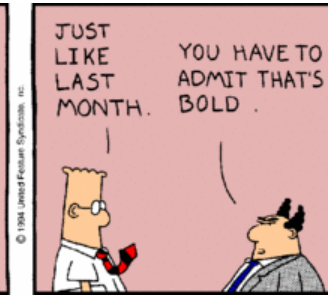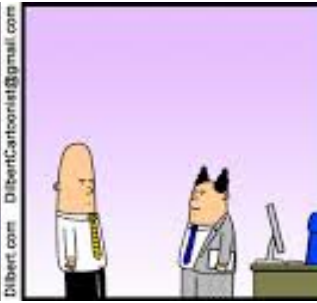# Scientific Computing Division Reorganization
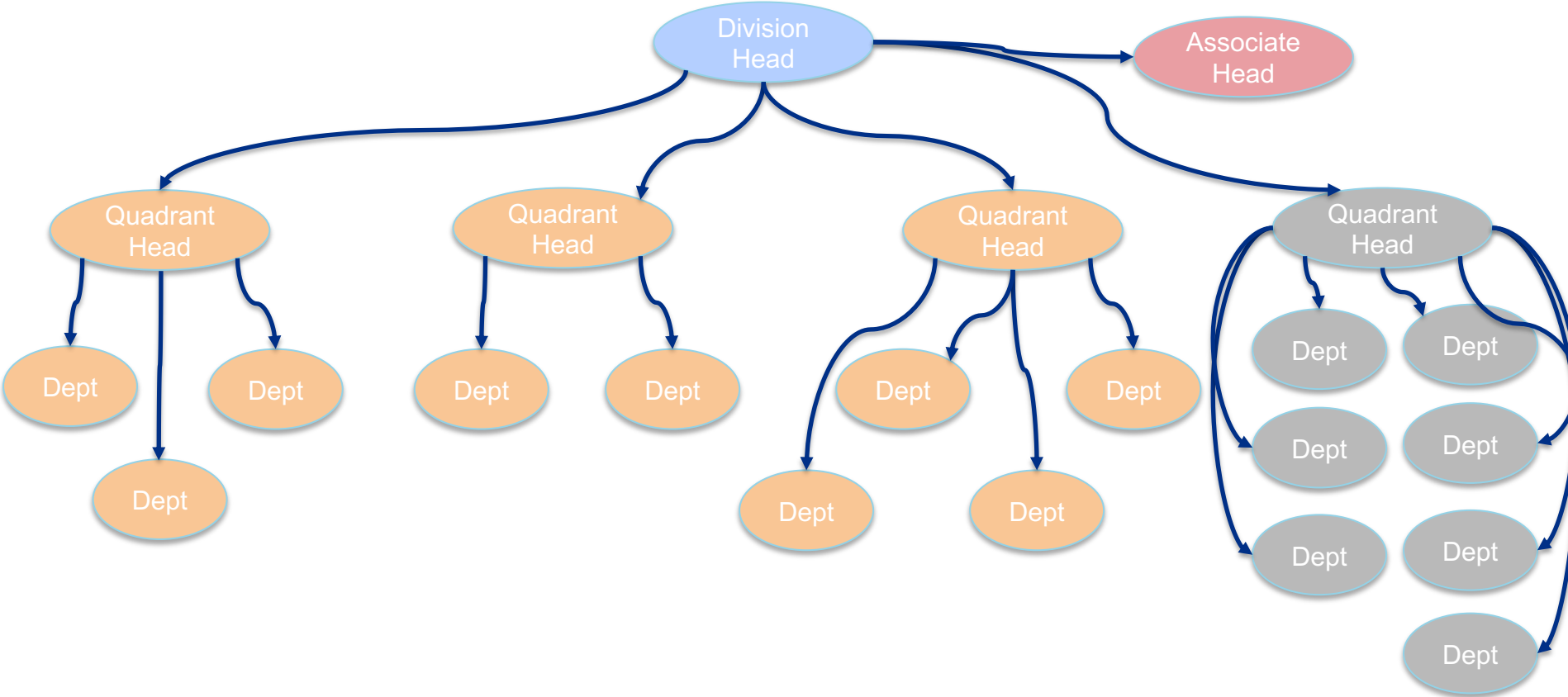
James Amundson

2nd Meeting of the International Computing Advisory Committee

October 15, 2019

# Original Organization: Quadrant Structure

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Original Structure: Elements

- Scientific Computing Facilities
  - Four departments: HPC, Storage, Computing, Data Center
- Scientific Computing Services
  - Two departments: Distributed Computing, Data Processing
- Systems for Scientific Applications
  - Three departments: Applications, Software Infrastructure, Realtime Engineering
- Scientific Programs
  - Seven(!) departments: CMS, Intensity Frontier, Cosmic Frontier, etc...
  - Purely virtual
 - Meant to highlight presence of scientists in the organization

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Line Management Communication Patterns

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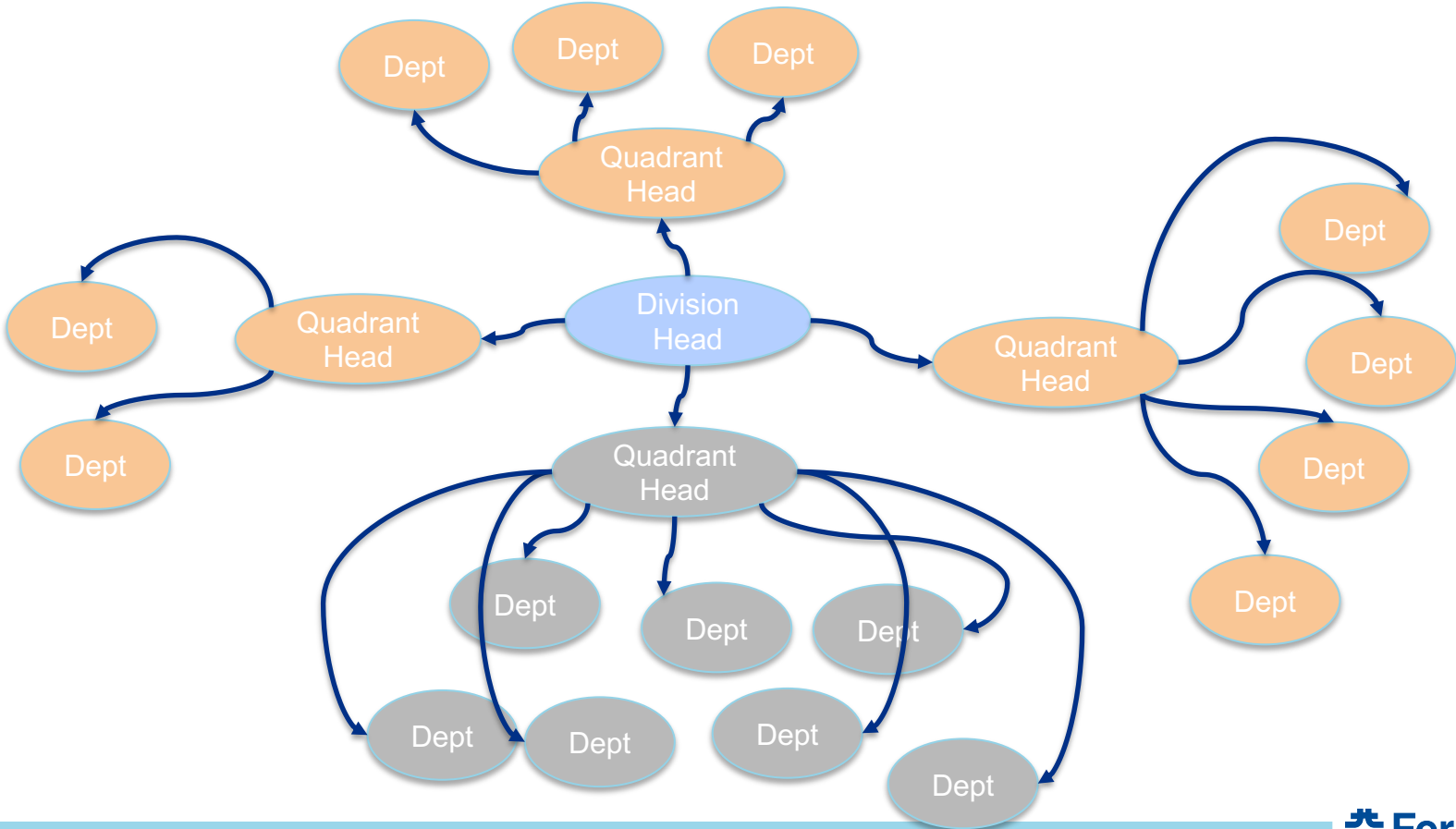
Problems with old arrangement

- Many layers of management: quadrant – department – group
- Quadrants were highly siloed
  – Department heads in different quadrants rarely interacted
- Scientists divided by discipline
  – More siloing
- Advertising science in org chart had little effect
  – Scientists rarely read org charts
- No dynamic component
  – High profile projects were being performed like side jobs
    - …because they didn't have dedicated groups/departments

- New structure proposed by Margaret Votava, Stu Fuess, and Adam Lyon
  – quadrant heads under old arrangement

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New Structure

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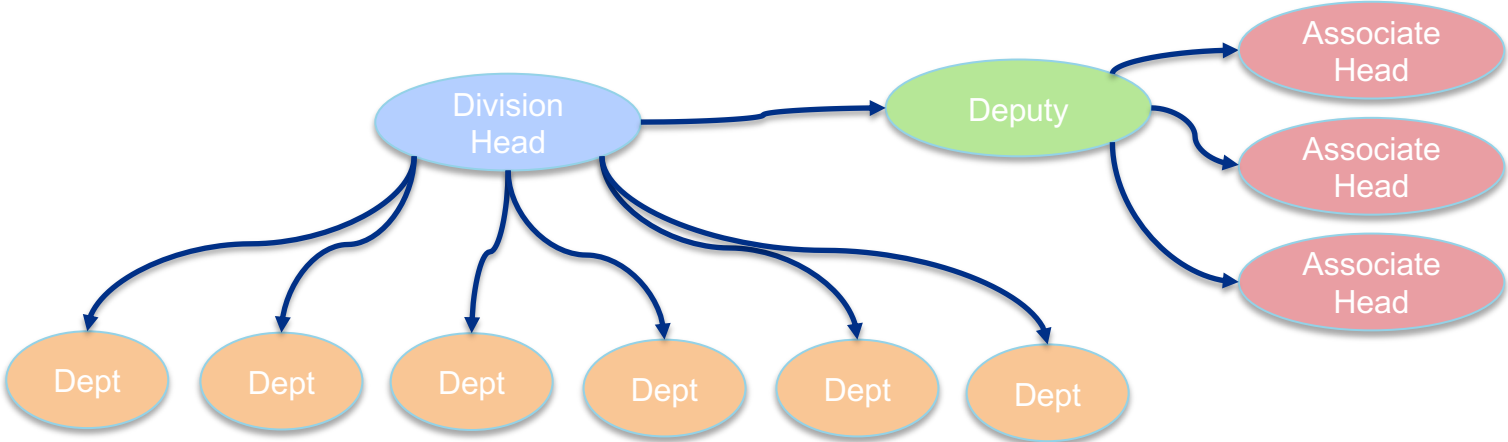
New Departments

- Storage Services: Scientific Data Services (SDS)
- Compute Services: Scientific Compute Services (SCS)
- Facilities: Scientific Computing Facilities (SCF)
- Simulation and Reconstruction: Artificial Intelligence and Software for Physics Applications (AISP)
- DAQ and Frameworks: Frameworks, DAQ and Electronics (FDE)
- Integrative Projects: Cross-cutting Projects and Initiatives (CPI)
  - Consists of leaders of the largest cross-department projects
  - Examples include
    - Rucio
    - Federated identity
    - HEPCloud
    - Spack
    - AI
    - Institutional Cluster

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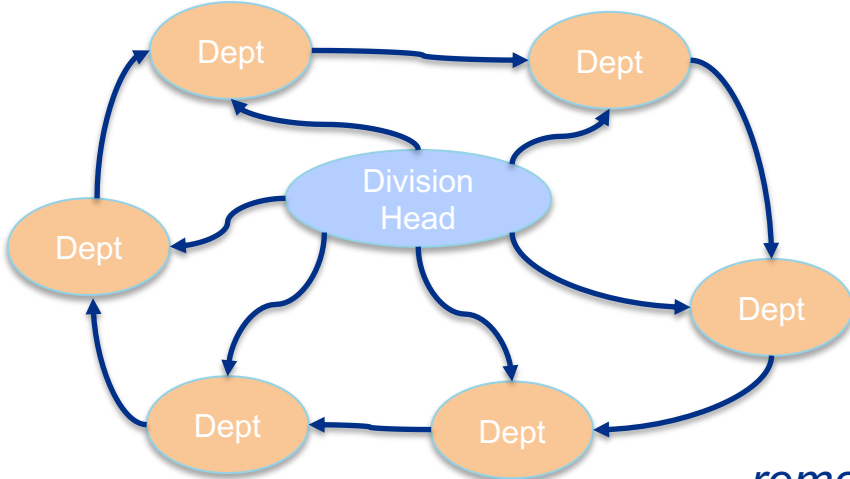
Matrixing

Scientific Data Services

Scientific Compute Services

Scientific Computing Facilities

AI and Software for Physics Applications

Frameworks, DAQ and Electronics

Cross-cutting Proj and Ini

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New Line Management Communication Pattern

remaining lines connecting departments suppressed for clarity

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New Senior Management Structure

- Associate Head for Projects
- Associate Head for Science
- Associate Head for CMS
- Associate Head for DUNE (vacant!)
- Associate Head for Facilities

- Associate heads report to the Deputy Division Head
- Deputy Division Head reports to the Division Head

Associate heads are out of line management, allowing them to take advantage of fully matrixed structure.

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Support for new structure from management theory

- Current trends in management theory strongly support new structure
  - Enhanced communication
  - Agility in the face of continuing change

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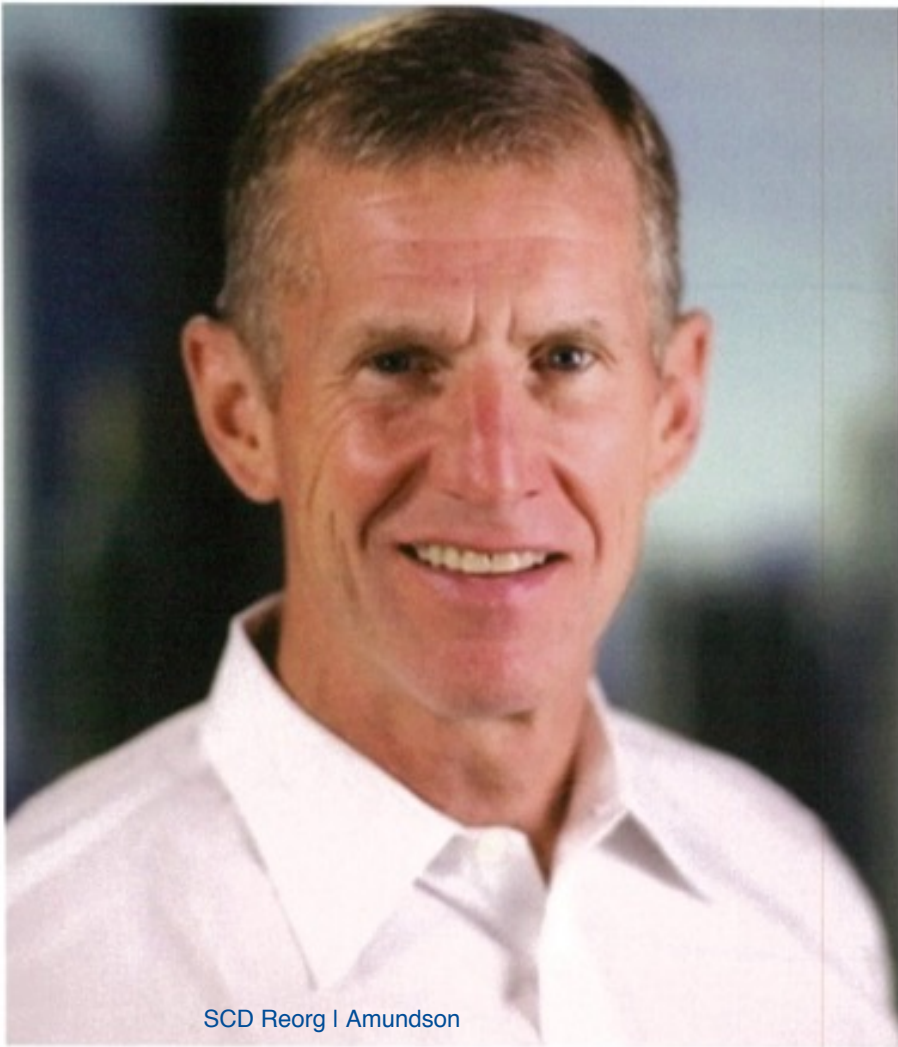
"In addition to being a fascinating and colorful read, this book is an indispensable guide to organizational change." — WALTER ISAACSON

TEAM
— OF —
TEAMS

NEW RULES OF ENGAGEMENT
FOR A COMPLEX WORLD

GENERAL STANLEY
McCHRYSTAL
U.S. Army, Retired

with Tantum Collins, David Silverman,
and Chris Fussell

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lab

Command
A traditional top-down structure. The connections that matter are between workers and their managers.

Command of Teams
Small teams operate independently but still within a more rigid superstructure

Team of Teams
The relationship among teams resembles the closeness among individuals on those teams.
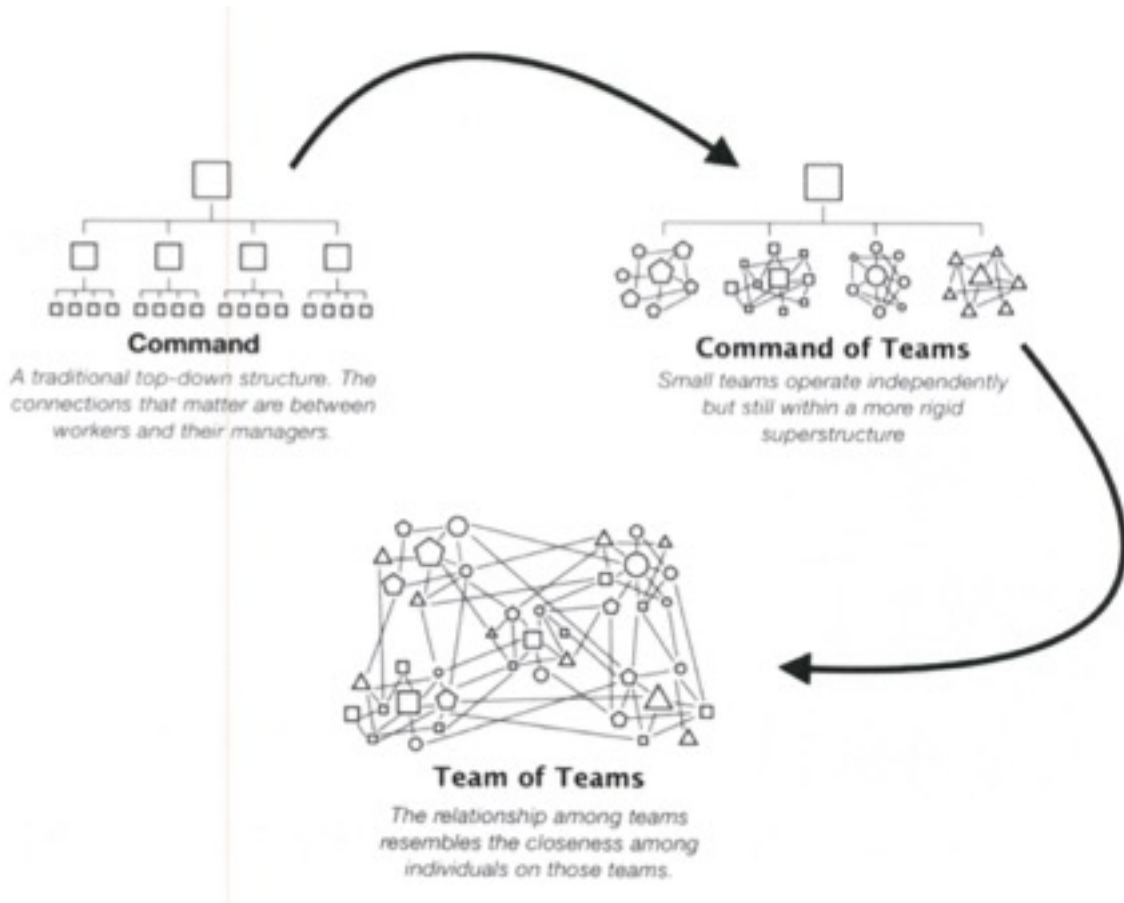
Traditional View of Organizational Change

| Period of Stability | Period of Change | Period of Stability | Period of Change | Period of Stability |
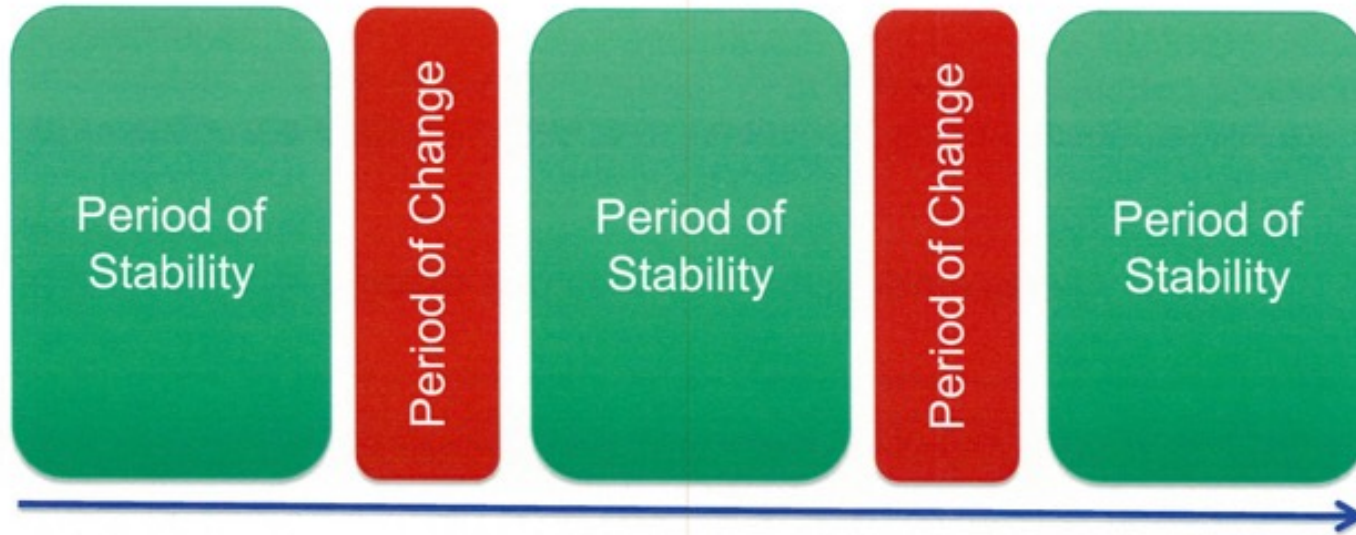
- **EPISODIC**: Need for significant strategic and organizational change emerges as a discontinuous event.
- **TOP DOWN**: Senior leaders mandate change based on clearly defined requirements.
- **PROGRAMMATIC**: Restructuring and change management programs begin and end.

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"Agile" View of Organizational Change

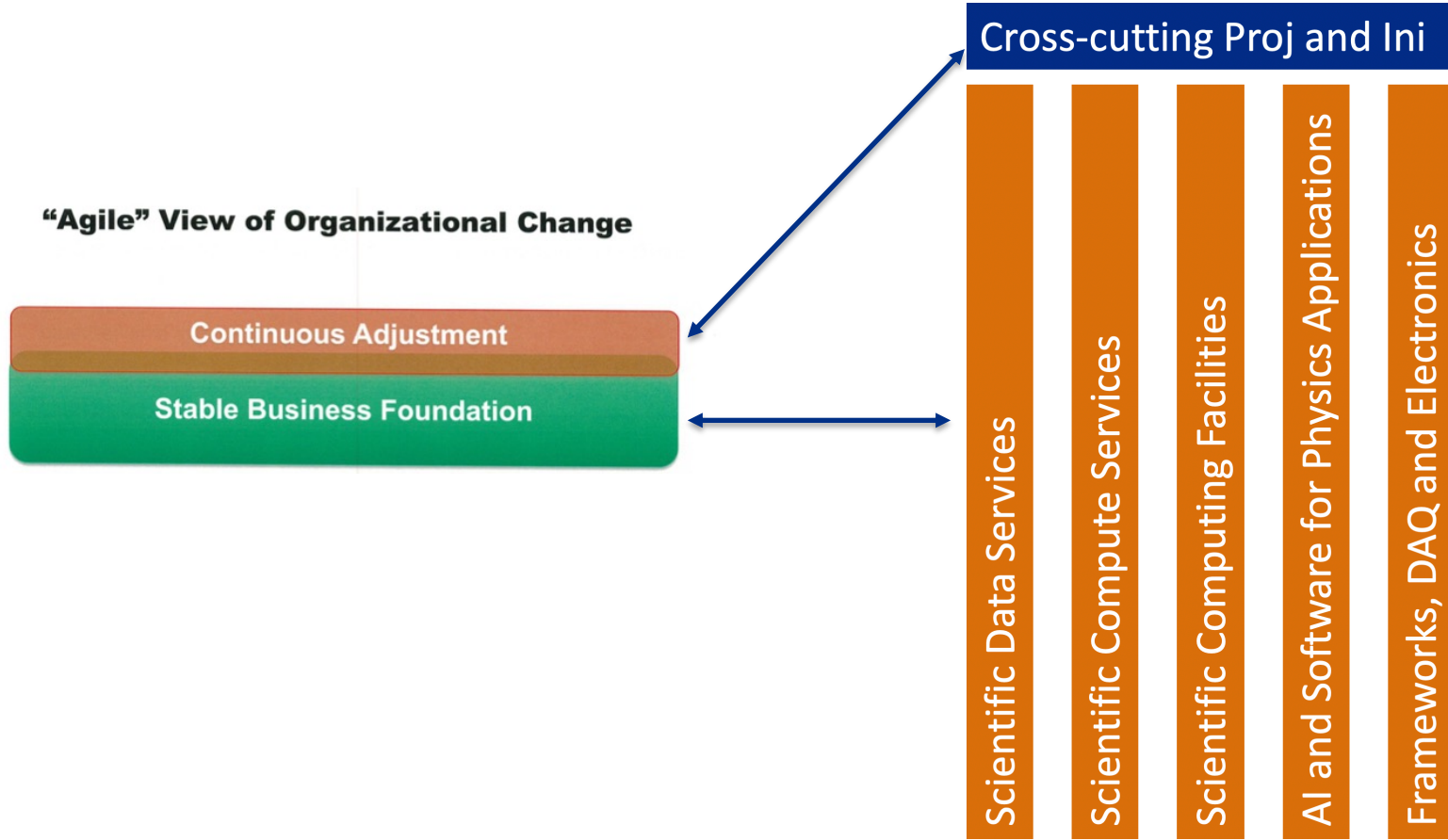**Continuous Adjustment**

Stable Business Foundation

CONTINUOUS: Strategy and operating practices continually under assessment.

DISTRIBUTED AND DELEGATED: Responsibility and accountability for recognizing and acting on the need for change pushed down and across the organization.

ROUTINE: Change management is a routine organizational activity.

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"Agile" View of Organizational Change

Continuous Adjustment

Stable Business Foundation

Cross-cutting Proj and Ini

Scientific Data Services

Scientific Compute Services

Scientific Computing Facilities

AI and Software for Physics Applications

Frameworks, DAQ and Electronics

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New arrangement solves many problems

- ~~Many layers of management: quadrant – department – group~~
  - Department heads now report directly to division head
  - Entire layer of management eliminated
- ~~Quadrants were highly siloed~~
  - All department heads now interact with each other on a regular basis
  - All department heads now interact with division head on a regular basis
  - All department heads now interact with project leaders on a regular basis
- ~~Scientists divided by discipline~~
  - Associate head for science covers all disciplines
- ~~Advertising science in org chart had little effect~~
  - New Computational Science Seminar highlights scientists' work
- ~~No dynamic component~~
  - Cross-cutting Projects and Initiatives department negotiates effort from foundational departments

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Reorganization Status

- New structure effective as of mid-September
  - Weekly meeting of new department heads
  - Weekly meeting of integrative projects
- Fermilab systems in the process of being updated
  - Limited by end of fiscal year changes
  - Updates complete by end of October

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