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July 7 - 12, 2018

An "EPIIC" Vision to Evolve Project Integration, Innovation, and Collaboration with Broad Impact for How NASA Executes Complex Projects

Moreland, R., McGowan, A., Phojanamongkolkij, N., Evans, J., and Knizhnik, J., 2018 International Symposium, INCOSE, Washington, DC, July 7-12, 2018

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Introduction

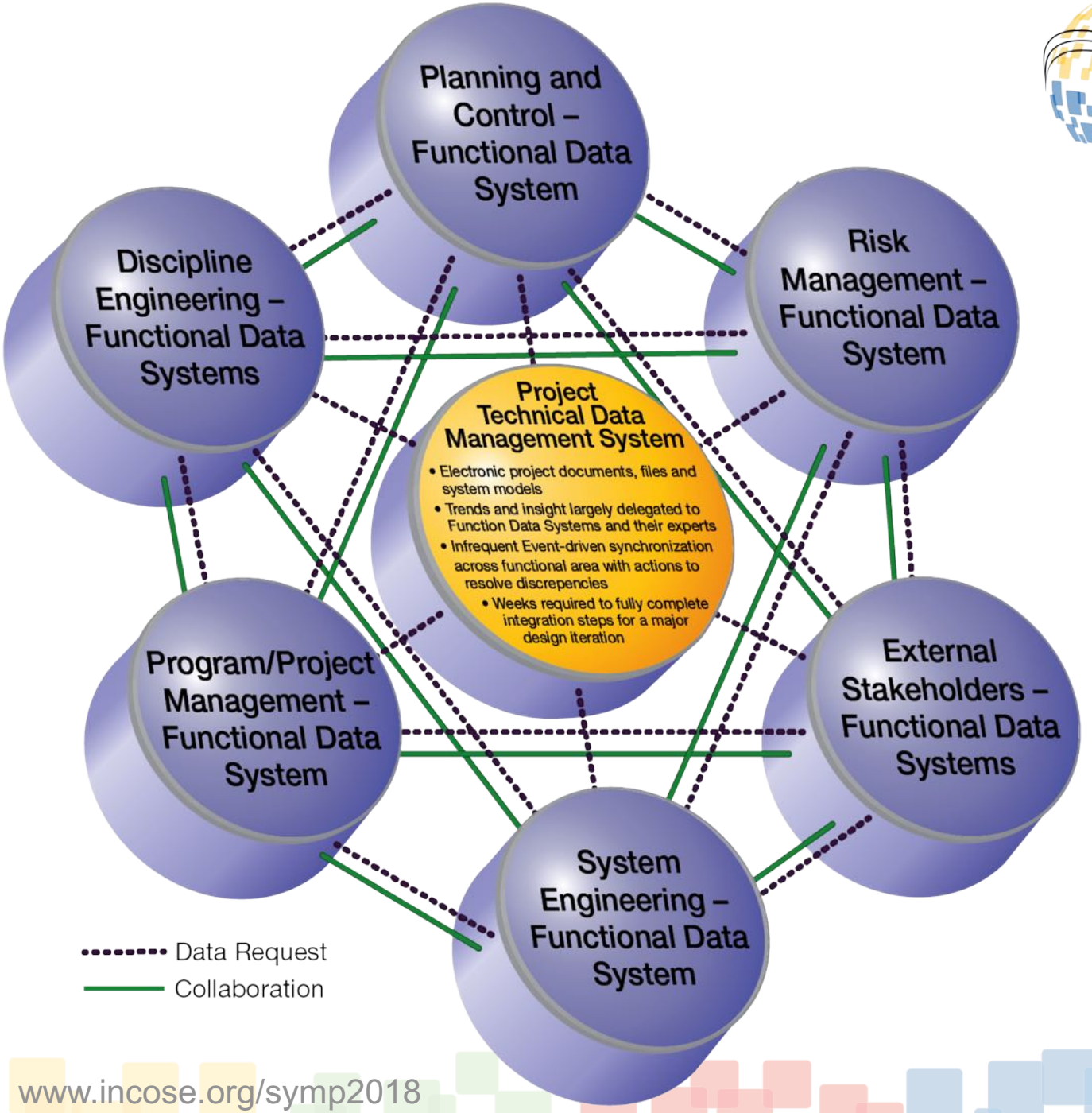
- Observation
  - The complexity of spacecraft systems continues to grow
    - Number of instruments / functions
    - Software
    - Interdependencies
    - Programmatic complexity
  - New digital opportunities
- Vision
  - This paper articulates a vision for evolving the way NASA manages information for highly complex projects
- Purpose
  - The authors solicit feedback and insights

Current State

Increasing complexity drives collaboration across functions.

However, the current network is dominated by data requests (preparation and collection) and synchronization.

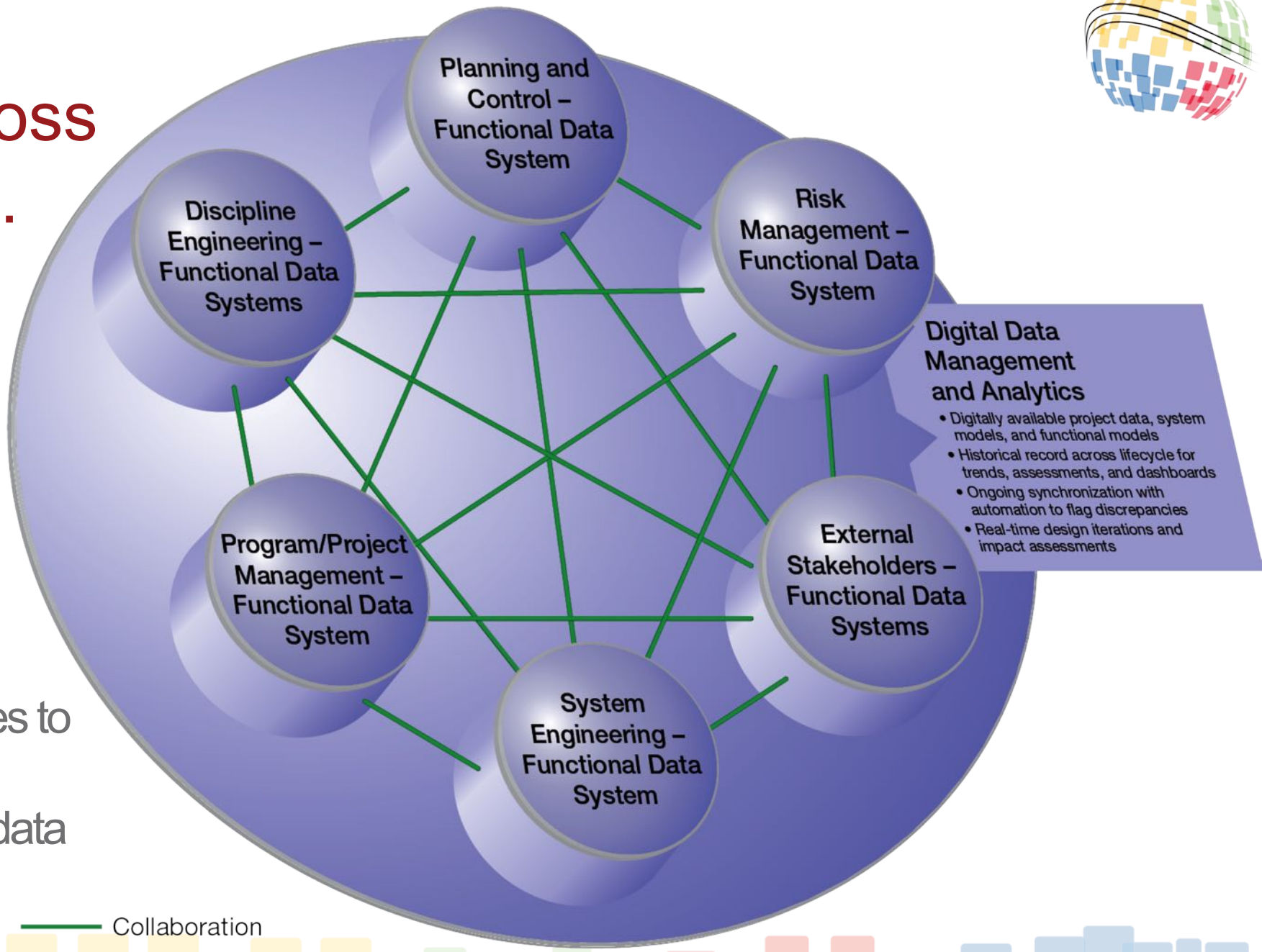
The figures that follow illustrate the EPIIC vision first on a single project, then applied more broadly.



A New Vision for Collaboration across a Single Project…

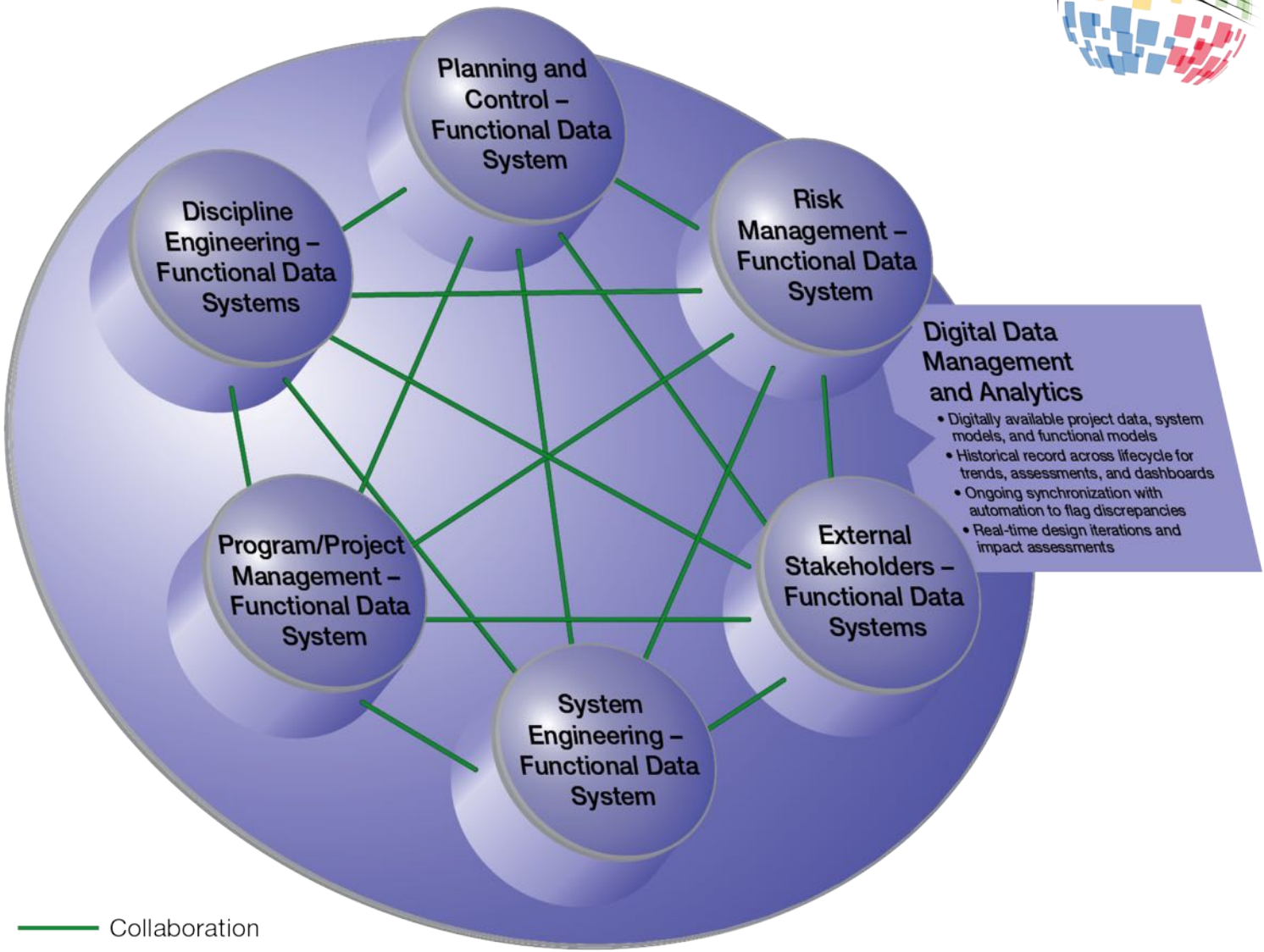
Depends on two key concepts:

1) A fully integrated, digital authoritative source.
2) A digital data management system with embedded intelligence that uses model-based, data-analytic, and machine-learning approaches to provide comprehensive and near-real time integration of data



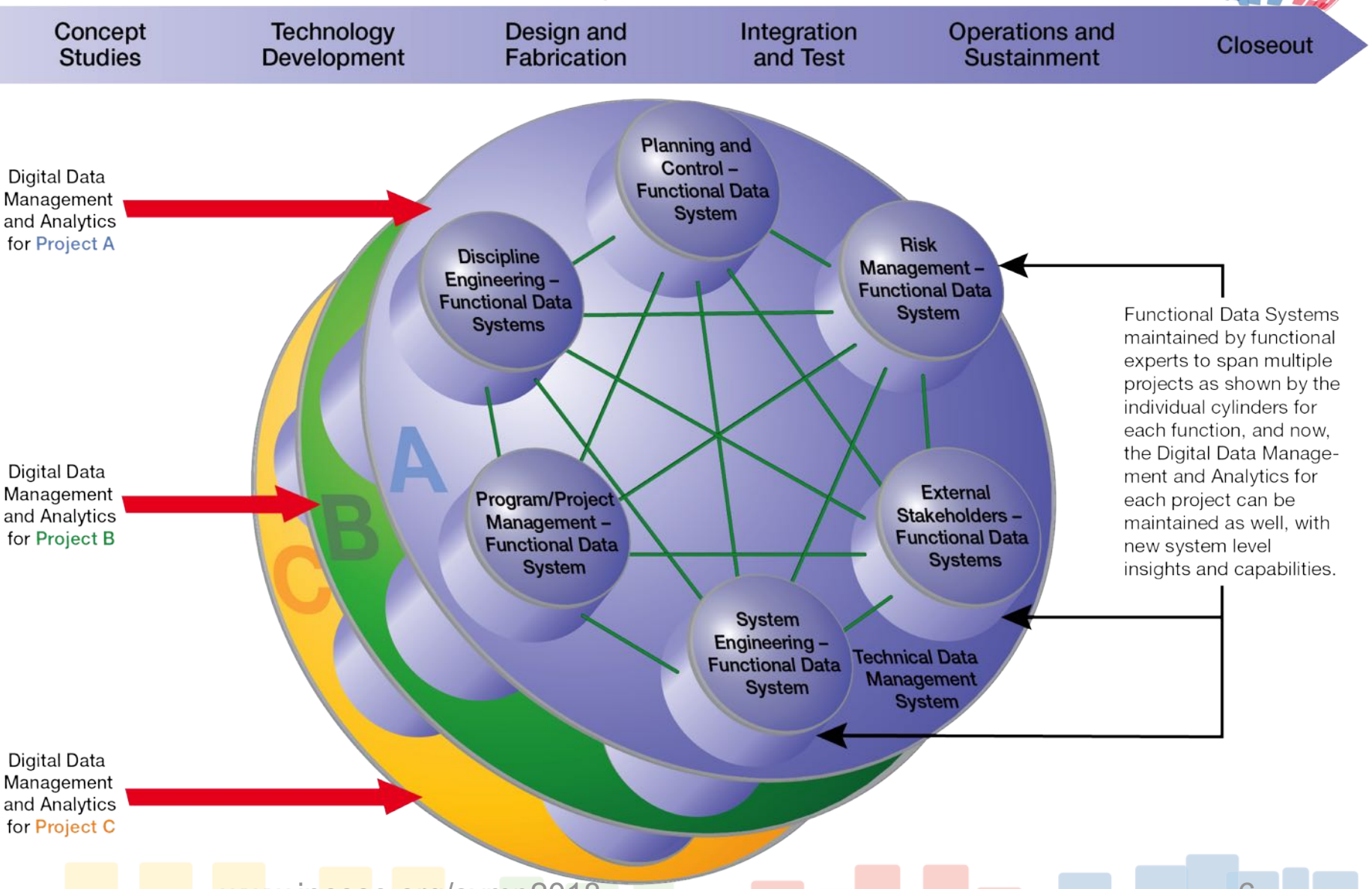
…with Benefits Throughout the Project Development Lifecycle

The EPIIC vision enables automated workflow management, cross-discipline change assessments and management, interactive programmatic and technical health assessments, model-based certifications, automatically generated gate review charts on-demand, and visualization to display multiple disparate data sources for better integration and decision making.



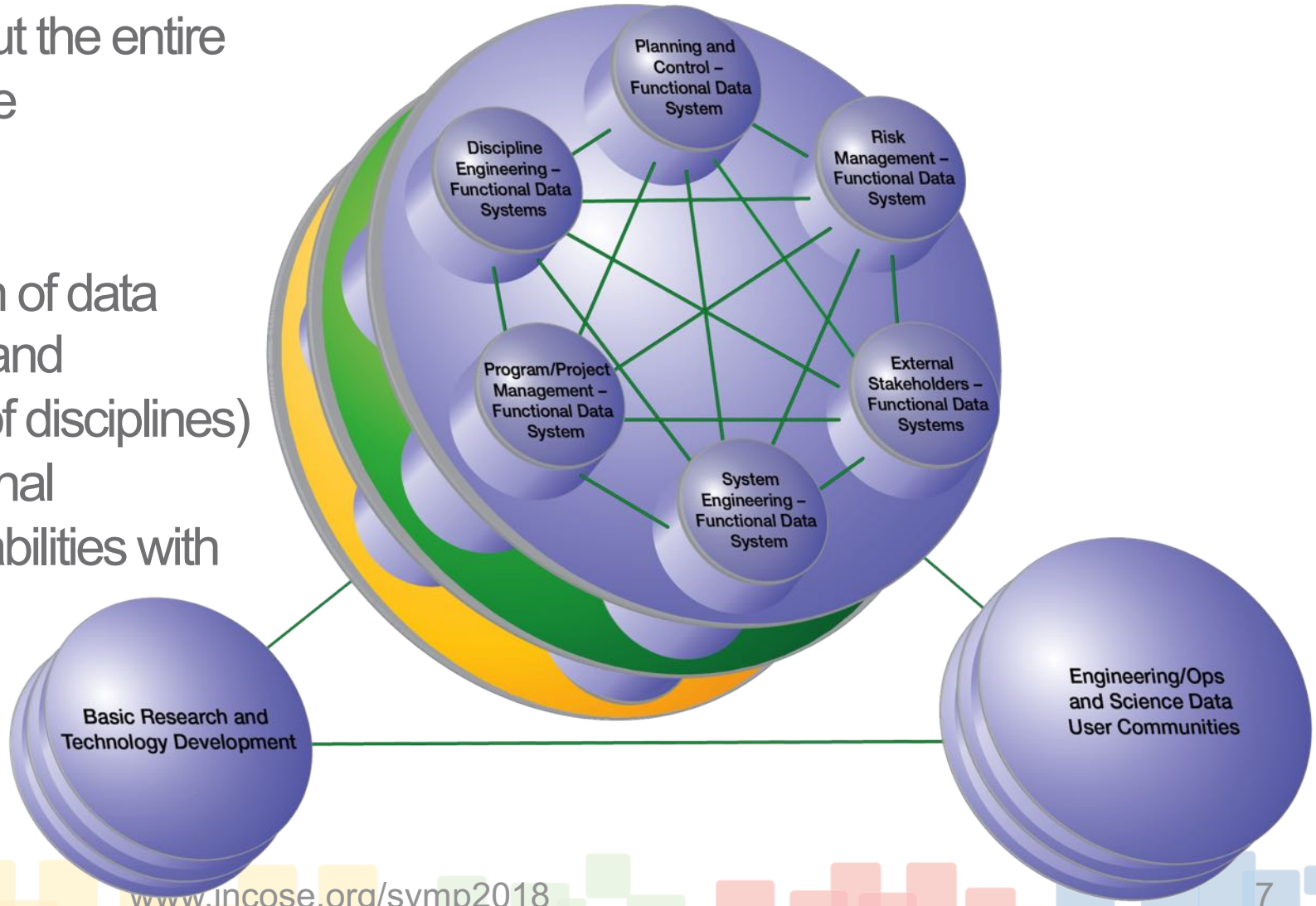
…with Benefits across Multiple Projects

- Enables more effective knowledge sharing, model reuse, and promulgation of lessons learned across multiple projects
- Enables more effective use of data sources (multi-project/historical data analytics) to support safety, risk, and reliability analyses across a portfolio of projects



…with Benefits across the Entire Lifecycle

- Enables collaboration throughout the entire mission/program/project lifecycle
  - Research and technology development
  - Operations and application of data collected by the scientists and engineers (from a variety of disciplines)
- Bridges cultural and organizational boundaries, better aligning capabilities with desired outcomes



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