

# **Collaborative Secure Knowledge Management**



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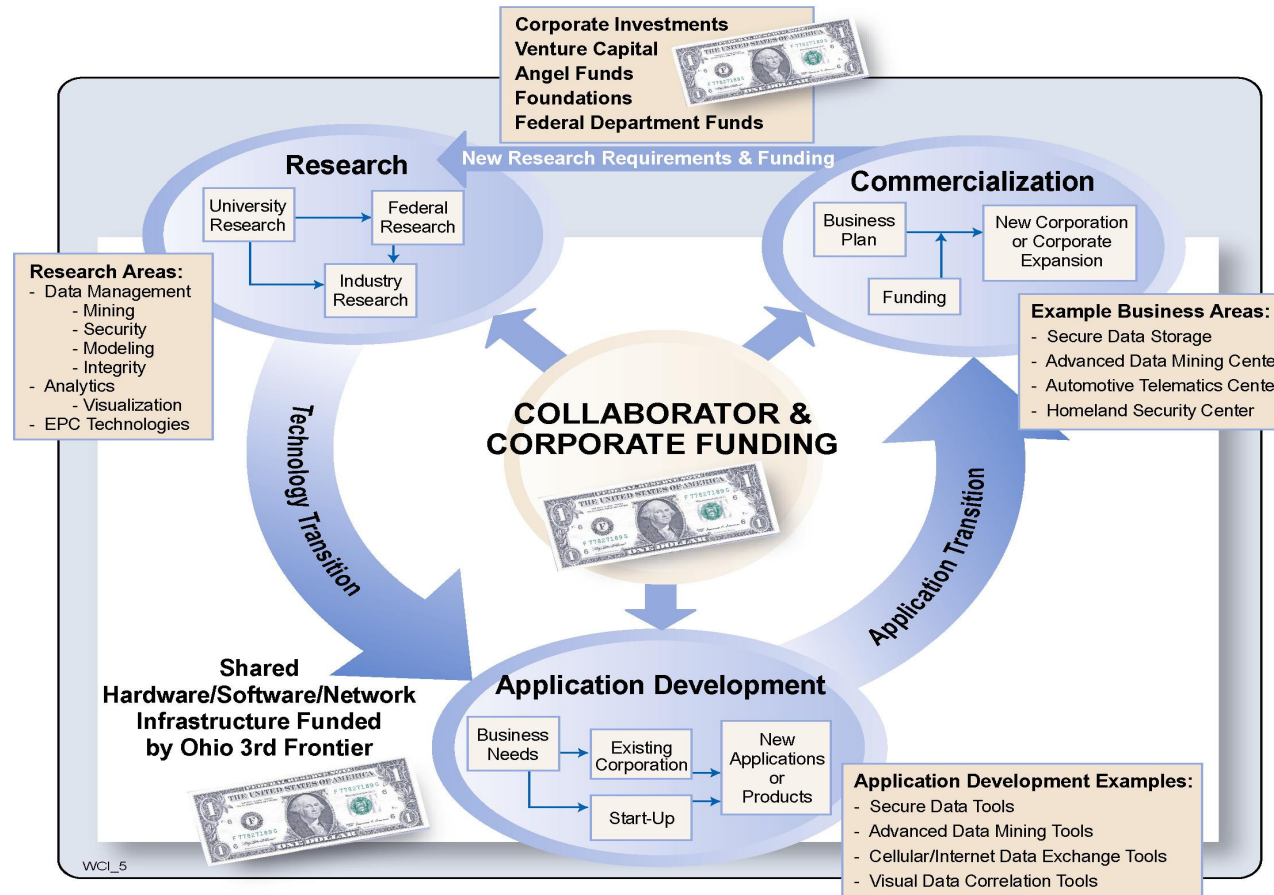
# Outline



- ➡ • **Background & Objectives**
- **Research Program**
- **An Application - Virtual Capability Planning**
- **Summary**



# Ohio 3<sup>rd</sup> Frontier Technology Initiative



**Wright Center of Innovation for  
Advanced Data Management and Analysis  
(WCI ADMA)**



# WCI Partnerships



**Wright Brothers Institute (WBI)**  
**Air Force Research Lab (AFRL)**

## GOVERNMENT

**Lexis-Nexis**  
**NCR**  
**P&G**  
**Reynolds & Reynolds**  
**SAIC**

## INDUSTRY

**EDS**  
**Standard Register**  
**CDO Technologies**  
**CINCOM**  
**Cincinnati Bell**  
**Intelliseek**  
**James Gregory**  
**Solve Intreactive**

**Wright State (WSU)**  
**Ohio State (OSU)**

## ACADEMIC

**Kent State (KSU)**  
**Cincinnati (UC)**  
**Dayton (UD)**  
**Miami**

## NON-PROFIT

**Uniform Code Council (UCC)**  
**Online Computer Library Center (OCLC)**  
**State/Regional Development Groups**





# A Knowledge Management Definition



## What Is Knowledge Management About?

Knowledge management is an integrated, systematic approach to identifying, managing, and sharing all of an enterprise's information assets, including data-bases, documents, policies, and procedures, as well as previously unarticulated expertise and experience held by individual workers. Fundamentally, it is about making the collective information and experience of an enterprise available to the individual knowledge worker, who is responsible for using it wisely and for replenishing the stock. This ongoing cycle encourages a learning organization, stimulates collaboration, and empowers people to continually enhance the way they perform work.

*Source: Army Knowledge Online—An Intelligent Approach to Mission Success, U.S. Department of the Army, Washington, D.C., 1999.*



# Air Force Critical Future Capabilities



## Information Superiority

... Provide continuous, *tailored information* within minutes ... ensure our use of the information domain unhindered ... be able to provide different levels of information depending on the needs of the user ....

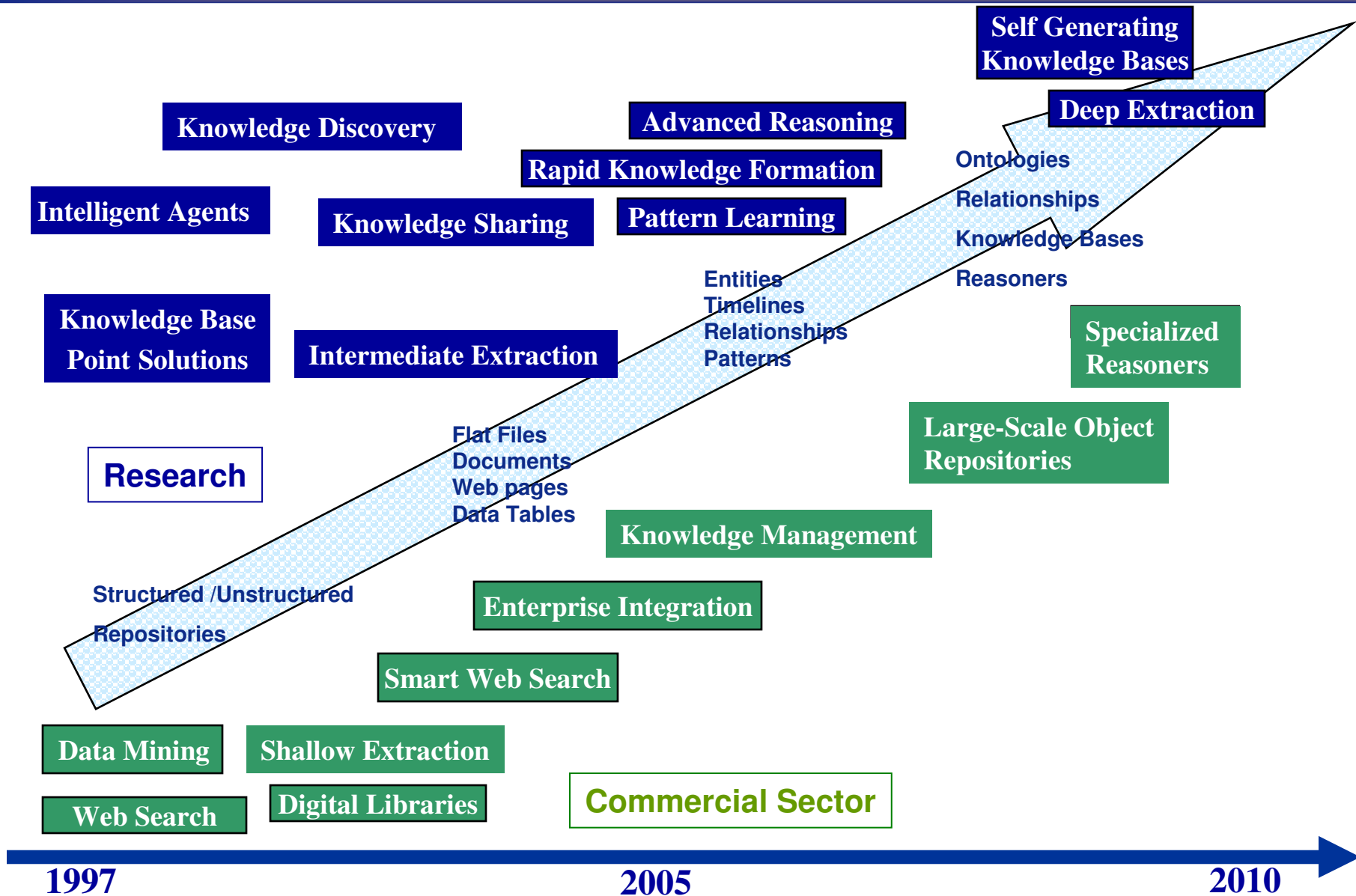
“The ability to share awareness, *create knowledge, and support collaboration* .... will transform the information advantage into an operational advantage”

Air Force Strategic Plan, Volume 3 “Long-Range Planning Guidance”

- Fuse *information from a variety of sources* into high-level “knowledge”
- Provide *knowledge based representations* of situation, planning, and execution status
- Manage, exchange, and understand the *large volume of relevant information*
- Rapidly (re)configurable applications (asset assignment in real-time)
- Interoperability with legacy systems and among joint & coalitions forces
- *Reusable, domain-independent* and efficient reasoning and *inference techniques*
- Automated capability to predict location and disposition of TCT's
- Planning and assessment with incomplete, wrong, and approximate information
- *Automated analytical support tools* to assemble large numbers of disparate facts in order to reach valid conclusions.



# Technology Timeline





# WCI Secure Knowledge Management



**Objective:** To provide **revolutionary** and visionary technologies in **information & knowledge creation and sharing** for efficient, secure, and meaningful **enhanced decision support** in the Air Force Enterprise Management and Aerospace Operations.



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# SKM Research Program

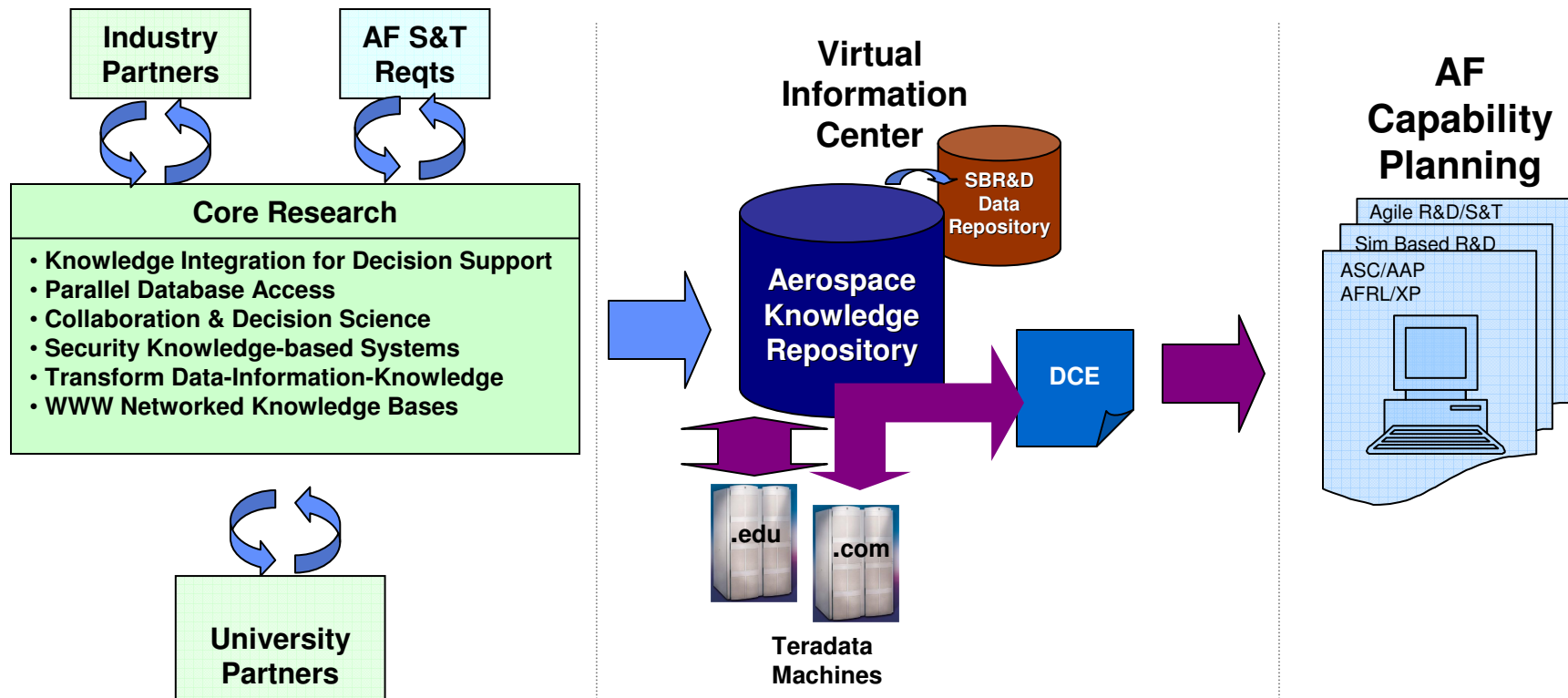


- **University Research**
  - SKM 5 Year Research Roadmap
  - Core Research
    - Use and Integration of Knowledge from Different Sources
    - Parallel and Distributed Database Access and Database Machines
    - Collaboration Science, Decision Science & Collaborative Use of Knowledge
    - Security in Knowledge Knowledge-based Systems
    - Transformation from Data to Information to Knowledge
    - World Wide Web Networked Knowledge Bases
  - Knowledge Management Workshops
- **Aerospace Knowledge Repository Prototype**
- **Application to Capability Planning**



# Secure Knowledge Management

## *Research Components*

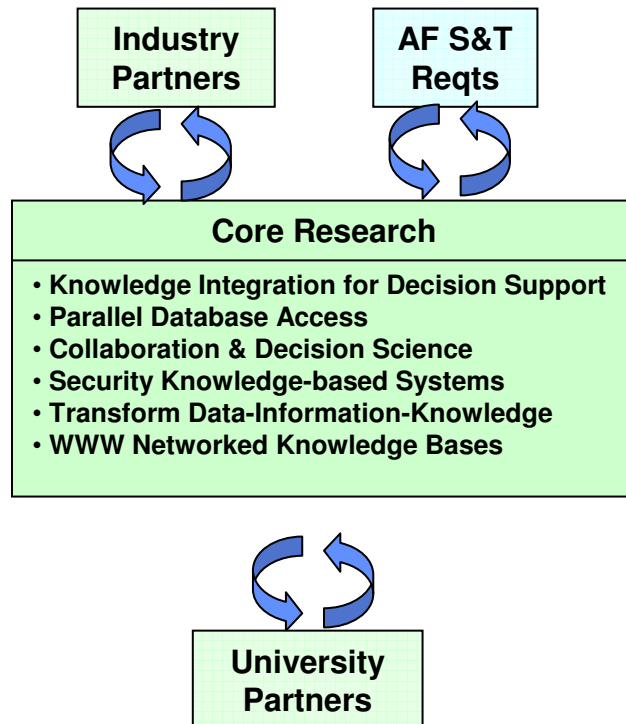






# Secure Knowledge Management

## *University Research*



### Facilitated by Wright Brothers Institute

- Collaboration with world-class visionaries
- Partnering Industry/universities for revolutionary technologies
- University technology demonstrators
- Accelerate university research
- Integrate commercial technology
- University involvement to create next generation of designers
- Continuous education and workshops



# University Research Areas

- **Use and Integration of Knowledge from Different Sources for Decision Support**
  - *An Architecture for Multi-Critical Decision Making : Use & Integration of Knowledge from Different Sources for Decision Support*, B. Chandrasekaran, Ohio State
  - *Data Mining Algorithms based on Implicit Integration of Distributed Databases*, R. Bhatnagar, Univ of Cincinnati
- **Parallel and Distributed Database Access and Database Machines**
  - *Development of Parallel Data Mining Algorithms for Text & Formatted Databases*, S. Chung, Wright State
- **Collaboration Science, Decision Science & Collaborative Use of Knowledge**
  - *Human-centered Collaboration Science with Knowledge Construction and Decision Making Infrastructures*, Waleed Smari, U Dayton
  - *Collaborative Science, Decision Sciences, Secure Knowledge Management*, Chia Y. Han, Univ of Cincinnati
  - *Multi-agent team formation & collaboration in complex dynamic environments*, M. Cox, Wright State
- **Security in Knowledge Management, Databases and Knowledge-based Systems**
  - *Synthesizing WWW documents retrieved from different resources and securing their confidentiality*, N. Bourbakis and J.Lu, Wright State



# University Research Areas



- **Transformation from Data to Information to Knowledge**

- *Discovering Similar Knowledge in Large Repositories*, G. Dong, Wright State
- *Putting User at the Center: A Research Program in Knowledge Management*, B. Chandrasekaran, Ohio State
- *Transformation from Data to Information to Knowledge*, D. Agrawal, Univ of Cinn

- **WWW Networked Knowledge Bases**

- *Information Extraction from Semi-Structured Documents*, K. Thirunananarayan, Wright State
- *Computer System & Network Security*, B. Wang, Wright State
- *Analysis and Knowledge Extraction from Archival Video & Audio*, R. Parent, J. Davis, R. Machiraju, D. Wang, Ohio State
- *Knowledge Mining & Management in Networked Multimedia Databases*, C-C. Lu, Kent State
- *Fault Tolerant Adaptive Agent Based Systems*, A. Bansal, Kent State



# Technology Roadmap



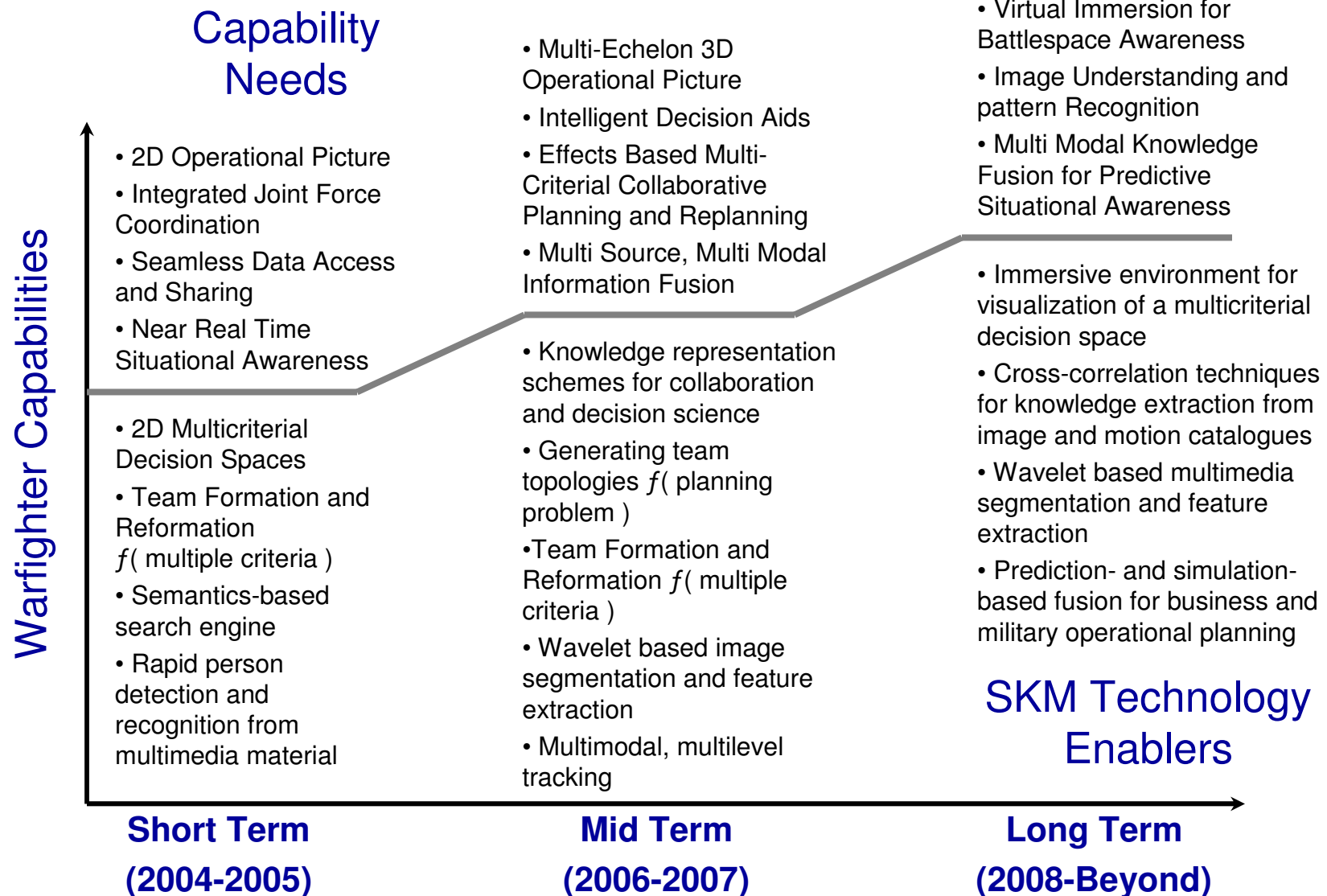
**Focus on SKM support to DoD planning & decision making**

- Identify and assess **critical SKM technologies**
- Assess **technology readiness** and maturity levels, both current and projected
- Consider ***emerging and disruptive*** technologies
- Assess **technology dependencies** and interrelationships
- Identify technology **gaps**
- Chart a **course for SKM technology** investment over the next 5-10 years



# Enabling the 21<sup>st</sup> Century Warfighter

## Mapping University Basic Research To Warfighter Capability Needs



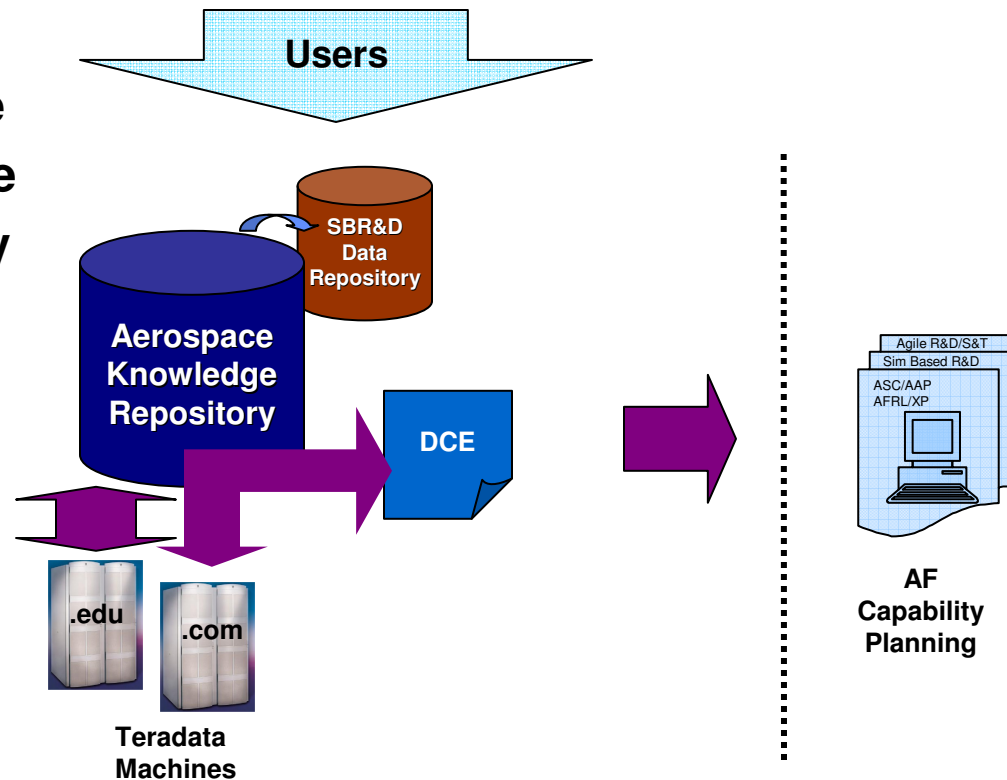


# WCI Secure Knowledge Management

## *Prototype Aerospace Knowledge Repository*



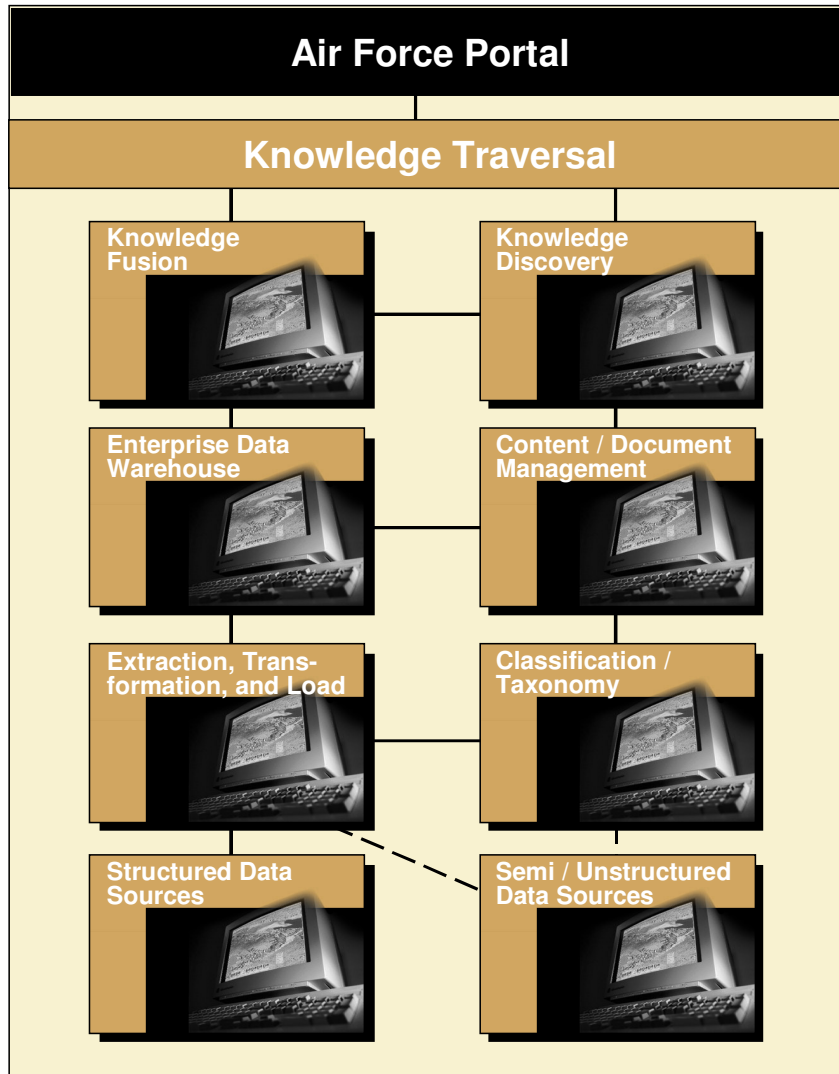
**Aerospace  
Knowledge  
Repository**



- On-line Repository of Technology, Research, & Researchers
- Aerospace Meta-Knowledge Base for Other WBI Research
- Knowledge Management Electronic Clearinghouse
- Supports Continuous Technology Gap Analysis



# AKR Concept



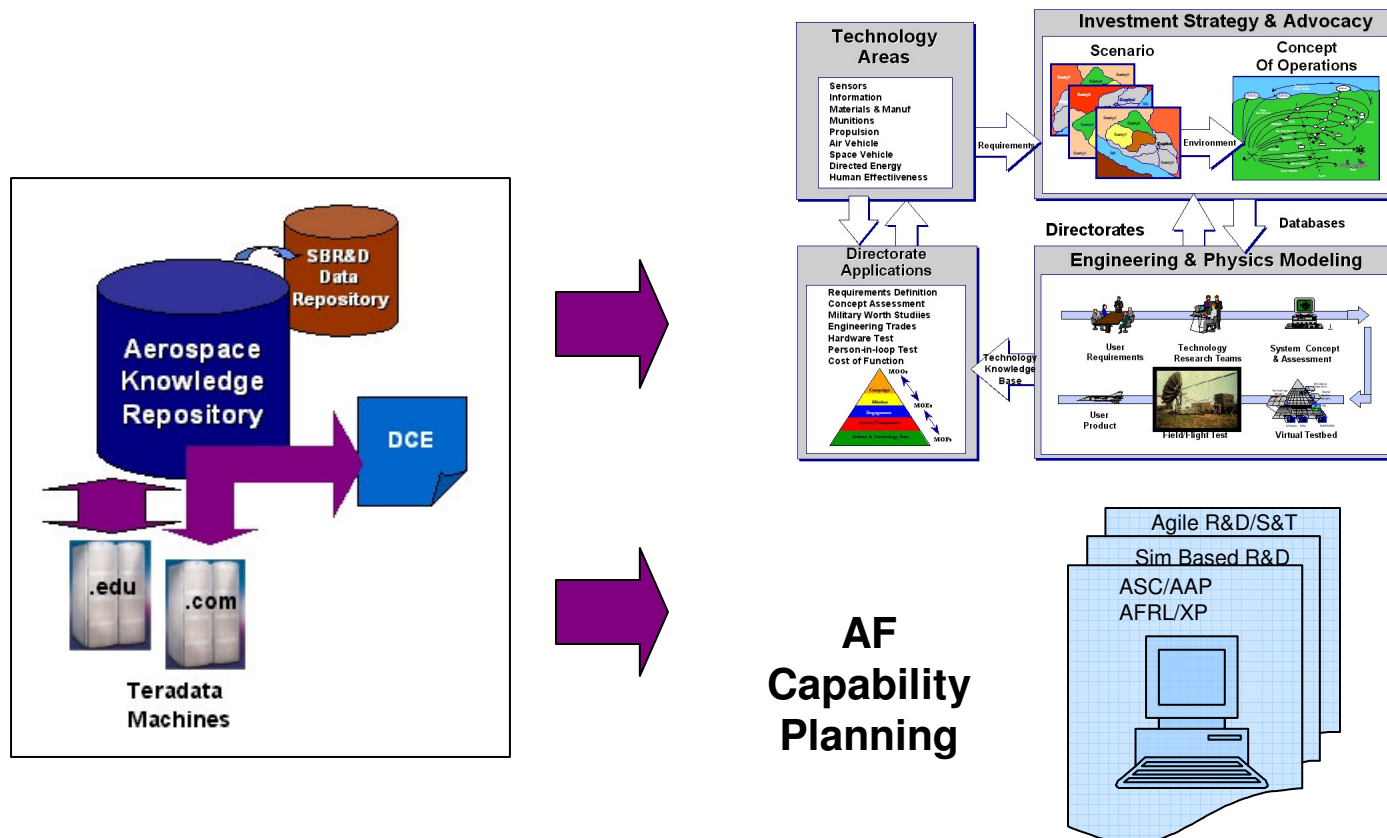
- **Focus on Knowledge Discovery**
- **Structured Data**
  - Rows and columns
  - Retrieved by indexes or keys
- **Unstructured Data**
  - Makes up >70% of information needs
  - Recognized as one of the major unresolved information technology issues
  - Full-text documents, Word files, PDF files, HTML or web files, etc.





# WCI Secure Knowledge Management

## Decision Support for Planning



- Decision support for capability planning
- Technology Trends Data base
- Technology Assessment Events to evaluate technology maturation & impact of new technology using M&S assets



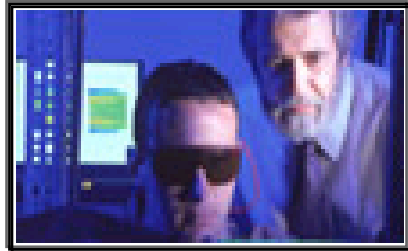
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# AKR Knowledge Mining



**Researcher /  
Technologist**



**Research**



**Technology**



**Academia**



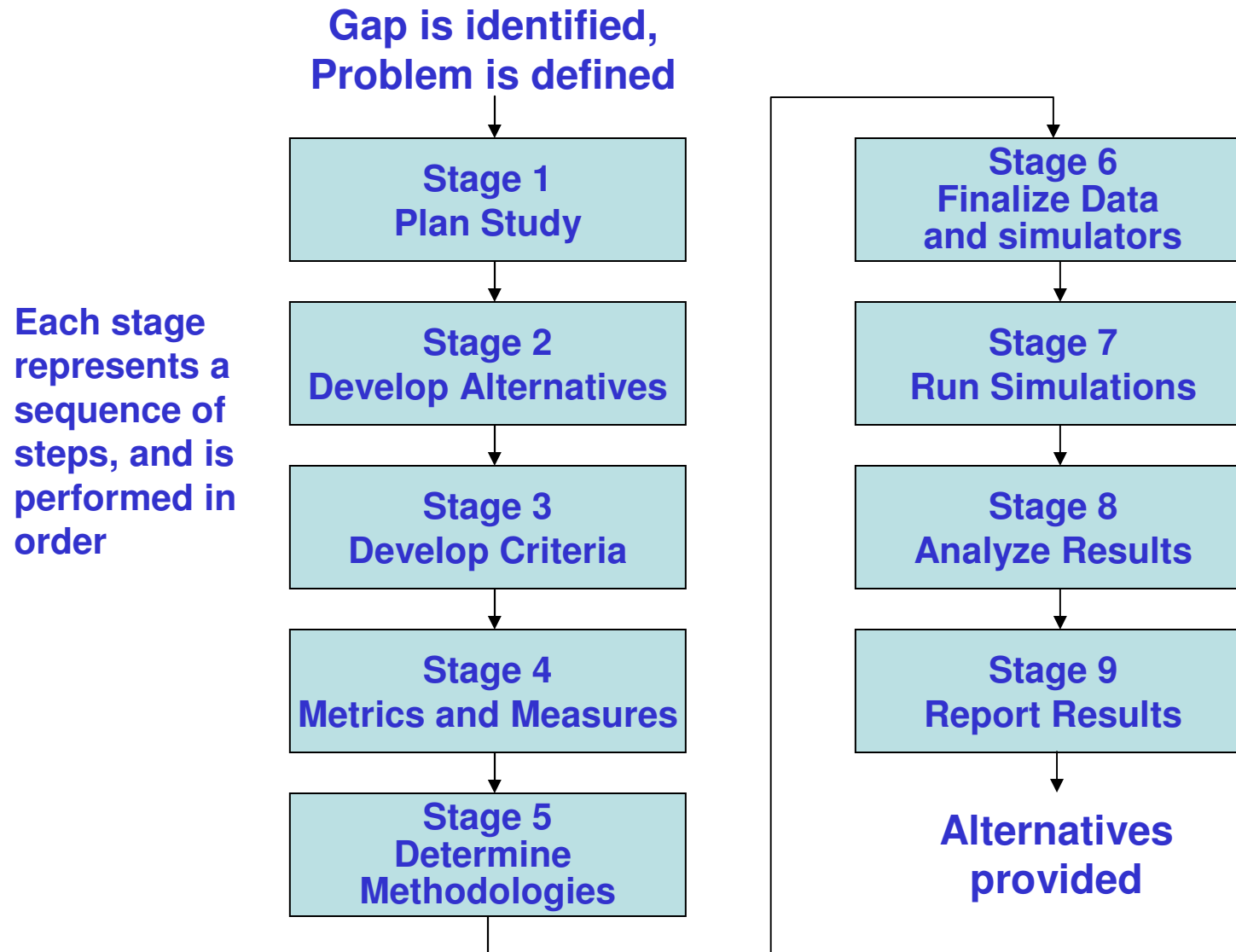
**Industry**



**Government**



# Capability Planning Process Flow





# Virtual Capability Planning Portal



[User Portal](#) [Enterprise Listing](#) [Enterprise Portal](#) [Filing Cabinet](#) [Roles](#) [Tools](#) [Search](#) [Log Out](#)

erprise ▾ Window ▾ Help ▾ [Register Now!](#)

**Enterprise Structure**

Enterprises  
    ★ AEKM  
        ★ Capability Planning  
        ★ CONOPS Release to Industry

★ Current Enterprise  
★ Available Enterprise  
★ Unavailable Enterprise

**Search**

[Advanced Search](#)

**Welcome AEKM User**

**Welcome to the Aeronautical  
Enterprise Knowledge  
Management (AEKM)**

**"Public Web Site"**

**Group Calendar**

◀ April 2003 ▶  
**Capability Planning Events**  

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
(20)	21	22	23	24	25	26
27	28	29	30			

[Week](#) | [Month](#) | [Year](#)  
[Search](#)

**AEKM Feedback**

Are you having a problem with AEKM-CEE? Do you have an idea that would make the product better? Please fill out a feedback form by pressing the button below.

You can also [read](#) existing feedback forms and their responses.

**TOOLS / RESOURCES**

**All News**

You have no news in Capability Planning.

**Warning**

- The Aeronautical Enterprise Knowledge Management (AEKM) Collaborative Web Site is provided as a public service by the Aeronautical Systems Center/Aeronautical Enterprise Integration Division (ASC/AEI), Wright-Patterson AFB, OH.
- Information presented on the AEKM site, is considered public information and may be distributed or copied. Use of appropriate byline/photo/image credits is requested.
- For site management, information is collected for statistical purposes. This government computer system uses software programs to create summary statistics which are used



# Process Execution/Knowledge Capture



**01. Initiate Analysis**

**Task** | Lessons Learned | Documentation

**Step:** Stage 1 - Step 01

**Content:**

**Title:** Initiate Analysis

**Description:** This step determines the acquisition problem to be solved. The problem statement will undergo analysis by stakeholders, who will be identified and will aid in determining the problem and scope of the analysis.

**Purpose:** The problem can be initiated by various sources. The receipt of the problem to be solved initiates the Capability Planning process. This activity can be triggered by a gap analysis of a capability or capabilities, and will be sponsored by one or more organizations.

**Subtasks/Directions:**

1. The Capability Planning Study Manager initiates a capability activity by creating a new enterprise and naming the enterprise. To do this [click here](#).

**Role(s)/User(s):**

**Assignees:**

Study Sponsor	Task Delegator
<a href="#">a@a.com</a>	111-111-1111

**POCs/Experts**

Study Sponsor	Task Delegator
<a href="#">a@a.com</a>	111-111-1111

**Useful Links**

**Process coordinates tasks providing knowledge content sheets, with analysis data repository, results approval & automatic updating of study status when tasks are complete**

**Stage 1 - DEFINITION AND PLANNING** Jun 01, 2004 - Aug 01, 2004

Name	%	Dur	Jun	Jul
00. Create Schedule	100.0	1d		
01. Initiate Analysis	0.0	2d		
02. Identify Relevant Stakeholders	0.0	5d		
03. Identify Designers of Study	0.0	.0d		
04. Assign tasks to determine issues	0.0	5d		
05. Identify Study Plan Details	0.0	.0d		
06. Determine Scope	0.0	.0d		

**Status**

**Stage 1 - DEFINITION AND PLANNING**

Name	%	Dur
00. Create Schedule	100.0	1d
01. Initiate Analysis	0.0	2d
02. Identify Relevant Stakeholders	0.0	5d
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04. Assign tasks to determine issues	0.0	5d
05. Identify Study Plan Details	0.0	.0d
06. Determine Scope	0.0	.0d

**Your Task 'Approve RTOC Predictions'**

**Task Name:** Approve RTOC Predictions

**Assigned On:** 04/29/2003

**Assigned By:** K-Squared Administrator

**Task Type:** Review and Approve/Reject Item(s)

**Task Description:**

1. This task is the final task required to complete the RTOC section of the ESLS. Access the [RTOC folder](#) and review its contents to ensure that tasking is complete and generated data is accurate.
2. If satisfied with the predictions generated in the RTOC section, click the "Approve Items" button below. Marking this task as approved will conclude the RTOC section and advance the ESLS to the next section.
3. If not satisfied with the predictions generated in the RTOC section, click the "Reject Items" button below. Marking this task as not approved will restart the RTOC section and retask the POC to collect new data.

**Approve Items** | **Reject Items**

**Started:** ☒ **Start By:** 04/29/2003 **Started:** 04/29/2003

**Past Due:** ☐ **Complete By:** 04/30/2003

Size	Created	Modified	Version	Creator
0 items	04/27/2003	04/27/2003	1.0	smanuan
27.47 kb	04/27/2003	04/27/2003	1.0	smanuan
14.81 kb	04/27/2003	04/27/2003	1.0	smanuan
53 kb	04/27/2003	04/27/2003	1.0	smanuan
4.76 kb	04/27/2003	04/27/2003	1.0	smanuan
146 kb	04/27/2003	04/27/2003	1.0	smanuan
34.5 kb	04/27/2003	04/27/2003	1.0	smanuan

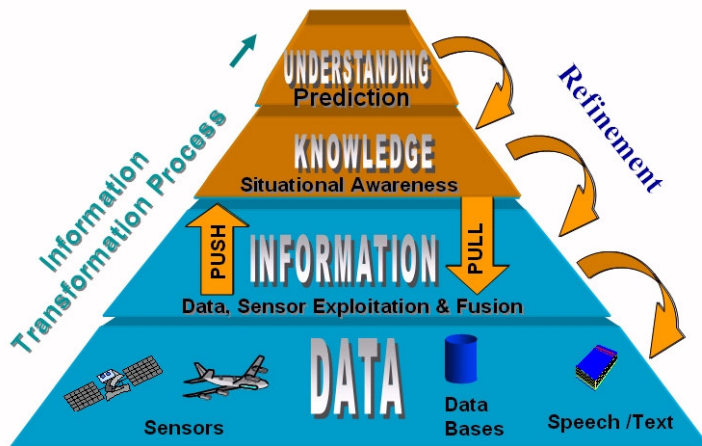
Item(s) in folder.

Local intranet





# Summary



Opportunity to provide decision-quality knowledge for planning including

- examining proposed capabilities
- cost of alternative approaches
- the impact of technologies
- identification of primary risk drivers
- creation of executable acquisition strategies