

# Navy Electrical Safety

Gary Dreifuerst for Stan Berry

ESTG 2017

July 24, 2017

# Roles

## ■ Shipboard

- 120, 480, 600, 4160, 13.8kV (Ford) VAC
- DC power to Radar & Countermeasures
- DC storage for AC drive systems – Submarines

## ■ Catapults

- USS Gerald R. Ford – 2017
- USS John F. Kennedy – 2020
- Electromagnetic Launch – not steam
  - Significant DC systems involved (Pulse Power like accelerators or lasers)

# CVN78 Gerald R. Ford cnet \$13B



# CVN78 Gerald R. Ford cnet

- 1106 Ft long
- 250 Ft high
- 90000 tons
- 35 mph
- Electromagnetic Aircraft Launching System (EMALS).
  - Rotating Machine is energy source

# CVN78 EMALS Test cnet



- Accelerate a 100,000 pound object to a speed of 125 mph in less than 300 feet
- $Wm = 0.5 * 45359 \text{ kg} * 56 \text{ m/s}^2 = 71 \text{ MJ}$

# CVN78 EMALS Performance

- <http://time.com/4775040/donald-trump-time-interview-being-president/>
- You know the catapult is quite important. So I said what is this? Sir, this is our digital catapult system. He said well, we're going to this because we wanted to keep up with modern [technology]. I said you don't use steam anymore for catapult? No sir. I said, "Ah, how is it working?" "Sir, not good. Not good. Doesn't have the power. You know the steam is just brutal. You see that sucker going and steam's going all over the place, there's planes thrown in the air."
- It sounded bad to me. Digital. They have digital. What is digital? And it's very complicated, you have to be Albert Einstein to figure it out. And I said—and now they want to buy more aircraft carriers. I said what system are you going to be—"Sir, we're staying with digital." I said no you're not. You going to goddamned steam, the digital costs hundreds of millions of dollars more money and it's no good.

# EMALS Rational

- [EMALS explained](#)
- Flexibility and Cost
- Mission diversity is possible
- Reduced maintenance on steam systems
- Less airframe stress, since acceleration rates are tailored to aircraft