



***Charging Ahead  
into the  
Next Millennium***

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# Rapid Knowledge Formation

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Program Manager



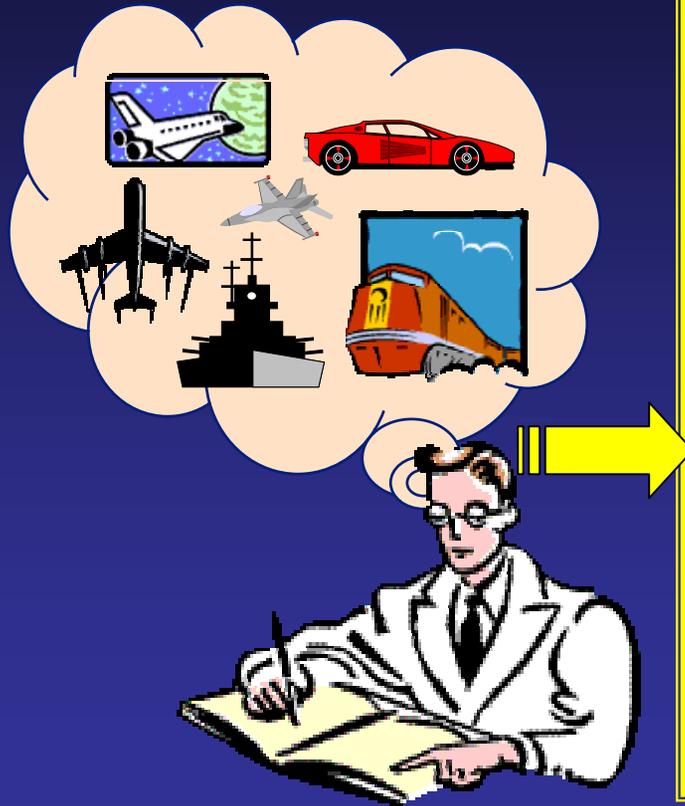
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# Grand Vision

- Experts Enabled to Directly Enter Knowledge
- Massive Libraries of Reusable Knowledge Throughout WWW



# What's Hard?



$\forall x, p1, p2.$

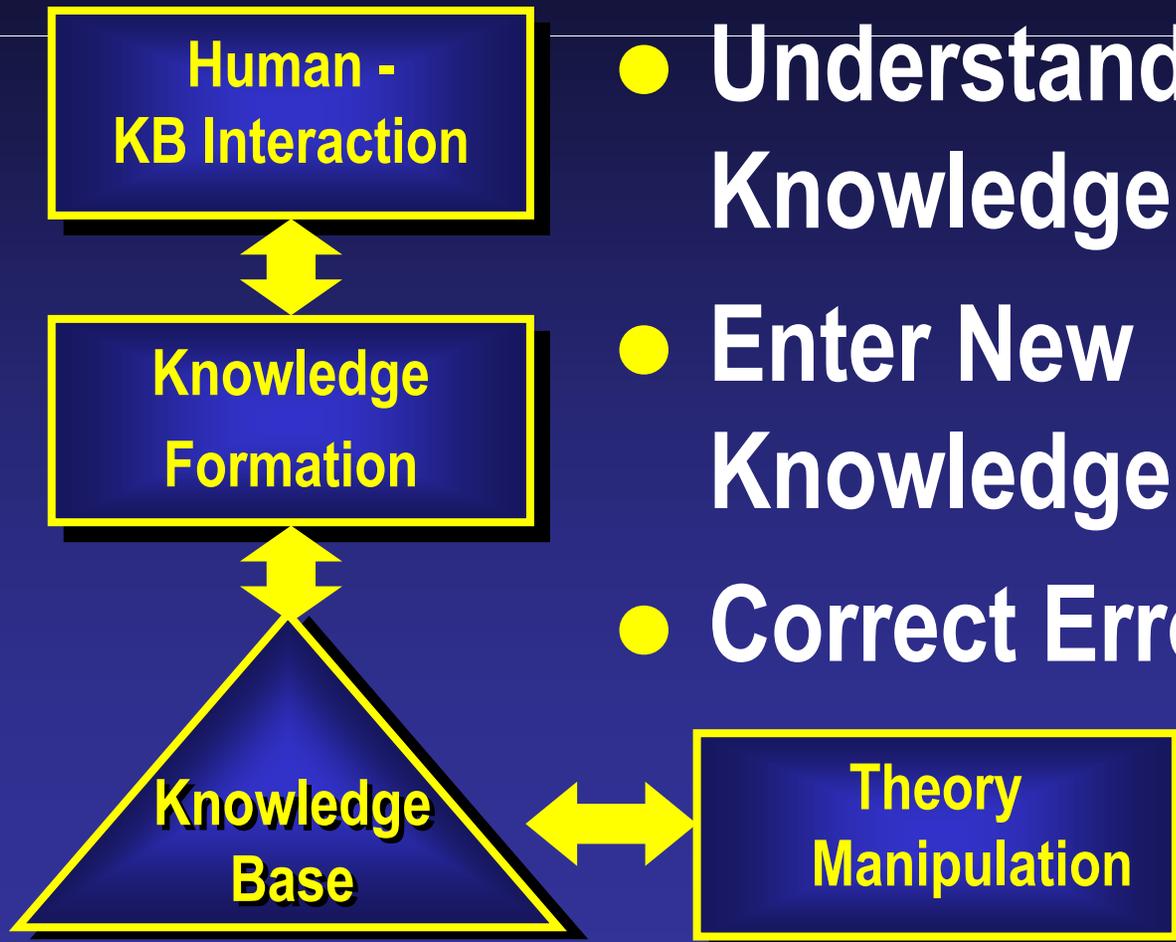
$\text{vehicle}(x) \Leftrightarrow$   
 $\text{physical\_object}(x)$  and  
 $\text{self-propelled}(x)$  and  
 $\text{can}(\text{move}(x), p1, p2).$

$\forall x, c. \text{cargo}(c) \Rightarrow \dots$



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# Rapid Knowledge Formation



- Understand Current Knowledge
- Enter New Knowledge
- Correct Errors



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# Human-KB Interaction

- Natural Language Entry
- Discourse Understanding
- Sketching & Diagram Input
- Explanation



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# Knowledge Formation

- Reasoning by Analogy
- Learning by Example
- Discourse Management
- Partial Theory Formation



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# Theory Manipulation

- Theory Slicing, Merging
- Conflict Resolution
- Context Management
- Belief Management



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# Knowledge Content

**Problem Solving &  
Reasoning Methods**

- **Upper Ontology**
- **Mid-Level Theories**
- **Domain-Specific Theories**

**Database**



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# Program Structure

- **Operational challenge problem drives the desired R&D**
- **End-to-end teams solve problem**
- **Technology developers advance the state of the art**



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# Challenge Problem

- **Develop knowledge bases to reason about chemical and biological weapons development**



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# Milestones

- **FY 99 3Q BAA**
- **FY 00 1Q Awards**
- **FY 00 4Q Component Tests**
- **FY 01 4Q Single User Entry**
- **FY 02 4Q Multi-User Entry**
- **FY 03 1M Axiom KB Developed**