HAWC

HARDWARE ONLY CONTROLLER

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WHO AM I…

DEPARTMENT OF THE ARMY
THIS WE'LL DEFEND
1775
UNITED STATES OF AMERICA

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

U.S. DEPARTMENT OF
HOMELAND SECURITY

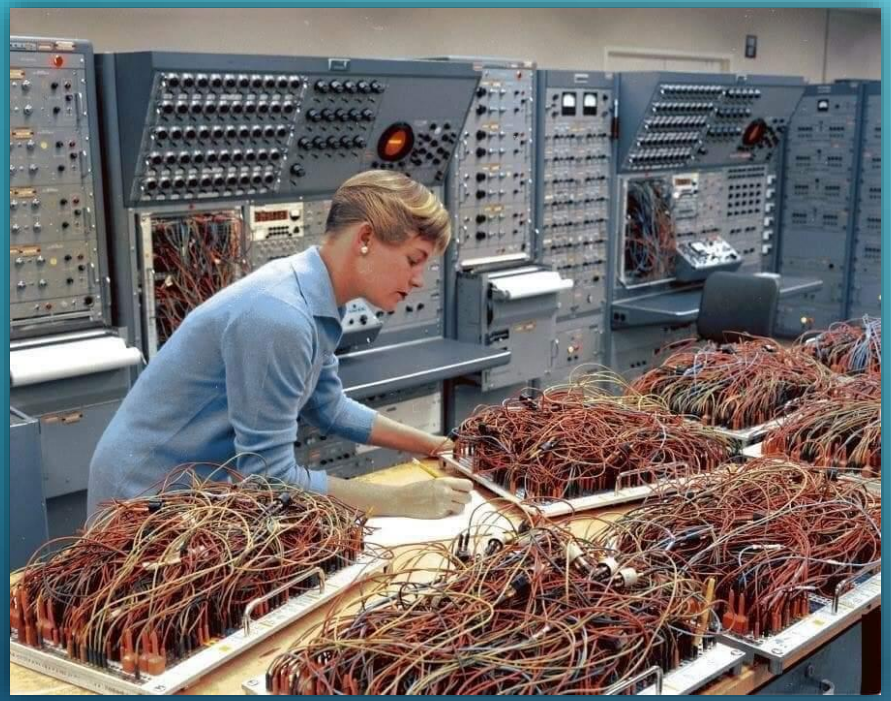
UNITED STATES NUCLEAR REGULATORY COMMISSION

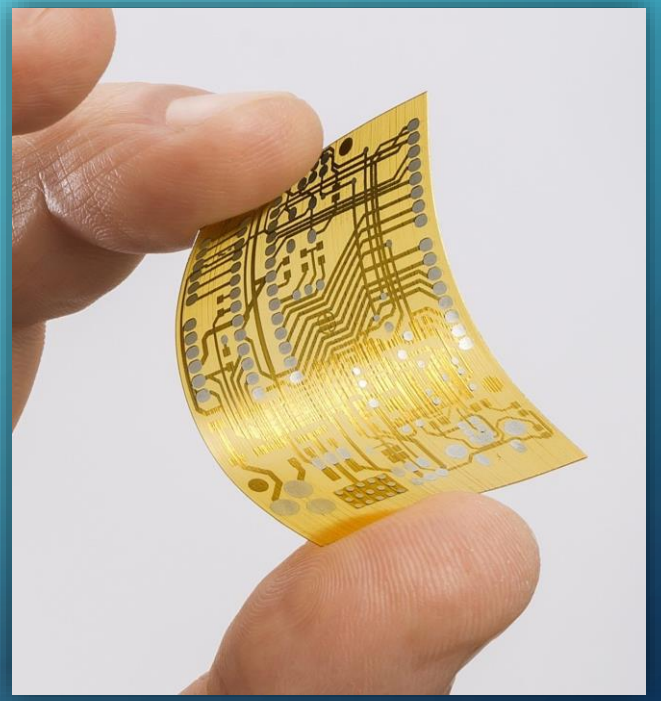
DEPARTMENT OF ENERGY
UNITED STATES OF AMERICA

AURORA

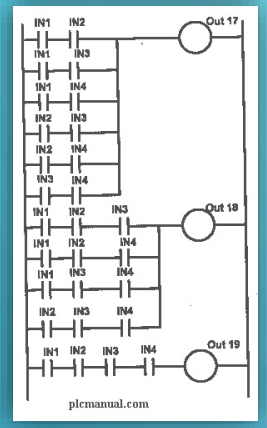
https://www.muckrock.com/news/archives/2016/nov/14/aurora-generator-test-homeland-security/

PROGRAMMING IN 1948

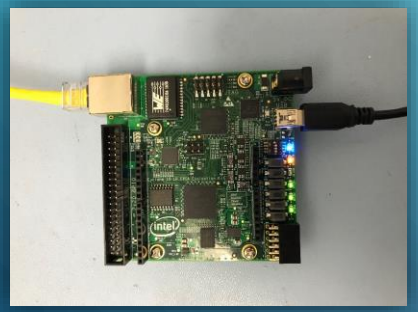


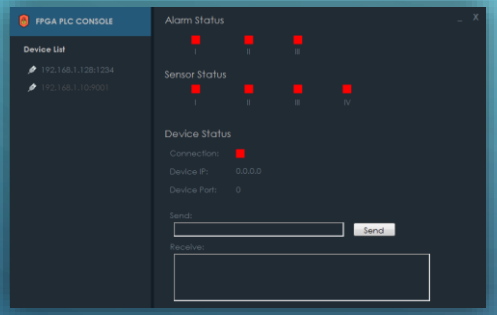


HAWC PHASE I




```
// Internal registers and interconnects
wire in1, in2, in3, in4;
wire out17, out18, out19;

/*****************************************************
 * SIMPLE PLC LADDER LOGIC
 *****************************************************/
// Assign the outputs according to system
assign out17 = (in1 && in2) || (in1 && in3) || (in1 && in4) ||
               (in2 && in3) || (in2 && in4) ||
               (in3 && in4);

assign out18 = (in1 && in2 && in3) || (in1 && in2 && in4) ||
               (in1 && in3 && in4) || (in2 && in3 && in4);

assign out19 = (in1 && in2 && in3 && in4);

// Assign the plc output such that LED 3 is least critical and
// LED 1 - LED 1 is most critical (note: LEDs active low)
assign plc_out[3] = (out17 || out18 || out19)?1'b0:1'b1;
assign plc_out[2] = (out18 || out19)?1'b0:1'b1;
assign plc_out[1] = (out19)?1'b0:1'b1;
/*****************************************************
 *****************************************************/
```



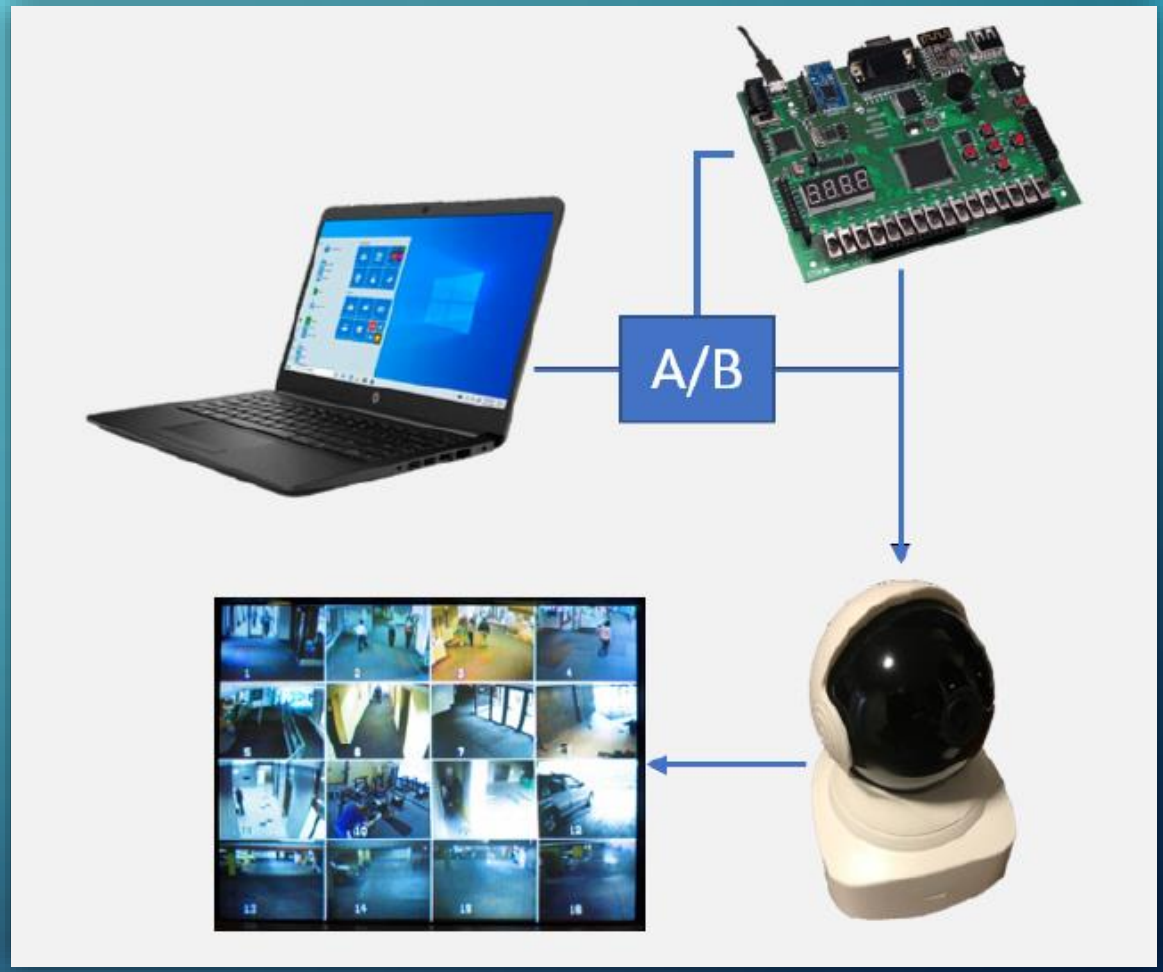


- Basic safety ladder logic with sensor input and alarm status output
- Converted to Verilog Hardware Definition Language (HDL) to load onto the Field Programmable Gate Array (FPGA)
- Graphical User Interface (GUI)

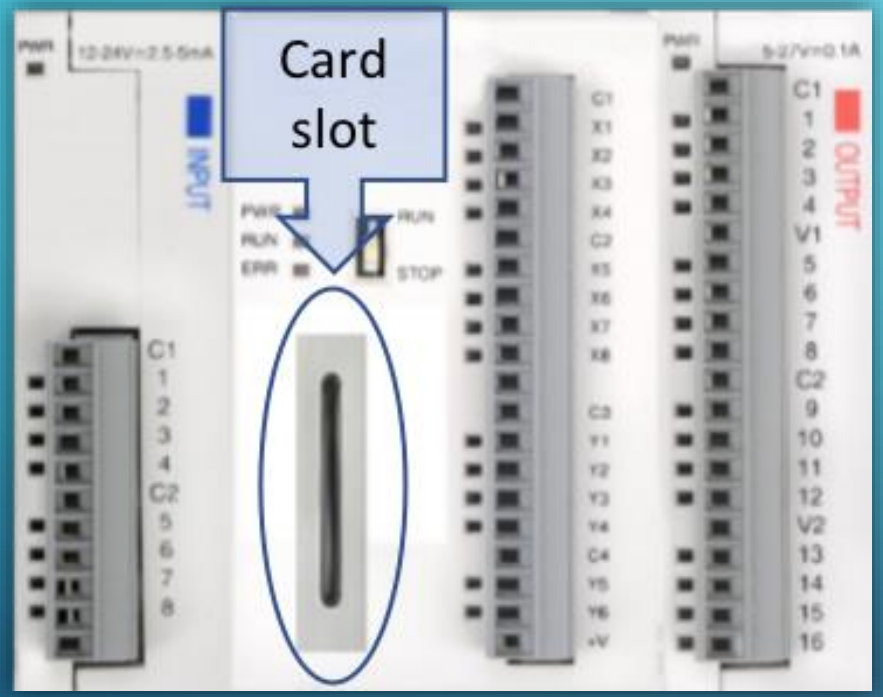
HAWC PHASE II

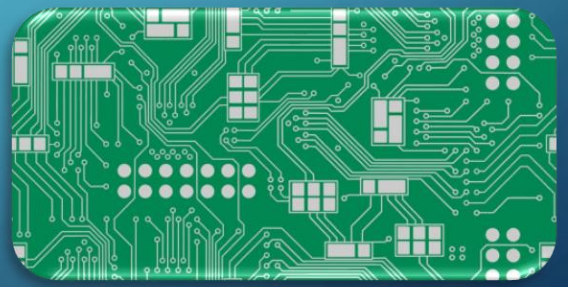
- HAWC protecting a networked video camera
- Demo on YouTube:

https://www.youtube.com/watch?v=gXEehgW-FyU



HAWC PHASE III





Notional

MARKET APPLICATIONS

Plant Safety Systems

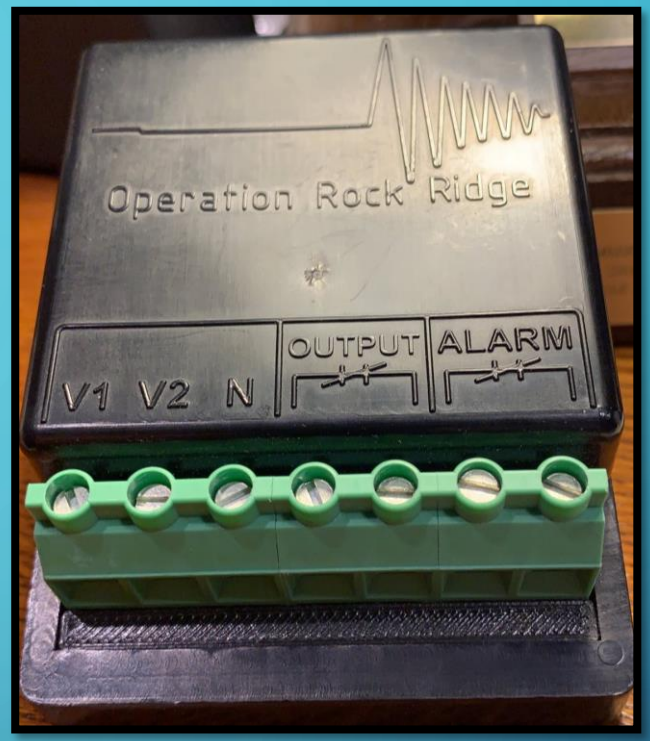
Industrial Control Systems (ICS)

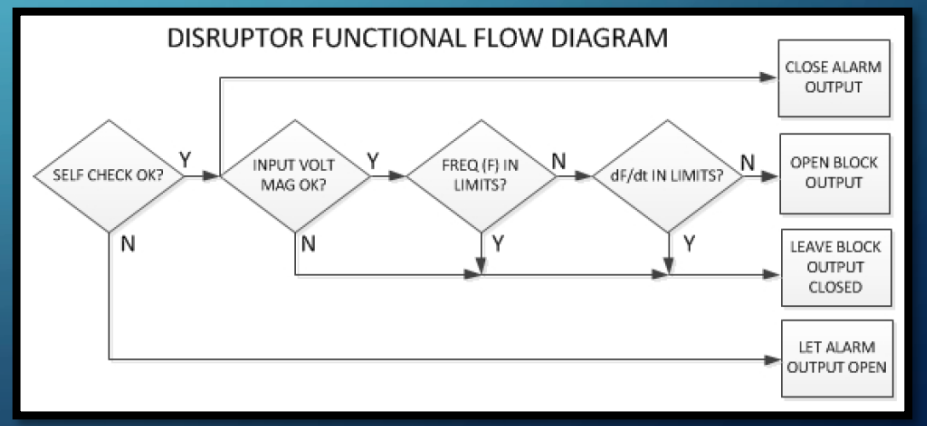
Internet of Things (IoT)

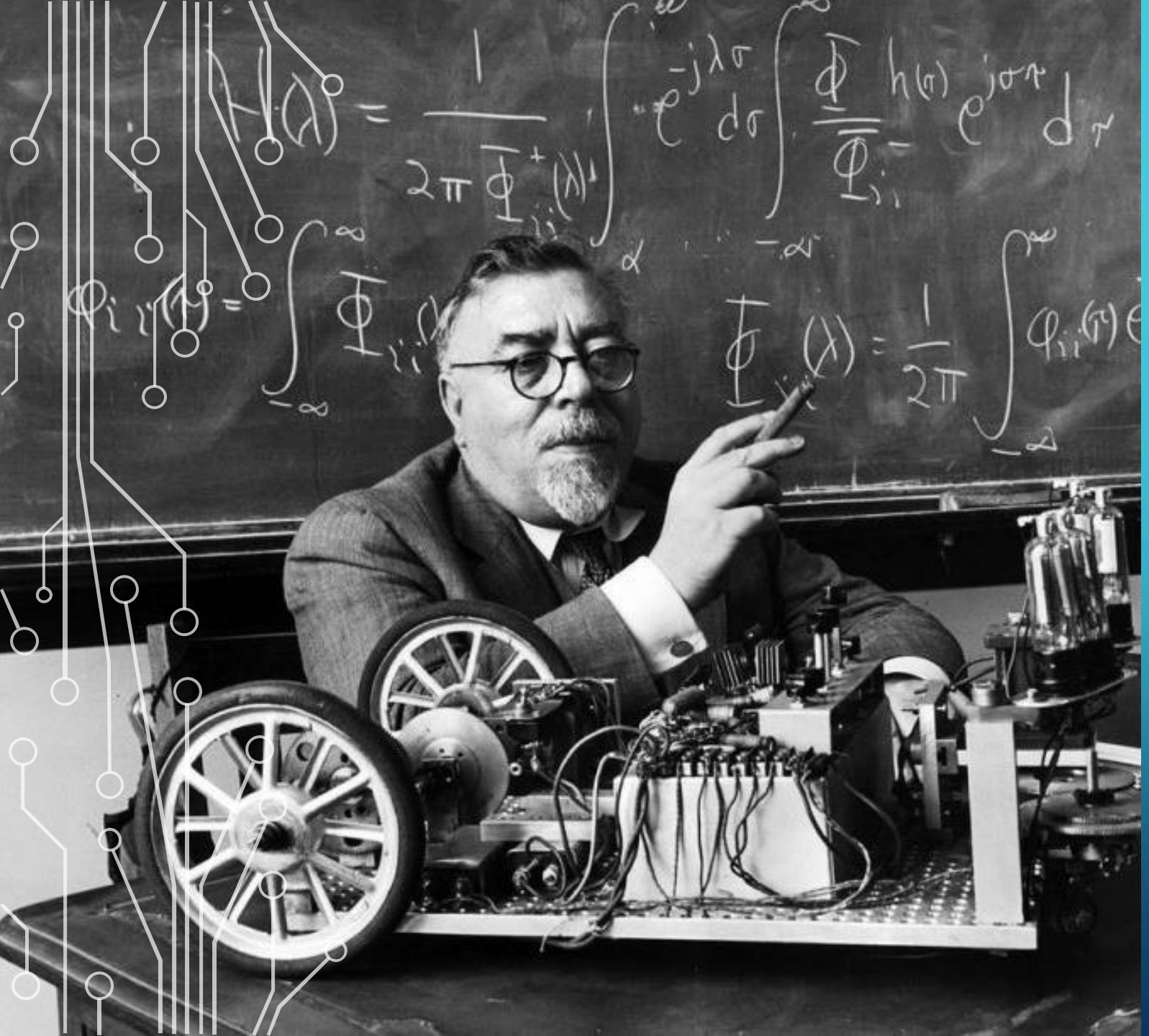
Deterministic cyber protection for high value targets

AURORA DISRUPTOR

- Purpose built hardware
- No moving parts/no software
- Deterministic protection implemented with grid physics
- Over 300 units installed in the U.S.
- More information
  - Tim Roxey scubanuke@gmail.com







FORESIGHT

"We have contributed to the initiation of a new science which, as I have said, embraces technical developments with great possibilities for good and for evil."

Norbert Weiner

Cybernetics, 1948

THANK YOU

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