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**Job Description**

Electronic warfare specialists are technicians who serve and identify radar signals that are processed through tactical display units, are processed and displayed in numbers. The specialist identifies the number, translates it into an identification number in order to determine what the entity (ship, airplane, etc.) emitting the radar signal is capable of doing. The information provided by the electronic warfare specialist is used to determine the ship's appropriate response.

**CONCEPT: Radar signals and the electromagnetic spectrum**

If you look at a radar scheme – screen, you see little blip or little dot on the screen. Well, EW [Electronics Warfare], we actually hear what the radar sounds like. Every human being has a fingerprint. Well, every radar has a fingerprint. It has different numbers or parameters, so those parameters, we take those four or five dozen numbers and then we link that to a radar and that's what we call a contact basically.

The radar is going to shoot out a beam. It's going to shoot out a signal just like your TV station. It sends out a signal, the antenna picks it up and it shoots down into your cable and through the TV. Well, the radar is going to send out that same – not the same signal, but it's going to send out a signal. That signal's going to hit our antenna, comes through our electronic gear, gets processed and is displayed in numbers. We take those numbers, translate it into an elite notation, which is basic identification number. We take that identification number and say, okay, for example, this is the Volkswagen radar, and that's how we determine what that radar is capable of doing. That radar fire control, surface search, air search and so forth. Missile guidance. That's how that works.

The electromagnetic spectrum plays a very, very large part of EW. All of your radio frequency signals are found in that spectrum, the location depending on the frequency. The higher the frequency or the lower the frequency is going to determine whether it's going to be a threat or a friendly contact. The higher the frequency, the smaller the platform. You can't have a missile with a very low frequency because it's going to be impossible to fly that missile. So when you take your higher frequency signals, those are going to be found on your smaller platforms which is your aircraft and your missiles and your fire-control radar. That's where all of your threats are going to be, so you have to know how radio frequency works.

Aircraft missiles, fire-control radar, those are high priority platforms. That's the main focus we want to look at. Those are called high priority platforms because that's where your – all of your threat's going to be. You're not going to pay attention to a low frequency surfer search radar because that's going to be, you know, your merchant ships. No threat to me whatsoever. But once you get into that higher frequency range, aircraft, like I said before, fire control, missile guidance missile, any type of high frequency signal, those are going to be your threat platforms because a merchant vessel is not going to be a threat. If he's swimming by us, what can he do to us? Nothing. But when you have your aircraft flying through, they can drop bombs, they can shoot missiles at us, use their guns or so forth. That's why we label that high priority platform. A platform is a boat, a ship – any contact basically is a platform.

The [EM] spectrum is critical. You have to know it. If you don't, you're going to be lost and you're going to pass some – some false information to the guys that are above you that are actually doing the shooting and stuff like, so you have to know what you're talking about. If you say something wrong and these guys put their trust in you, you know, so you have to know what – you have to be on the money every time.

**CONCEPT: Using mathematics**

Mathematics plays a – an integral part [of electronic warfare]. When you're dealing with fixing the circuits, if something burns out or one of our transformers or something like that breaks. Ohm's law is a good one. You have to use that to be able to fix all of your electronic circuits. Binary numbers is a good one. That's the way computers talk, in ones and zeros. The way that works is your computer is turned on and ones and zeros, on and off, on and off, on and off. It's like a Morse code that computers use. So you have to understand when that computer or that piece of gear, that equipment gives you this code, you have to take that, translate it into regular numbers, decimals, and figure out what the problem is.

### **WORK SKILLS: Working with people -- Communication skills**

Working with people basically is the big skill that I've learned. Once you learn how to work on the gears, you know, they teach you how to do that, but everyone learns it a different way. So if I try to get my hands into that piece of equipment and this guy or this girl over here is trying to get their hands into it, you have to be able to work together, you know, and that's something that I had never really experienced before because I was always used to doing things my own way and my way only. So getting other people in there to work with me is – was the hardest thing for me to do, but now I've adjusted to that and it works fairly well.

You have to be able to get to know people and I believe that I could change somebody, you know, just talking to them, sit down and have a nice conversation with them, you have to be able to talk. You have to be able to – if you can't communicate, you can't get anyone else to communicate back to you. So the main thing is you yourself knowing how to communicate with other people.

The Navy's taught me a lot of different protocols. I had the Texas slang – I kind of still have my Texas slang, but I've learned to diversify what I – how I express myself. You know, when I'm in a professional situation, I know how to be professional. When I'm, you know, hanging with the fellows or doing whatever, I know how to hang with the fellows as well. So it's taught me how to control how I express myself, which is very important. I don't want to go to the bank and get a loan and act like I'm with the fellows, you know. So it's taught me how to express myself in a unique way.

The writing that I do, evaluations, you have to do lessons learned. Okay. We were over here, if we ever have to go back, what did he learn from the last time we did it? And you have to be able to write clearly and precisely. You have to get your point across and if you don't have very good writing skills, you're not going to be able to do that.

Communication is more important than technical. If I go into to speak to the Admiral or to speak to my Captain, I can't talk to him the way that I speak with, you know, the guy that's in there with the gear with me. I can't say, hey, give me that wrench or you need to do this. I can't do that. So learning to communicate with certain people, for example – you don't say to your grandmother, "yeah, I'll do it in a minute." It's "Yes, ma'am, here I come". That's pretty much how communication falls into place. You have to be able to know how to speak to each person.

### **WORK SKILLS: Working with information -- Learning new things**

The most interesting thing is learning new stuff, learning new things. One day you can think that you know it all and then someone else comes along from San Diego or Norfolk and they've experienced this and [you learn from them]. So you're constantly learning new things on how everything works.

What do I love about my job? I love learning new things. I can apply them to anything. You know, when I go home, I can fix a refrigerator or my TV now because I work with electronics, you know, onboard a ship and it's basically the same principles. Before I'd have to go out and spend \$200-300 to have the TV repairman come fix my VCR or whatever, but I can do that myself now, so learning all the different jobs and working with that stuff is the best thing that I like about it.

### **JOB/CAREER: Job overview**

My name is Valentino Espinoza. I am a Second Class Petty Officer in the United States Navy. My job title is an electronic warfare specialist. I'm stationed onboard the U.S.S. Inchon in Ingleside, Texas.

I've been in the Navy approximately five years. I started out in Boot Camp, of course. From there I went to Pensacola, Florida. I went through A and C School.

My A School consisted of working with electrons, Ohms law, frameworks, which is going to include your electromagnetic spectrum, anything dealing with electronics basically is what my A School covered. When I went on to C School, I learned about how exactly the equipment worked and how the brains of the computer worked and if something breaks, how I have to fix it. A School, it was really just your basic framework really.

I stayed in Pensacola for another year. I did some master at arms work there, just pretty much basic security. From there I went to Charleston, South Carolina. I was stationed aboard the U.S.S. Santa Barbara. Did a cruise. Went over to the Mediterranean, the Gulf, the Arabian Gulf. Did some exercises over there. Came back home, decommissioned the ship and here I am in Ingleside, Texas.

That's five years.

### **JOB/CAREER: Electronic warfare**

Underway it's very hectic. A lot of stress. Sometimes you work 16, 20-hour days. The main purpose of EW or electronic warfare is anti-ship missile defense. What we do is say we pick up a radar contact. We'll say, okay, this radar is found on this ship. This ship has these weapons on it. This is what they're capable of doing to us. This is what we have to do to combat that. Anything dealing with electronic countermeasures to protect the ship, that's what EW is going to do. We're the ones responsible for that.

[To learn about the radar signals and what they mean], you have to go into a lot of publications, study up on certain countries, what ships they have, what type of ships they have, and you find out their basic complement. Once you learn all of that, you find out, okay, this radar is going to meet these parameters. These parameters match this weapon. You have to be able to memorize all of that stuff, so memory plays a big part of EW. You don't want to go into a tactical situation and have to scramble through all of your pubs trying to see, okay, where is this at? So you just kind of have to know and study. It's a lot of studying, a lot of studying.

When I look at a contact (radar signal on the screen), or when I first started, it was – it was very hard, very hard at first because they throw all of this stuff at you and you're expected to just know it off the bat like that. So, I mean, it was a lot of extra studying coming in 6:00, 7:00 at night just to look up in a book. A couple of months down the road, doing it day in and day out, you kind of learn, okay, this guy's coming from here. This is what I need to do, stuff like that. It's exciting at times, but then at other times, it's stressful. A lot of stress can be put on you.

I've been in two warfare situations. 1997 we did Operation Southern Watch when I was aboard the USS Santa Barbara. Iran was flying planes in and out and we had to watch those guys to make sure that they didn't fire anything upon us. Just recently in the Kosovo situation we were involved in Operation Shining Hope where all of our helicopters or helos, they would fly out and we had to make sure that their land-based missile sites weren't locking onto them. So we had to watch the whole spectrum to make sure we could only see U.S. contacts. We didn't want to see anyone else. We just wanted to see U.S. contacts so when those guys did pop up, we would notify the appropriate authorities and then they would take care of that.

[In tight situations,] confidence is important, I think. You have to be able to say, look, this is what I have. Pay attention to me or we're all going to die. That's basically confidence to be able to speak up and get your point across clearly. You have to know what you're doing and if you – if you hesitate, you know, when you're talking missiles, you're talking split seconds. You know, mach 10, mach 9 – not mach 10, mach 1, 1.9. That's fast. So when they fire that, you got 30 seconds to live unless you can combat this thing.

The most stressful situation I've been in is in the Arabian Gulf. Picked up a submarine that no one knew was there. Didn't receive any intell [intelligence] on it and all of a sudden it just popped up, shot a flare out there, and if they would have been hostile, we would have been dead because we wouldn't have known about it. You shoot the engines up and just drive and drive and drive because you never know if they're going to fire a torpedo at you, you know, or a surface-to-air missile. Your basic maneuvering. Basic maneuvering. That was the most scary situation I've been in.

### **JOB/CAREER: Need for a strong family**

I thought the Navy was going to be like you see on TV, you know, walking around in boots and yes, sir, no, sir. But it's like a regular job. You come to work, you do your job, you go home, and you're with your family.

I've had a lot of friends that were in the Navy and they would tell me all of their stories and they've been here and did this and did that, and you know, I wanted to experience that, so I came in. The travel – you're going to see a lot of places. I've been to a lot of places in the world.

Being away from your family sometimes is very hard. You have to be able to adjust to anybody of all races, religions, because you're going to be living together. That's your family for that six months that you're underway, that you're in another country. So you have to be able to adjust. You have to have a strong family to support you while you're gone and it's – it can be stressful at times, but then at other times when you get the mail and you get your care packages and you talk to them on the phone, it can be rewarding sometimes as well.

My family likes the Navy sometimes. Sometimes when I'm at home. Like I said, you have to have a strong family that has a strong backbone to support you when you're gone. The family is supposed to be family and you're supposed to take care of things together. Well, you can't do that sometimes when you're gone. You can't take care of, you know, going to the bank or buying your son Christmas presents or stuff like that. So you have to have a very strong, strong family basically.

### **JOB/CAREER: Career path**

Right now I'm trying to get into an officer program. I'll find out in September the results. The intelligence field, working with the Office of Naval Intelligence, Defense Intelligence Agency or other intelligence agencies, that's where I would like to go. If I decide to get out of the Navy, I can use the clearance that I have now instead of – say, the FBI, if I want to do the FBI -- instead of their spending \$15,000 or however much money they're going to spend to do background searches and do all their checks. I have a secret clearance already that the Navy provided for me and that would pretty much open two doors for me. I could do security. Working with radar companies. Raytheon is a very big radar company out there with a very nice starting salary. I wouldn't mind doing that if I decided to get out. If I stay in, I would like to choose the officer's path and see how far up I could actually advance.

The Navy offers you a lot of different wide varieties of things to do. For me, my interest and what I'm interested in, I see the Officer's community as being what I want to do, being in a leadership role, mentoring to junior sailors. That's what I would like to do because I – I think that I can, you know, motivate or give them something – some type of incentive to work for. It shouldn't have to be, you know, hey you, get down there and clean this bilge or sweep this peaway or – you know, like before, communication and confidence are the two main principles that you have to apply.

I learned that from my grandmother. I got all my confidence from my grandmother. She told me that if I don't believe in myself, who is? You know. So I had to believe in myself for me to excel. If it wasn't for her, I don't believe I'd be here now doing what I'm doing now. So my grandmother played a very important role in my life.

If I had to tell students or give them some type of advice, I would tell them to stay in school pretty much. That – that's a big one. But everyone says that, stay in school. Never give up. Always know that there is one step that you can climb higher than where you are now. You don't have to stay at one level. You can always move up a little bit even if it's, you know, a inch at a time. You can always move up. At the same time you can fall down if you let yourself, but I always try to climb and make myself better than what I am.