

# Exploring the Marketability of Fermilab's Existing Patents

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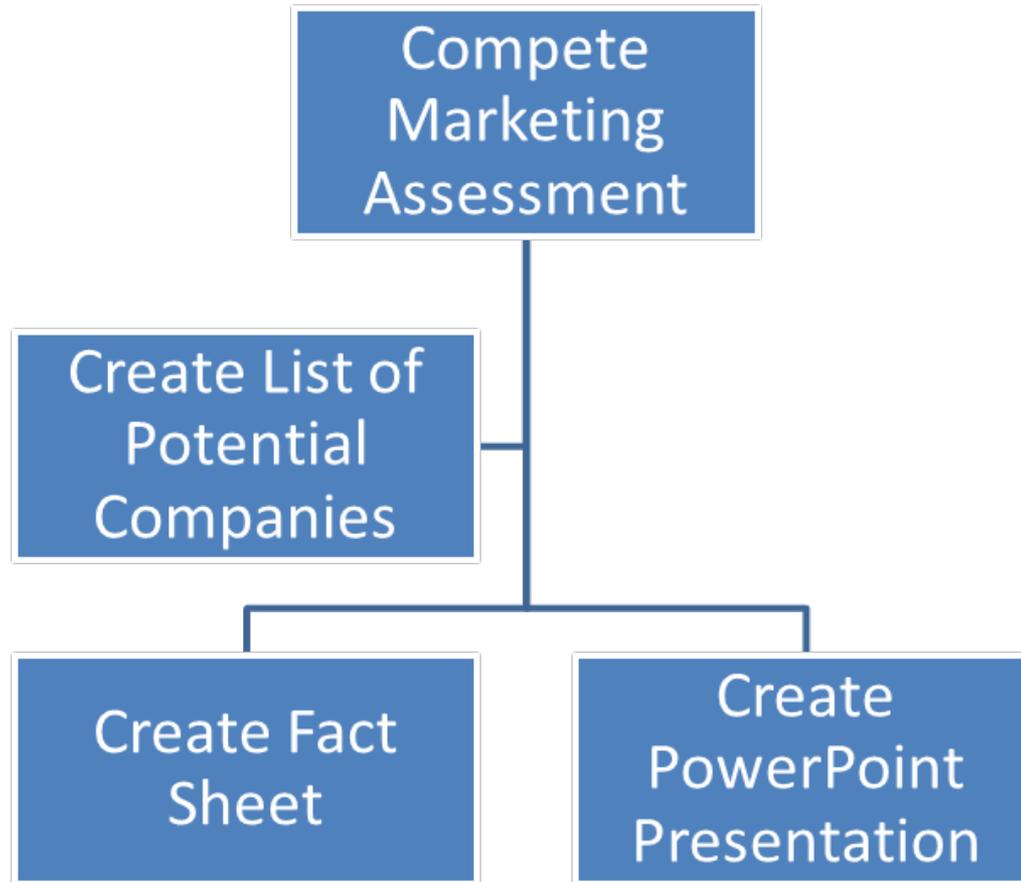
# Background

- Office of Partnerships and Technology Transfer
  - “The process by which existing knowledge, facilities, capabilities, developed under federal R&D funding are utilized to fulfill private or public needs”
- Intellectual Property
- Patents

# Outline

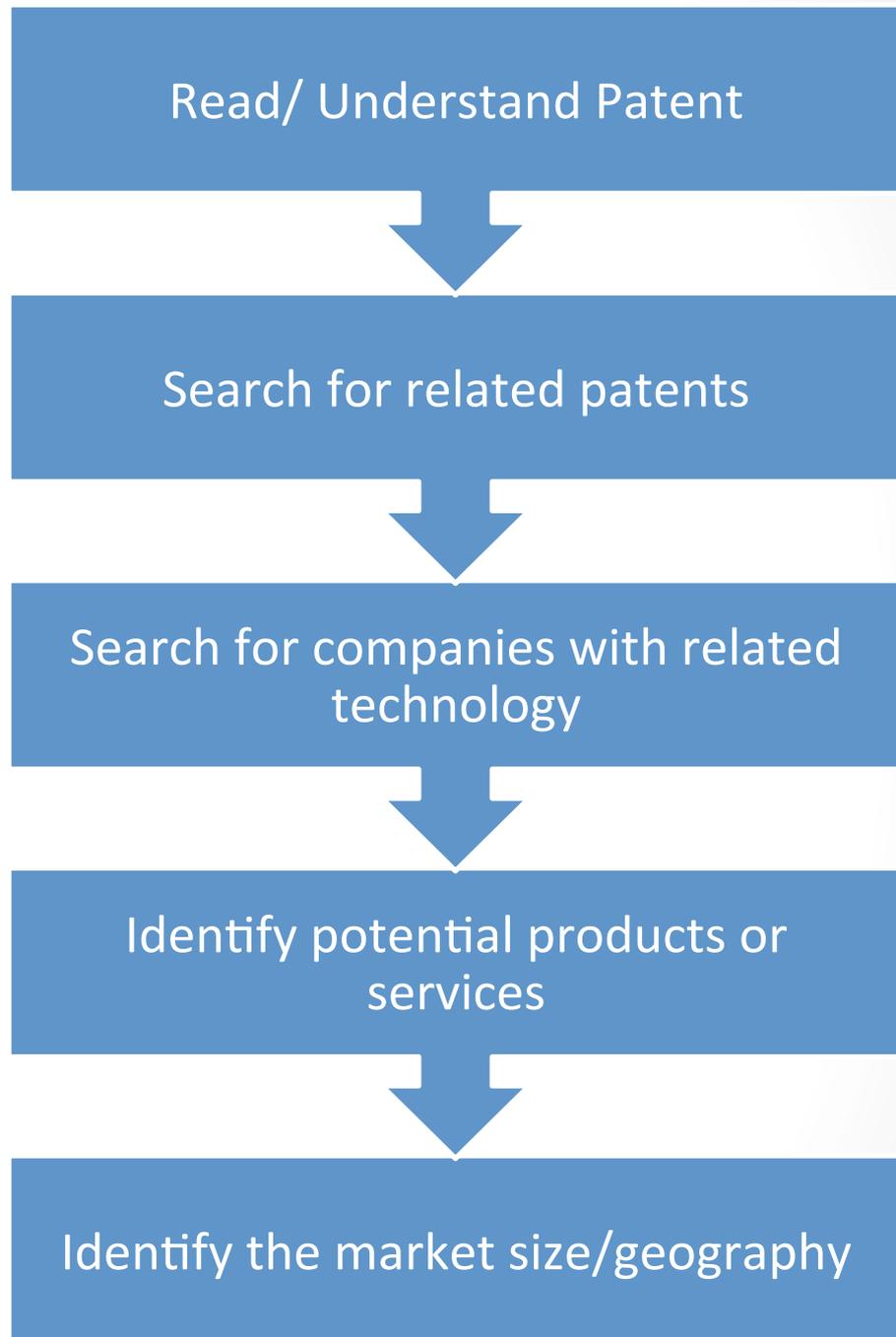
- Three main Patents that were explored
  - Single Event Upset Suppression System, by James Hoff
  - Oil Boom Apparatus, by Arden Warner
  - Nuclear Detection System, by Alan D. Bross, Kerry L. Mellott, Anna Pla-Dalmau
- How to assess current Fermi technology?
- How to market Tech?

# Assignment



# Methods

- What can we learn from a marketing assessment?



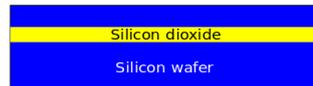
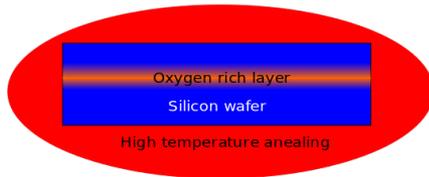
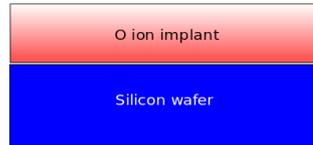
# Single Event Upset Suppression System (SEUSS)



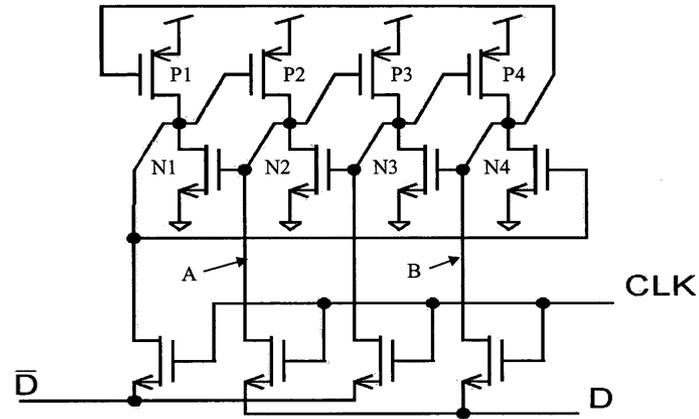
- Electronic circuits suffer two types of radiation
  - Total Dose Effects
  - Single Event Effects
- Single Event Upset (SEU)
  - Single particle can alter a memory state



# Current Technology



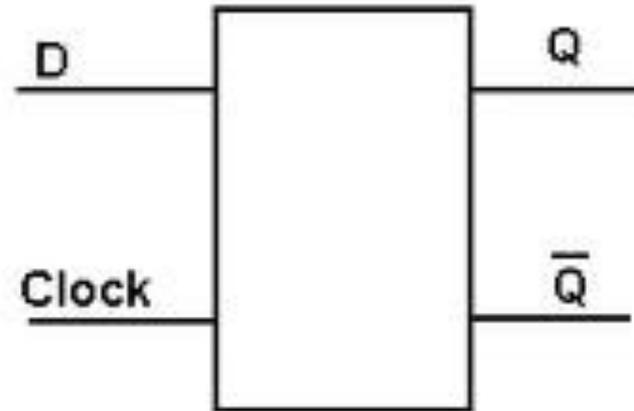
Silicon on Insulator



DICE latch

# The Problem

- SOI processes make changes to the fabrication of chip
- Hardening Techniques can cost billions of dollars
- DICE cell is not flexible



D Latch

# The Technology

- The Solution?
  - Better, flexible, more efficient CMOS configuration
- PMOS and NMOS transistors arranged to act as SR latch

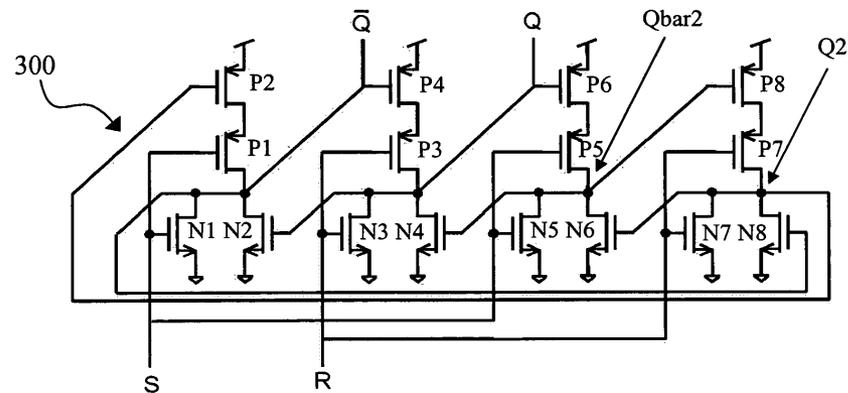
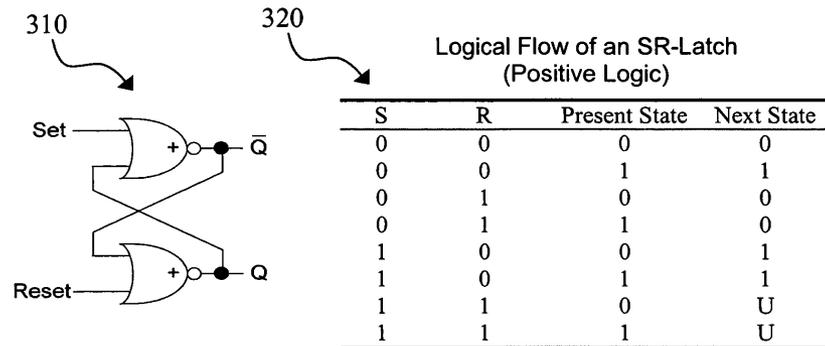


FIG 3

SEUSS NOR

# Applications

- Almost any Aerospace microelectronic
  - Field Programmable Gate Arrays (FPGA)
  - Static Random Access Memory (SRAM)
  - Microprocessors
- Data protection
- Medical applications



# SEUSS Potential Companies

- Boeing
  - Net Sales: \$86 billion
  - largest aerospace company and the leading manufacturer of commercial jetliners and military aircraft combined
- BAE
  - Net Sales: \$27 billion
  - leading military contractor in the US defense market
- Xilinx
  - Net Sales: \$2.1 billion
  - supplier of programmable logic devices. It is known for inventing the field programmable gate array (FPGA)

# Oil Boom Apparatus

- Oil spillage is a growing concern
- Exxon Valdez Oil Spill, 1989
- BP oil Spill, 2010
- How can the oil be effectively collected and recovered?



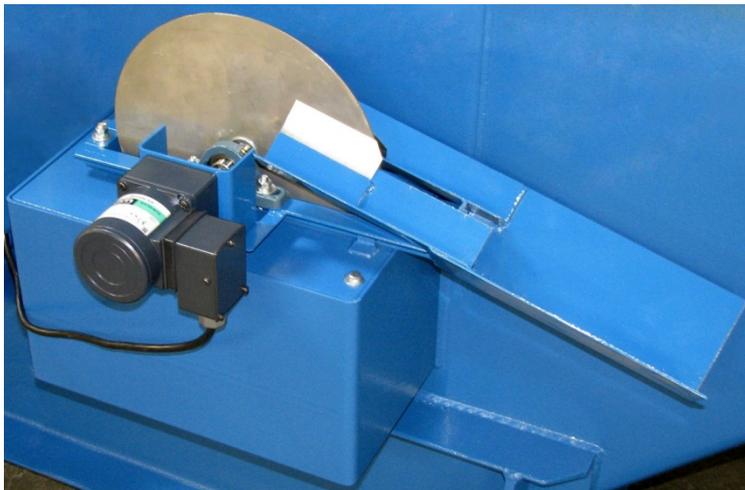
# Current Technology



Oil boom



Oil dispersant



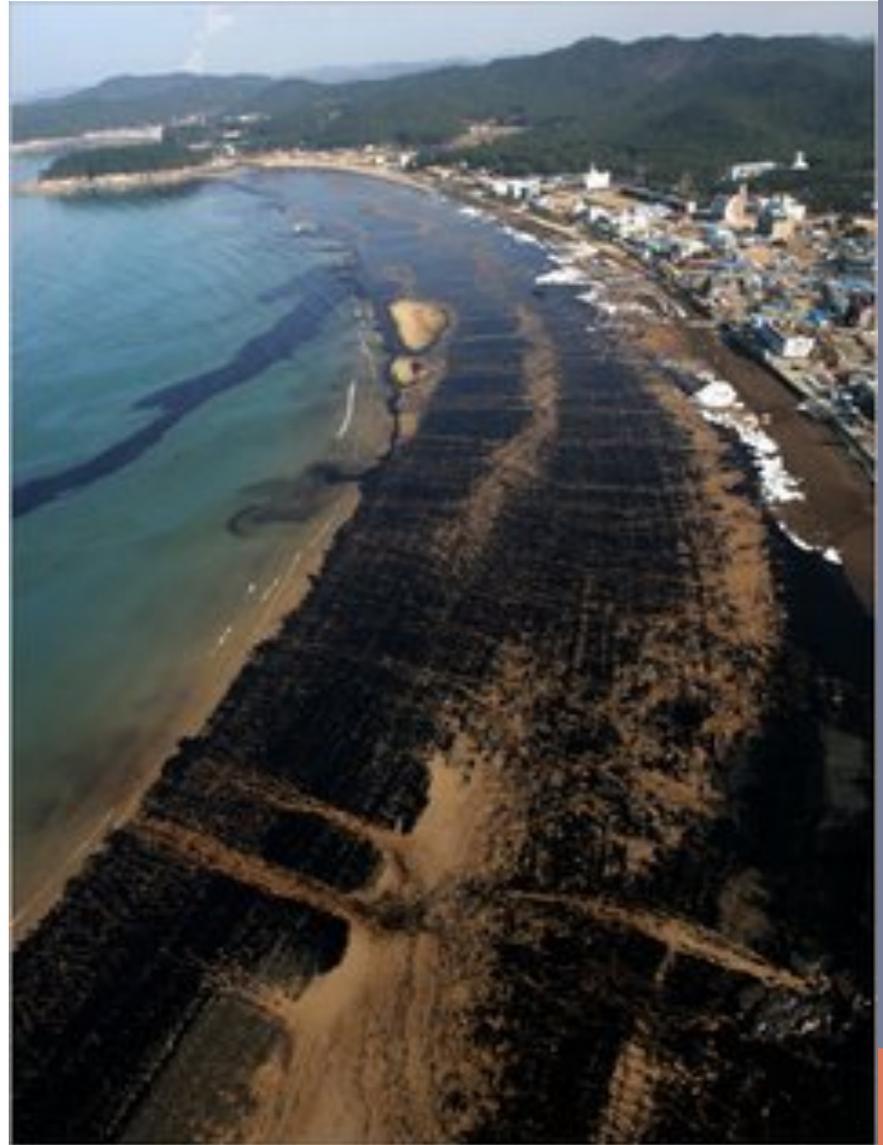
Oil skimmer



In situ Burning

# The Problem

- Current oil containment booms not effective
- Oil dispersants allow oil to sink to the bottom of the ocean
- In situ Burning converts oil into airborne residues
- 



# The Solution

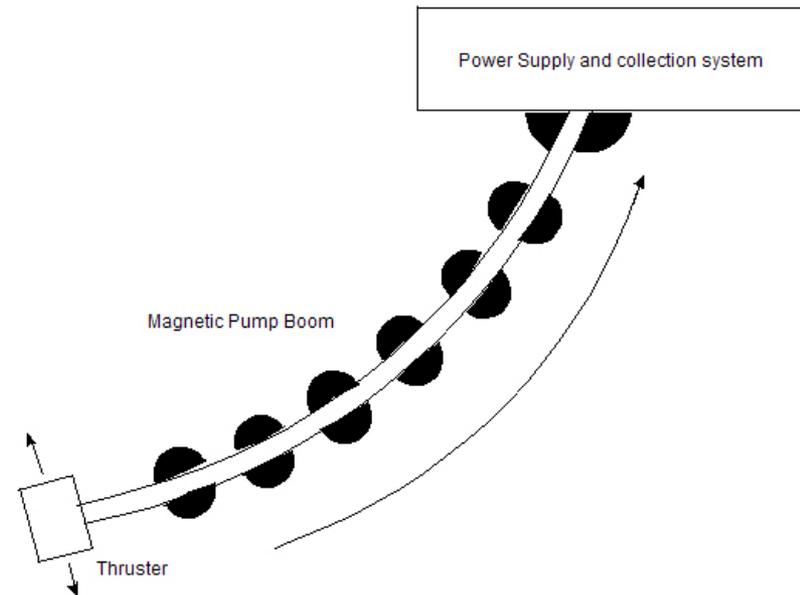
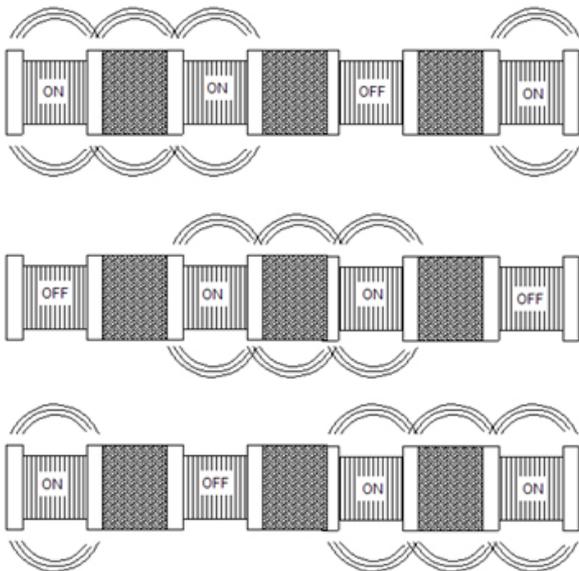
- Make use of magnetic fields
- Use simple ferrite filings to magnetize oil



# Oil Boom Apparatus

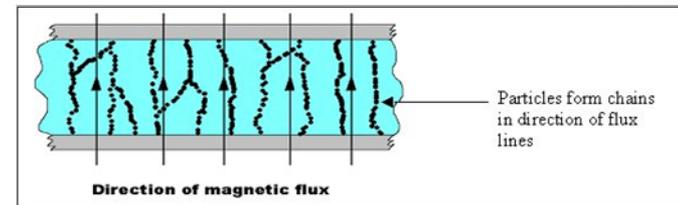
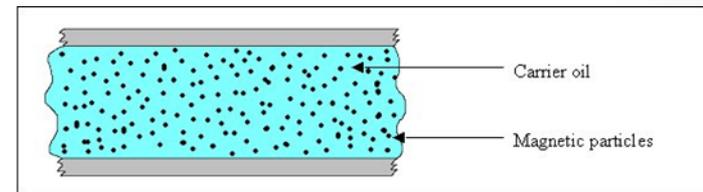
- Boom apparatus composed of alternating solenoids and flexible floats
- Power supply, collection system, and tether attached to apparatus

Pumping Sequence:



# Applications/Advantages

- Recovers spilled oil through the use of magnetic field
- Environmentally friendly: Makes no use of chemicals or absorbents to recover oil from water
- Ferrite filings can be recovered and reused
- Capable of cleaning up even dispersed oil
- Boom apparatus can be deployed off a dock or vessel
- Able to be used in any body of water as small as lake to as big as ocean



# Oil Boom Potential Companies

- Exxon Mobil
  - Net Sales: \$438 billion
  - One of the world's largest oil companies
- DESMI-AFTI, INC.
  - DESMI Net Sales: \$147.92 billion
  - Subsidiary of DESMI, together they are second-largest oil spill technology company in the world
- Garner Environmental Services, Inc.
  - Net Sales: \$41.8 million
  - a full-service environmental company offering emergency response for oil spills and hazardous materials, soil remediation, vacuum truck services, etc.

# Conclusions

- Fermilab has valuable inventions to offer to the market
- Various applications for SEUSS
- Many potential companies for Oil Boom Apparatus

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Calendar	Feature	Calendar	Feature
<p>Thursday, July 24</p> <p>2:30 p.m. <a href="#">Theoretical Physics Seminar</a> - Curia II Speaker: Matthew Reece, Harvard University Title: Nonthermal SUSY Cosmology, Dark Matter and Indirect Detection</p> <p>3:30 p.m. DIRECTOR'S COFFEE BREAK - 2nd Flr X-Over</p> <p>Friday, July 25</p> <p>3:30 p.m.</p>	<p><b>Fermilab technology available for license: Bed-ridden boredom spurs new invention</b></p>  <p>Fermilab engineer Jim Hoff recently invented an electronic circuit that can guard against radiation damage. Photo: Hanae Amitage</p>	<p><a href="#">Have a safe day!</a></p> <p>Wednesday, July 30</p> <p>10:30 a.m. <a href="#">Particle Astrophysics Seminar</a> (NOTE DATE, TIME, LOCATION) - One East Speaker: Meg Urry, Yale University Title: The Growth of Supermassive Black Holes and Their Co-Evolution with Galaxies</p> <p>3:30 p.m. DIRECTOR'S COFFEE</p>	<p><b>Accelerator physicist invents new way to clean up oil spills</b></p>  <p>Fermilab physicist Arden Warner revolutionizes oil spill cleanup with magnetizable-oil invention. Photo: Hanae Amitage</p>

# Questions