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A Discussion of Engineering Archetypes and What They Mean to You



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Introduction

When integrating engineered systems, we tend to focus on functional roles and the interactions between those roles.

Similarly, when integrating social systems, like an engineering team, we need to focus on organizational roles and the interactions between those roles.

✓ ENGINEERS

✓ ARCHITECTS

✓ AGILE DEVELOPERS

✓ PROJECT MANAGERS

✓ OPERATIONS

Why Does This Presentation Exist? And Why Should You Care About It?

Because Engineering is still, at its core, primarily a human endeavor

COLLABORATION CHALLENGES

Many professions deal with managing complexity, and most of those think differently about it

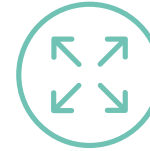
Many individuals don't fully understand their roles in a team activity, much less the role of others

As engineers, we sometimes lose sight of "practical utility" in pursuit of "technical rigor"

We communicate "from" our point of view rather than "to" our audience's point of view

We spend our energy building processes over building collaboration

POTENTIAL BENEFITS TO YOU



You are better able to scale your impact across your teams



You are better able to build trusted relationships with your leaders, peers, and staff

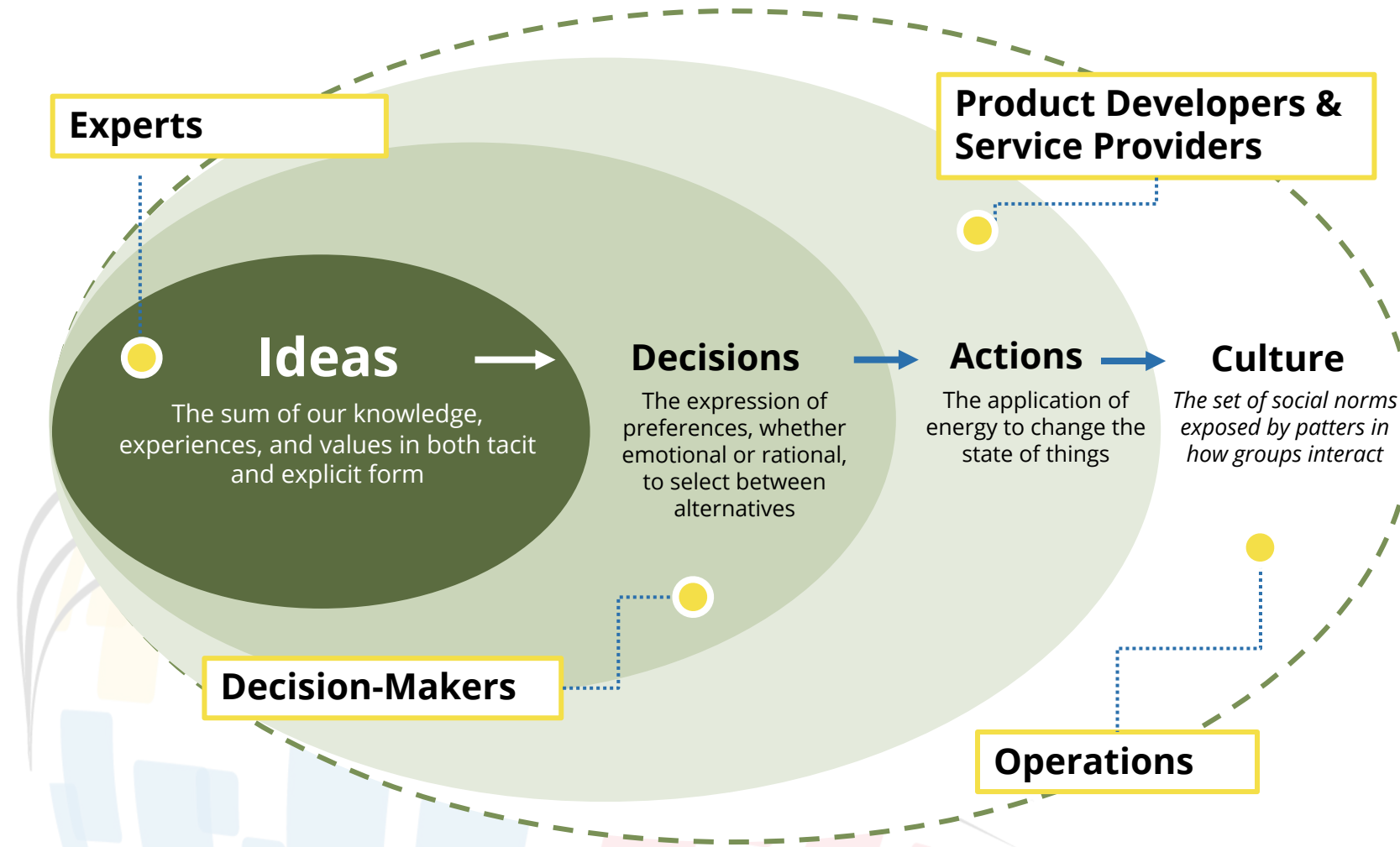


You might have some fun!

How Do Organizations Get Things Done?

They go from Idea to Action...through decisions (made by Decision-Makers).

Experts inform Decision-Makers. Decision-Makers direct Actions through Product and Service Providers.



“ We don’t have a technical problem. We have a Culture Problem!”

- Overheard at INCOSE IS19

Three (3) Archetypes for Engineering

The objective of engineering is to provide solutions to people's problems. Therefore, while we may shift from one archetype to another, at any given moment, we are fulfilling one of these three (3) archetypes as we provide those solutions.

Decision-Makers

TURNING STRATEGY INTO
DIRECTION

Decision-makers synthesize **many inputs** from many Experts and Providers in order to provide a **single actionable direction**.

Experts

ANCHORING IN THE INFORMED
POINT OF VIEW

Experts maintain their **awareness and understanding** in their domain of expertise—including risks, opportunities, best practices, methods, environments, trends and leading indicators. Critically, Experts must be able to **transfer understanding** to others.

Service / Product Providers

DELIVERING VALUE THROUGH CAPABILITY

Providers **deliver value** by achieving solutions that matter to people by reducing the energy they need to solve their problem. Service providers take this problem on themselves by **applying their energy**.

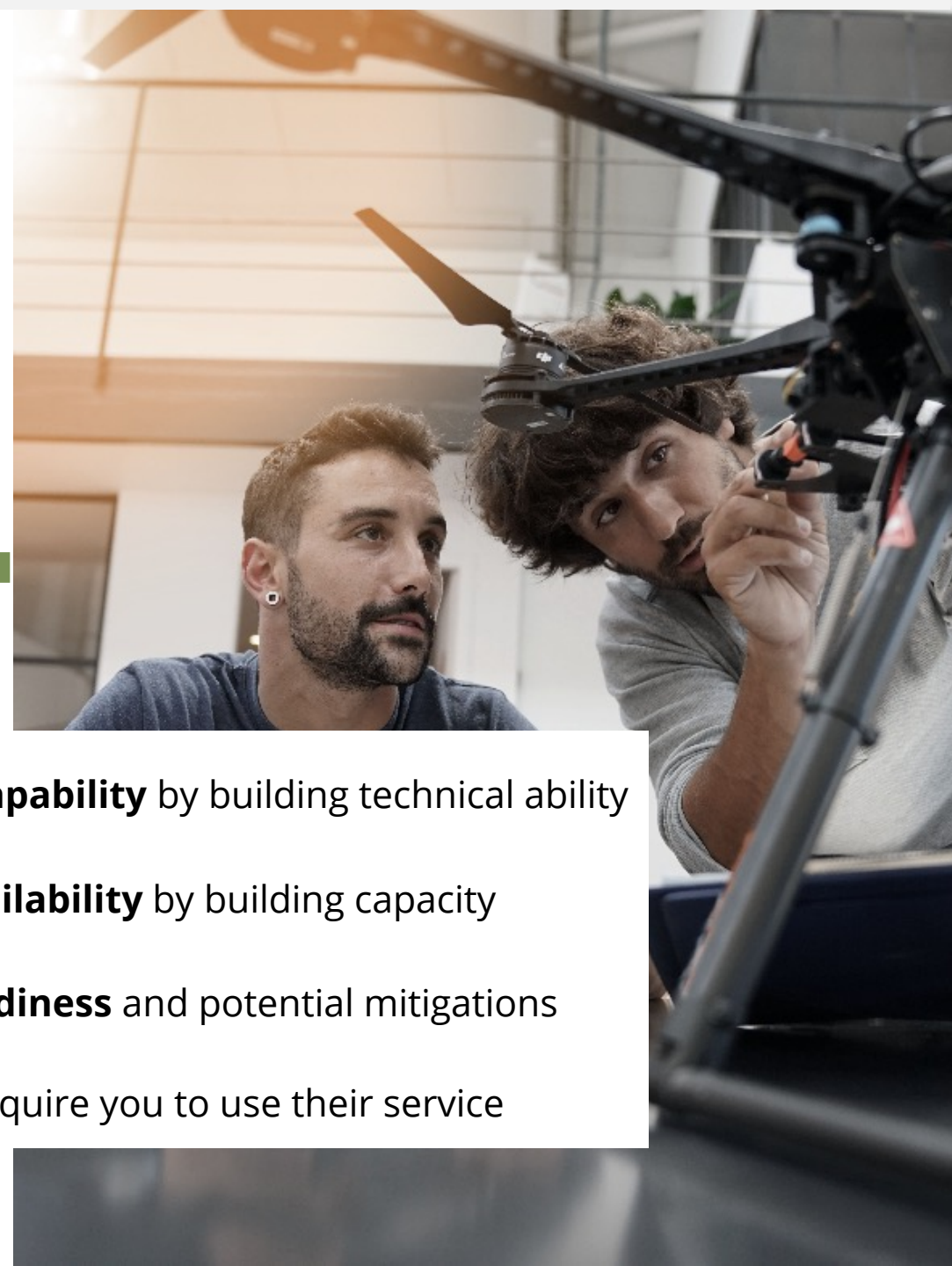
The Product / Service Provider

Delivering **Capability Excellence** to Produce Value

"[Product and Service Providers] perform work (processes and activities) using information, technology, and other resources for internal or external customers. (Alter, 2013)"

-Steven Alter (2013)

- **Maintains Capability** by building technical ability
- **Provides Availability** by building capacity
- **Delivers Readiness** and potential mitigations
- **DOES NOT** require you to use their service



The Decision-Maker

Creating **Informed Policy** to Guide Actions

"Decision-making is the cognitive process resulting in the selection of a belief or a course of action among several possible alternative options based on assumptions of values, preferences and beliefs of the decision-maker."

-Herbert Alexander Simon (1977)

- **Gathers Viewpoints** of multiple experts
- **Prioritizes Risks** that the group can best manage
- **Sets Direction** based on available information
- **DOES NOT** require consensus to make decision



The Expert

Providing **Comprehensive Understanding** on Critical Topics

"A person who has accumulated great knowledge in a particular field or topic and this level of knowledge is demonstrated by the person's degree, licensure, and/or through years of professional experience with the subject."

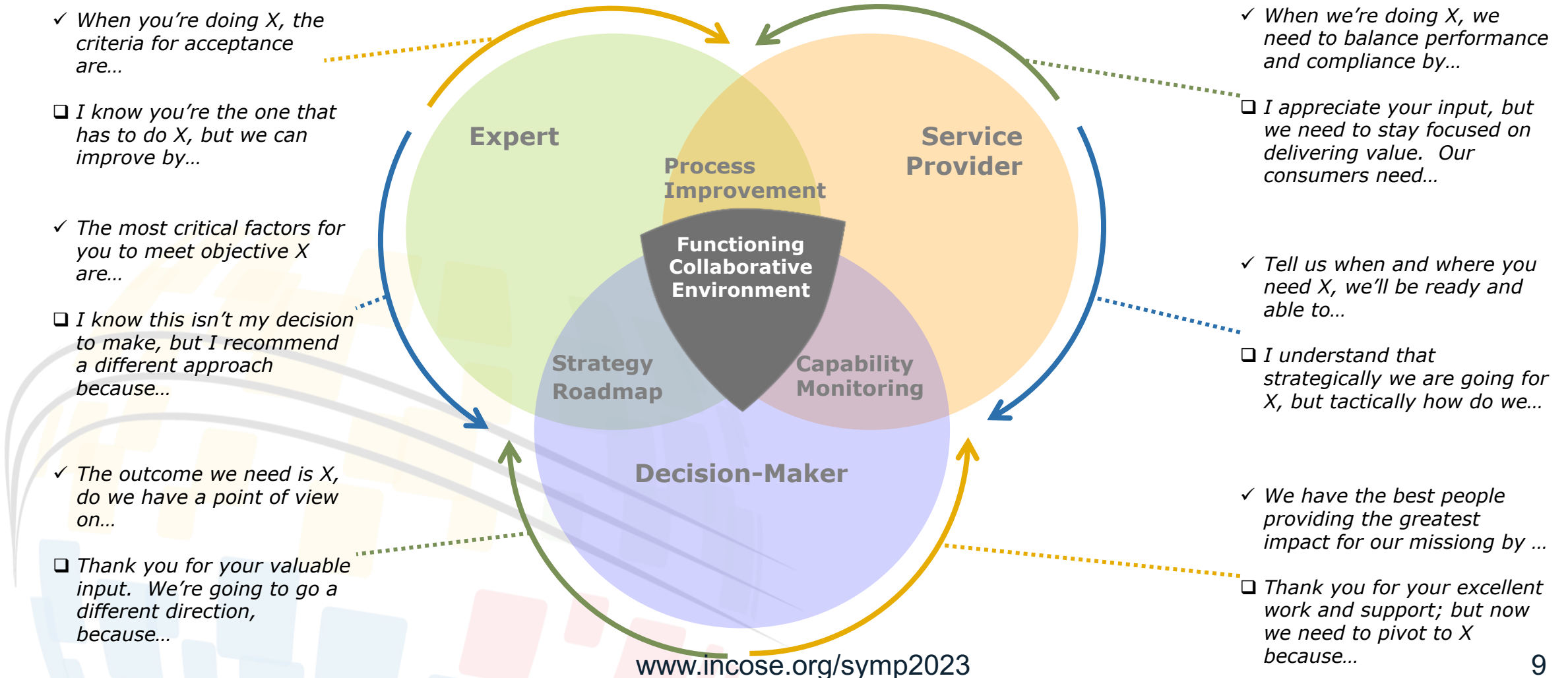
-ASTM E2500

- **Maintains Knowledge** of significance to subject
- **Shares Perspective** to communicate knowledge
- **Identifies Risks** and potential mitigations
- **DOES NOT** require others accept point of view



Where Experts, Decision-Makers, and Service Providers Collide

Below are some examples of constructive patterns for engaging each archetype in both nominal and potentially contentious situations.



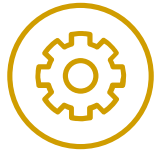
Do Engineers Have a Monopoly on Complexity?

The biggest challenges are all defined by complexity

Complexity has many dimensions that are too much for one person



Engineers manage complex systems



Architects manage complex systems of systems



Developers manage complex products



Project Managers manage complex processes

How do you build a capability through technology?

How do we identify and mitigate risks?

How do we deliver value and scale?

How do we sequence work to best use our resources?

Solution Architect or Systems Engineer?

1

HOW ARE SYSTEMS ENGINEERS AND ARCHITECTS ALIKE?

Emergence. SEs and Architects alike try to identify the properties that emerge from networking technologies and capabilities together

2

HOW DO SYSTEMS ENGINEERS AND ARCHITECTS DIFFER?

Risk vs Opportunity. SEs try to minimize the probability of “negative” emergence. Architects try to maximize the probability of “positive” emergence.

3

WHERE DO SYSTEMS ENGINEERS AND ARCHITECTS CONVERGE?

Model Patterns. MBSE combines engineering and architecture by establishing patterns of features, technologies, and functionality.

Project Manager or Systems Engineer?



1

HOW ARE PROJECT MANAGERS AND SYSTEMS ENGINEERS ALIKE?

Dependencies. Both the SEs and PMs aim to drive progress by identifying and managing the dependencies among the components and activities of a project

2

HOW DO PROJECT MANAGERS AND SYSTEMS ENGINEERS DIFFER?

Activity vs Artifact. PMs try to manage the relationships that constrain tasks. SEs try to manage the relationships between physical domains that constrain the outcome.

3

WHERE DO PROJECT MANAGERS AND SYSTEMS ENGINEERS CONVERGE?

Risk Mitigations. Whether the risks are cost, schedule, or performance, PMs and SEs take steps to minimize the chance of negative outcome

Development Lifecycle or Engineering Lifecycle?

1

HOW ARE THE ENGINEERING AND DEVELOPMENT LIFECYCLES ALIKE?

Capability. Both the SELC and SDLC aim to provide value through useful capability to support their stakeholders' needs

2

HOW DO THE ENGINEERING AND DEVELOPMENT LIFECYCLES DIFFER?

Debt vs Rigor. SEs try to minimize the probability of “negative” emergence. Architects try to maximize the probability of “positive” emergence.

3

WHERE DO SYSTEMS ENGINEERS AND ARCHITECTS CONVERGE?

Features and Services. Both the SELC and SDLC drive value to the user through features and services where the feature and service definitions are agnostic to implementation.

What Does This Mean for You?

Engineering is fundamentally a discipline of people working for people

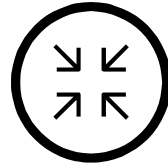
Success depends on strong, collaborative relationships



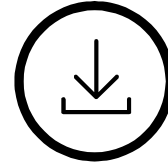
**Acknowledge
Value**



**Use Their
Language**



**Share
Complexity**



**Build
Partnerships**



Have Fun!

“The strength of the team is
each individual member. The
strength of each member is
the team.”

PHIL JACKSON | COACH



www.incose.org/symp2023

Questions?



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