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Perspectives on Teaming from the DOE National Labs

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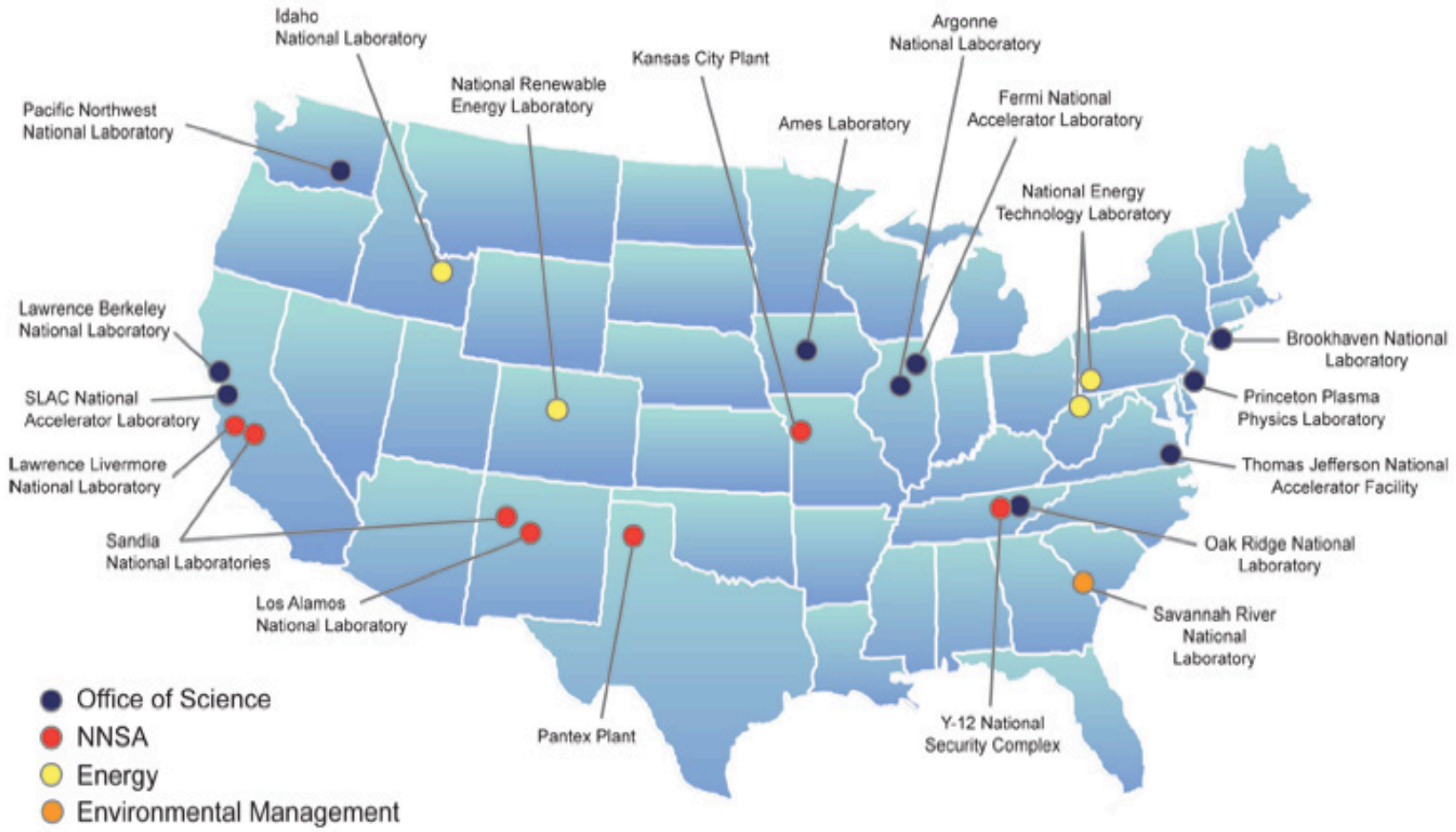
Teams have been critical to the success of DOE since the beginning

- The Manhattan Project
  - 1930's-40', 130,000 people from the US, Brittan and Canada, $2B
  - Research and development of nuclear weapons; most resources went into production of fissionable materials
  - Also resulted in nuclear energy production

- Atomic Energy Commission years
  - Fusion energy research to generate electric power
  - Better understanding of radiation and development of new medical diagnostic techniques
- DOE founded in 1977 to develop a national plan to deal with the energy policy

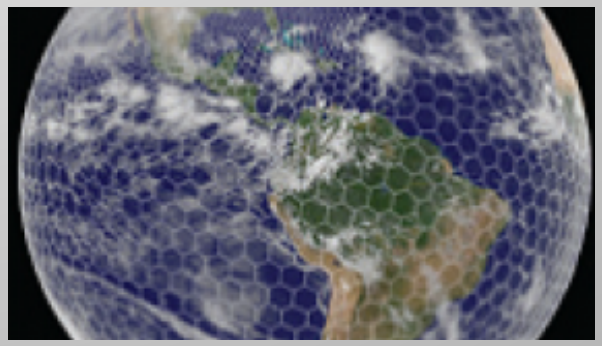
The DOE Laboratory System today is both extensive and diverse

Map of DOE National Laboratories



Today, DOE continues to rely on large teams

- World-class large facilities with national implications
  - Advanced light sources for materials imaging
  - Neutron sources for neutron scattering experiments
  - Leadership class computing facilities for large scale computations
- DOE Team discoveries have touched many aspects of our day to day lives
  - Highly efficient combustion systems
  - New solar photo conversion processes
  - Better climate models to understand the uncertainty of clouds and aerosols
  - Biological research to develop cost-effective cellulosic biofuels



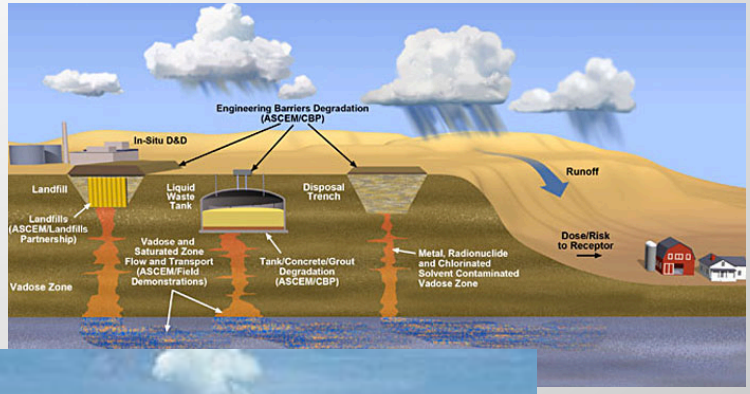
Current funding emphasis in DOE is focused on large teams

- ASCR Office of Science:
  - FASTMath and SDAV SciDAC Institutes
  - Multifaceted Mathematics Integrated Capability Centers (MMICCS)
  - Software Productivty
- NNSA:
  - Large code teams comprised of mathematicians, code physicists, computer scientists focused on modeling and predicting key physical phenomena associated with nuclear weapons science

Current funding emphasis in DOE is on large teams (2)

Applied energy offices

- Consortium for Advanced Simulation of LWRs (CASL) ($25M/yr)
- Nuclear Energy Advanced Modeling and Simulation (NEAMS) (~$13M/yr)
- Carbon Capture Simulation Initiative (CCSI) (~$10M/yr)
- Advanced Simulation Capabilities for Environmental Management (ASCEM) (~$8M/yr)
- Accelerated Climate Modeling for Energy ($19M/yr)



CCSI™ Carbon Capture Simulation Initiative

CASL Consortium for Advanced Simulation of LWRs

My experiences leading teams span SC, NNSA, and applied energy offices

- 2011-present: Leading the FASTMath SciDAC center focused on structured grid methods, unstructured grid methods, solution of algebraic equations) (~45 team members)
- 2010-present: Director, Center for Applied Scientific Computing, a 100 person research organization focused on math, CS and data sciences at LLNL
- 2006-2011: Led ITAPS SciDAC center focused on interoperability of unstructured grid methods (~20 team members)
- 2008-2010: Led enabling computational technologies effort in the Nuclear Energy Advanced Modeling and Simulation effort (NEAMS) focused on SQA, coupling, HW needs for nuclear energy simulation program

How can you tell when a team is dysfunctional?

- Team members don't talk to each other…as much as they talk about each other…
- Problems are never addressed; conflict is avoided…
- No one takes responsibility…and everyone passes blame…
- Communication usually brings more tension than progress…and no one is truly honest with each other…
- Only the leader gets recognition or can make decisions…and team members never feel valued or appreciated…

- There are competing visions, goals or objectives….and it's every team member for his or herself…

Ron Edmondson: http://www.ronedmondson.com/2011/08/7-signs-of-a-dysfunctional-team.html

What makes a great team?

- Trust and Respect
- Productive Conflict and Open Communication
- Commitment
- Accountability
- Attention to Results

http://hrtsmakefamilies.hubpages.com/hub/What-Makes-a-Great-Team

Emotional Intelligence is an important component of strong teams

High performing teams achieve superior levels of participation, cooperation, and collaboration because their members trust one another, share a strong sense of group identity, and have confidence in their effectiveness as a team. In other words, such teams possess high levels of group ***emotional intelligence*** *(EI).*

Three Suggested Practices

- Make time for team members to appreciate each other's skills
- Understand, surface and manage emotional issues that can help or hinder the team's progress
- Show appreciation
- Regulate unwanted behavior in productive ways

Harvard Business Review, Bloomburg BusinessWeek, and many many others

There are many challenges to creating highly functioning teams in the current environment

- Teams are often geographically dispersed (another building, another lab, another state, another country)
- Current teams have some history of competition (yesterday's enemy is today's ally)
- Expertise can dictate the composition of a team rather than 'compatibility'
- Team members are often part of many different projects
  - Leads to lack of team identity
  - Possibly conflicting priorities
  - Time management challenges

Lessons learned from my experiences – what works

- Face-to-face meetings with informal interaction time (this is a must!)
- Regular communication among the team via telecons
- Empowering decision making at the local level

- Taking advantage of externally driven deadlines that provide a common purpose/goal (e.g., a team tutorial)
- Creating sub-teams of a manageable size with a clear lead and focus
- Reward/compliment team successes
- Be open to feedback and prepared to make adjustments

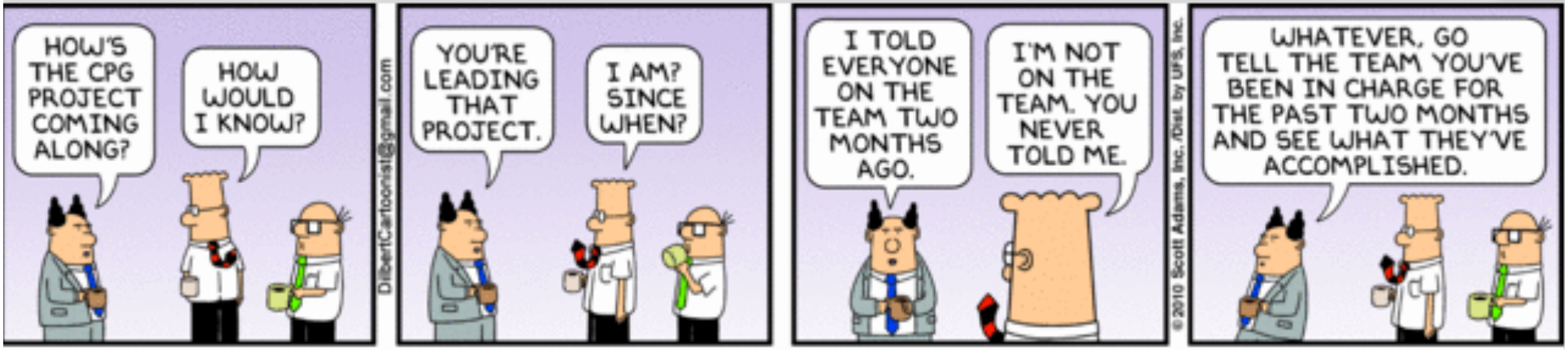
Lessons learned from my experiences – what doesn't work

- Telecons without the face to face meetings
- No interaction time in meetings to allow folks to get to know each other
- Lack of communication
- Allowing problems/conflict to fester
- Centralized control (leading to severe bottleneck)

Great functioning teams are essential for DOE success

- Large and complex teams have been and will continue to be ubiquitous in the DOE science environment
  - Geographically disperse
  - Multi-disciplinary
- Understanding the foundations of building a great team can lead to greater success
  - Trust and respect
  - Appreciation
  - Accountability
  - Emotional intelligence
- Such qualities can be developed, fostered and nurtured by team leaders and members

Questions?


HOW'S THE CPG PROJECT COMING ALONG?
HOW WOULD I KNOW?
DilbertCartoonist@gmail.com
YOU'RE LEADING THAT PROJECT.
I AM? SINCE WHEN?
I TOLD EVERYONE ON THE TEAM TWO MONTHS AGO.
I'M NOT ON THE TEAM. YOU NEVER TOLD ME.
© 2010 Scott Adams, Inc. /Dist. by UFS, Inc.
WHATEVER. GO TELL THE TEAM YOU'VE BEEN IN CHARGE FOR THE PAST TWO MONTHS AND SEE WHAT THEY'VE ACCOMPLISHED.

A team that works well

- http://www.youtube.com/watch?v=cPFXW58dwnw

… and less well

- https://vimeo.com/61971077

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