

# The US Muon Ion Cooling Experiment (MICE)

A subjective and philosophical look back.

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# A Downloadable Reference

“Understanding the Outcomes of Mega Projects  
EW Merrow, Rand Corporation

<https://www.rand.org/content/dam/rand/pubs/reports/2006/R3560.pdf>

- Almost all of the management suggestions were ignored by MICE.

# The Magnet

- The experimental team proposed a magnet that pushed the state of the art.
- The magnet was designed to be *cheap*.
- Construction firm was questionable.
- Cryocoolers and cryostat design.
- Not magnetically shielded.
- Prone to quench.

# Cheap vs. Inexpensive

- a. Cheap is a pejorative term in this example. Inexpensive should be the operating term. Specifications should go through an analysis of whether you need it or want it. Is there engineering margin?
- b. Finding qualified vendors and limitations of the bidding process.
  - i. "Good news and bad news."
  - ii. Is there any real QC and QA?
- c. What is the best value for the sponsoring institution or funding agency?
- d. Laboratory contracting office? Who are they working for?

# Magnetic Field Shielding

The original magnet was not magnetically shielded. The stray field of the solenoid affected the electric motors of the vacuum pumps and the cryocooler. A thick iron shield had to be fabricated to isolate the electric motors from the solenoid. (We should remember that MRI magnets are actively shielded, and the cryocooler sees very little if any stray magnetic field.) This exercise added over \$1 million USD and time to the costs.