

Rapid Knowledge Formation in an Information Rich Environment

Prepared for the 2004 CCRTS

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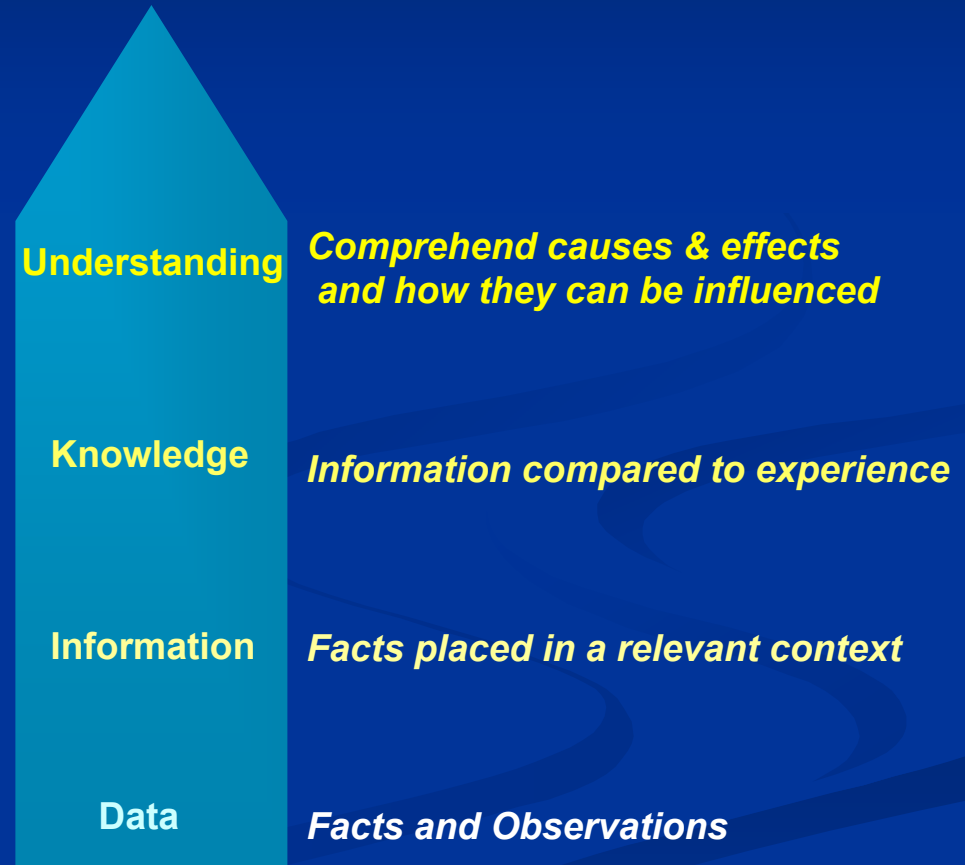
M.J. Brown & Associates

Presentation Overview

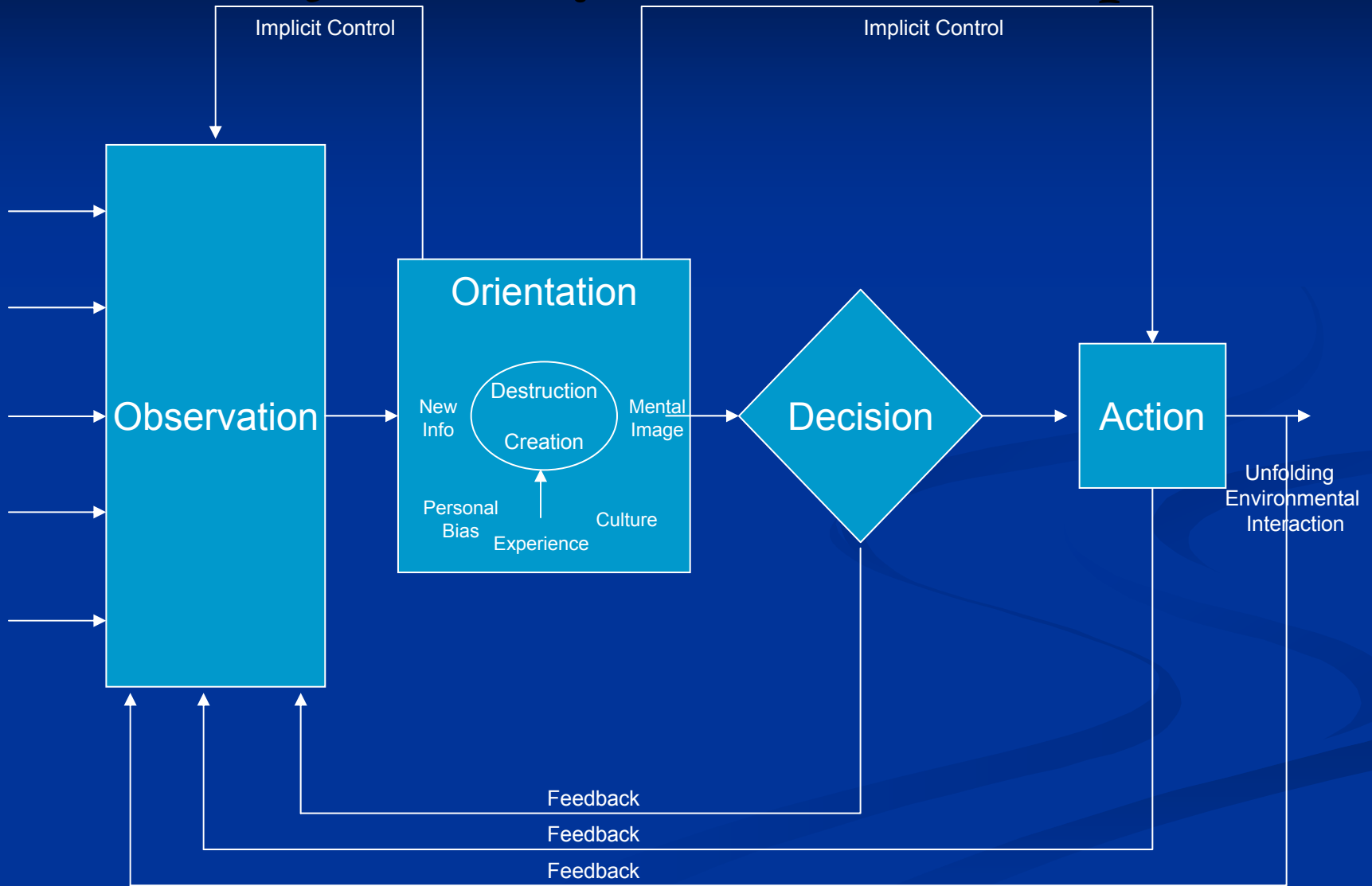
- Knowledge Formation and C2
- The Problem
 - Recognition and Association
 - Dynamic Adjustment
 - Information Delivery
- Intelligent Assistant for C2
 - Concept
 - Architecture

C2 Knowledge Formation

- Battlefield agility begins with:
 - Detection and recognition of key events reflected in data
 - Assembling these individual data elements into relevant information
 - Forming knowledge by comparing information to past experience
 - Seizing the initiative through insight and understanding of causes and relationships



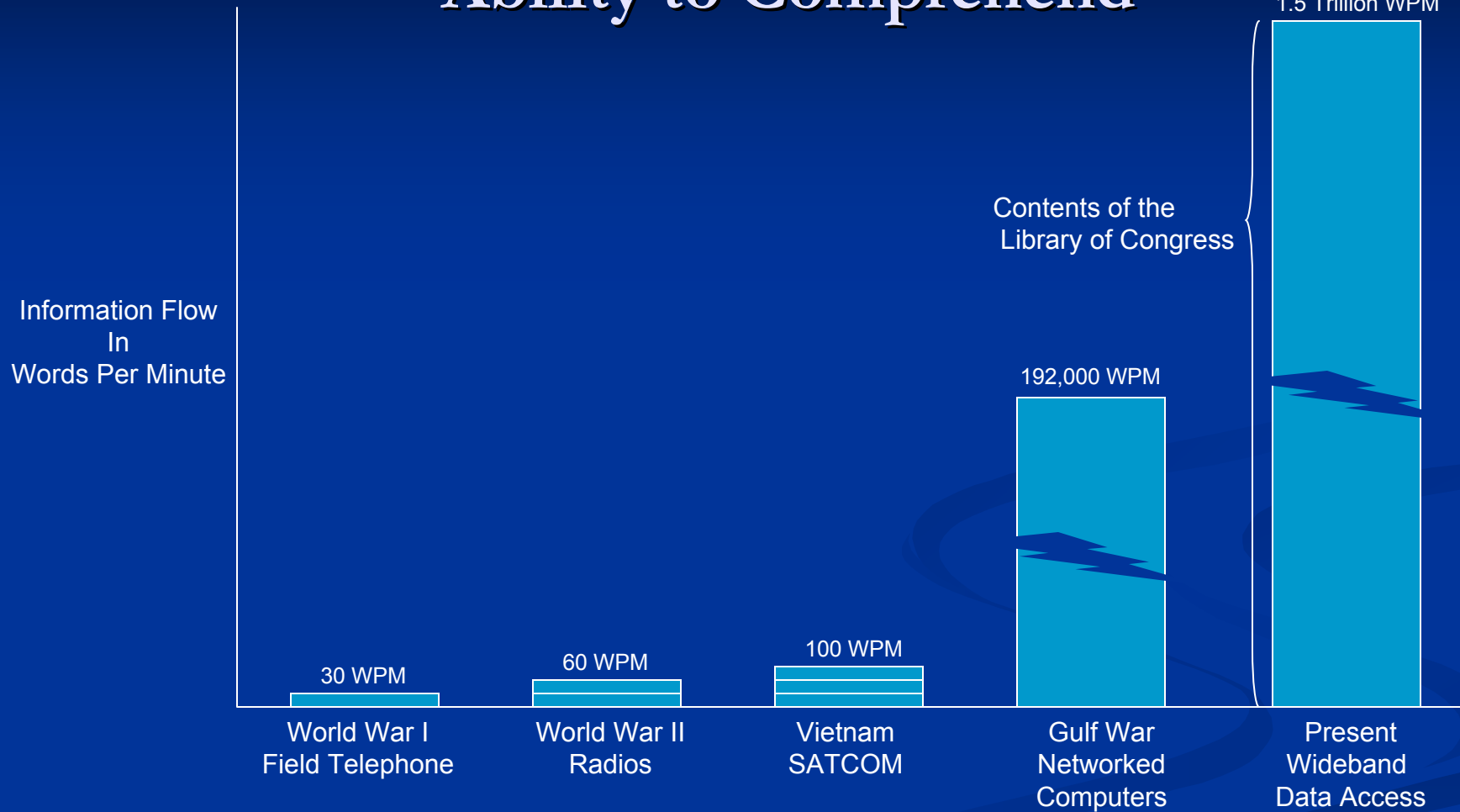
John Boyd's OODA Loop



Technology Impacts on Command Agility

- Volume and speed of data delivery
 - Technology investments in information dissemination paying off
 - Deliver increased amounts of data to the commander
 - Volume of information delivery capability outpaces ability to assimilate the information
- Automated Fusion capability delivers more information than data
- Technology has facilitated the move from “push” and “pull” models to “publish and subscribe”
 - Decouples sources and consumers
 - Employs early filtering to remove information clutter

Information Delivery Capability Outpaces our Ability to Comprehend



Addressing Information Overload

- Technologies supporting discovery and filtering emerging
 - Agents and agent societies can help ensure that commanders receive relevant information
 - Often require constant management. Difficult to tailor to individuals
 - Source and near source transformation technologies begin the fusion process early
 - Fusion technologies often placed at information source
 - Limits adaptability if source data hidden
- Technology treats information as a commodity
 - Fails to support the dynamically changing needs of the decision maker

Dynamic Information Needs

Needs are Structured By:

Own Situation

Planned Actions

Nearby Friendly Unit Situation

Nearby Friendly Planned Action

Enemy Situation

Perceived Enemy Intentions

Battlespace
Information
Needs

Needs are Satisfied By:

Directed Queries

Trusted Information Sources

Known Information Sources

Undirected Queries

Available Information Sources

External Events

Needs are Triggered By:

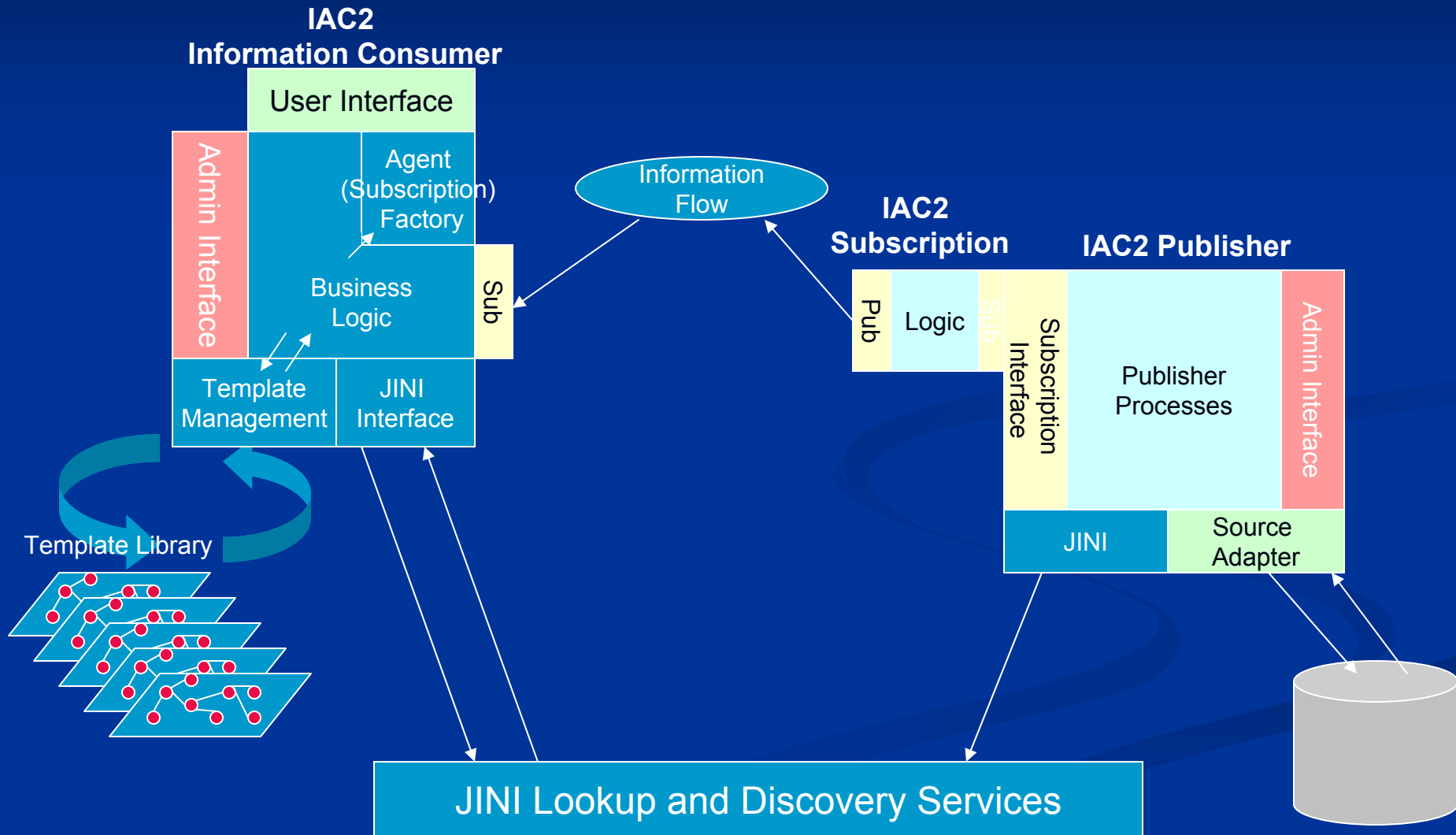
Conceptual Framework for the Intelligent Assistant for C2

- Information needs can change dynamically:
 - Often the result of a combination of events
 - Each event can trigger additional information needs
- Subscriptions to information sources are transitory
 - Established to fulfill a specific need then abolished
- Each decision maker has specific information needs
 - Differences in:
 - Experience
 - Methods for knowledge formation

Basic Technologies for the Intelligent Assistant for C2

- COTS foundation
 - Employ standards based components (JINI)
- Leverages previous DoD sponsored research
 - Including Active Templates, JBI, ACEM
- Monitors and Consumers are decoupled
 - Monitors
 - Focus on providing information from sources
 - Simple information representation
 - Can manage consumer subscriptions
 - Consumers
 - Focus on information needs
 - Can discover and subscribe to sources
 - Include and Intelligent Assistant
 - Template based approach for supporting information needs
 - Dynamically create subscriptions

Intelligent Assistant for C2 Architecture



Conclusion

- Technology focus on delivering decision quality information in a complex, rapid paced environment
- Consumer managed near source filtering and transformation
- Adaptable knowledge based assistants to manage information delivery