calculation. (NRL developed GPS in the late 60s and early 70s, so we had pretty good software to do the job.)

We put all of our information together and after many computations we concluded that an explosion had happened near Marion Island and Prince Edward Island. (The two Islands are jointly named

the Prince Edward Islands.) They are located about 1,200 miles south- east of South Africa. The highest point on Prince Edward Island is 2370 feet above sea level). Since these islands belonged to South Africa, we suspected that the source of VELA detection was probably related to activity by South Africa.

One of the members of the NRL team was Col. Jack Brown who was a retired Army Colonel. While Jack was in active service, he had been assigned to the Defense Nuclear Agency (DNA). In the days before the US had signed the Test Ban Treaty, while assigned to DNA, Jack had overseen several nuclear tests.

I asked Jack, "If you were a South African in charge of your country's first nuclear test how would you go about it?" After some thought Jack replied that he would look up what he could find out about how the US and Soviet Union conducted their above ground tests, and he would follow their procedures as closely as possible. I then asked how the US conducted its nuclear tests. Jack then outlined the many technical problems that constrain the when and where of the test of a nuclear weapon.

The criteria for where to test (some place remote from Civilization with nearby locations for test monitoring equipment) were rather obvious. Jack's comments on when tests take place were more interesting. Jack pointed out that all US and Soviet atmospheric tests of nuclear weapons took place 10 minutes before sunrise occurred at the highest point where measurement equipment was located. He outlined the reasons why this was so and provided a long list of considerations why this time was chosen for tests of nuclear weapons by both the US and Russia.

In the United States, the US Naval Observatory computes all predictions for sunrise and sunset. The Observatory is located in Washington DC and its Director was a close friend of mine.

On a hunch, I called him up and asked him to have somebody compute the time for sunrise on September 22 at the location of Marion and Prince Edward Island at an altitude of 2730 feet above sea level that corresponded to the altitude of the highest peak on the Island. My friend was used to my asking him to make strange computations, so he did not ask me any questions.

After a few hours, I received a phone call that provided me with the information I had asked for. To my amazement the time quoted for sunrise was within one second of being 10 minutes after the suspected detonation had been detected.

I was pretty sure that we had our smoking gun. In order to make our case stronger, we decided to reexamine the worldwide data from all relevant sensors. The results pointed unambiguously to the Prince Edward Islands.

The classified report that the NRL team produced for the White House was thorough and highly detailed, approximately 300 pages in length. The original classification of the report was TS (SI/TK code word). I also recall that there were certain touchy classification issues involved in the preparation of the report, possibly because the report used information from both Navy and Non-Navy sensors. The report used information from DOE, CIA, State Department and other agencies, but it was not circulated back to those agencies.

The full report was sent only to the White House and I believe it was not circulated beyond it. I recall that one copy went to John Marcum, who was with OSTP staff although, as I discovered years later a sanitized copy might have gone later to the Los Alamos National Laboratory (I was told years later that LANL used some portion of the report for a textbook developed for training IAEA inspectors)

The NRL concluded, based on legal standards criteria (i.e., preponderance of evidence vs. shadow

of a doubt), that the NRL report had demonstrated a preponderance of evidence but did not make a case beyond the shadow of a doubt.

We brought our findings and conclusion back to the White House and we were surprised to find that there was a group there, led by Jack Ruina who objected strongly to our report. In the course of our study we had come across the fact that there was a CIA sensor system that should have detected a Nuclear Detonation had there been one. It did not detect an event. Ruina's panel argued that because of the failure of the Agency sensor to make a detection, our findings were not beyond a shadow of a doubt, and at best the findings should be considered ambiguous.

In my view, the Ruina panel did not understand how underwater sound propagates. I should stress that NRL had studied acoustic records from previous nuclear tests. We knew that low frequency sounds gets trapped in the deep ocean sound channel and that it will bounce off continental shelves. A time-bearing plot of echoes from a large detonation provides a map of the continental shelf. We understood that a signal originating from the vicinity of Marion Island would have bounced off Antarctica continental shelf and then up the Atlantic basin. Ruina thought that was preposterous and he would not believe it. Nevertheless, despite our difference of opinions, I still believe that Jack Ruina was a decent man who honestly believed in the findings of his panel.

Apparently, our answer was not the kind of answer that the Carter Administration expected or wanted to hear. I do believe, however, that President Carter may actually have read, or at least scanned, our report. Carter was a Rickover trained man. Based on the very few interactions I had with him, I think that he tended to try to understand technical issues and not take a briefer's words for granted. His Navy experience with the technology of submarines, meant that he had complete knowledge of the capabilities of the SOSUS system. Thus, I have reason to suspect that he believed the NRL report. When President Carter wrote in his diary, on February 27, 1980 that "we have a growing belief among our scientists that the Israelis did indeed conduct a nuclear test explosion in the ocean near the southern end of South Africa." I believe that in his reference to "our scientists" he actually meant NRL scientists. His entry became publicly available only in 2010.

In retrospect, I realized that, from the political standpoint of the Administration, our report put them in an awkward situation. The United States was a signatory of the Nuclear Test Ban Treaty. Both the Carter and proceeding administrations had assured the public that systems were in place that ensured that all Nuclear Tests would be detected. Our report showed that at least one test escaped observation.

What was more awkward was the fact that Israel and South Africa were known to have collaborated on Nuclear Projects. The Uranium for Israel's reactor at Dimona had come from South Africa. In addition, some Israeli Nuclear Physicists had served as visiting professors at some South African Universities.

My close Israeli friend Dr. Dror Sadeh who had worked at Dimona, (where he had been the victim of an accident that led to his receiving excessive dosages of radiation that eventually led to his death from cancer) seemed to have a more than a casual knowledge of the issues related to nuclear weapon design. Somehow, whenever I met him, or the Israeli Science Advisor at the Israeli Embassy in DC, (Avraham Hermoni), the conversation always nudged to how American Satellites could locate a nuclear detonation.

The same was true with other Israeli Scientists I met in the years after I left NRL.

If our findings were correct, the implications were that Israel may have been involved along with South Africa in the design and test of a nuclear weapon. If Israel had indeed violated the Test Ban treaty, the US would have been forced to stop all military aid to Israel and to impose economic sanctions. I believe that, that was something the Administration was not about to do.

I think that rather than publicly taking on some unpleasant conclusions, the Administration elected to bury the report by making its classification so high that few people, if anyone, could read it, and announced that the VELA detection was an error generated an old failing satellite that would be replaced in the near future.

Much later, when I became the second person in the United States to be awarded the Presidential Distinguished Senior Executive Service Award, I learned that President Carter had intended it to be implicit admission of his acceptance of our conclusions. Indeed, I think that President Carter personally believed in the NRL report.

President Carter signed the award and personally shook my hand when he presented it to me. The Citation stated:

“The President of The United States of America has conferred upon Alan Berman the rank of Distinguished Senior Executive in the Senior Executive Service for sustained extraordinary accomplishments in management of programs of the United States Government and for leadership exemplifying the highest standards of service to the Public.” Signed Jimmy Carter

The citation was accompanied with a check in the amount of \$20,000, which was a significant amount of money relative to my annual salary at the time.

About twenty-five years after the VELA event, while I was visiting the Los Alamos Laboratory on an unrelated matter, I was asked to leave the meeting I was attending to meet with someone whose name I did not recognize. On leaving the meeting I was greeted by a man who said, “Dr. Berman, you probably don’t remember me, but back in 1979 I was a member of the White House staff assigned to review your report. Today I am the head of the program here at Los Alamos where US Nuclear Inspectors and those of the International Atomic Energy Association (IAEA) are trained. We use your report as a text- book on how to investigate suspected nuclear tests. The integrity and completeness of your panel’s report is the standard that future nuclear inspectors are expected to adhere to.” I finally felt completely vindicated.

Originally Drafted: October 26, 2019, amended in 8 November 2019.