Distributed Planning

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September 2001
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<td>See Also ADM001419 for whole conference on CD-ROM. These papers are from the Harnessing Advanced Technology for C4ISTAR, The Second Annual Advanced Technology Conference, held 25-27 September 2001 at The Great Malvern Theatre Complex. The original document contains color images.</td>
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Presentation theme:

Despite £M’s spent on planning systems why is planning usually conducted by military staff meeting around a table and using a combination of pen/paper, whiteboards and MS Office?

Agenda

• What is Planning?
• Why is supporting Planning difficult?
• Issues for current Planning support systems
• Why are ‘low-tech’ solutions in evidence?
• Recommendations for supporting Planning
Agenda

• What is Planning?
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Most people would agree that Planning...

• Is a complex, human-directed process
• Is driven by goals, requirements & constraints of a given campaign
• Involves
  – receipt and understanding of direction & guidance
  – decision-making & human judgement
  – communication & collaboration amongst groups of experts in their individual fields
  – development of common understanding, awareness and intent
Planning is...

- A process specified in doctrine and SOPs
- A complex group activity
- A design/problem-solving activity
- An example of decision-making grounded by judgement and experience

PS Functional Reqts Concept - 4

Layers

TOOLS
- Task-oriented requirements, describing support required by specific divisions

FORMATS
- Reqts for flexible, user-defined representations of planning info, to support group and coalition working

MGT
- Reqts for support in managing collaborative processes and their products

INFO
- Reqts on access to / the provision of information by other parties
Agenda

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Computers don’t naturally fit the problem

Planning
• Knowledge intensive
• Complex & multi-faceted
• Each plan & planning process is unique
• Planning, monitoring and re-planning is dynamic

Computers
• handle data/information
• best in pre-defined domains
• During application development it is easier to prescribe a process
• Dynamic variables are defined in advance
Systems Engineering is non-trivial

- Knowledge elicitation/task analysis is difficult
- Limited access to users
- Littoral, linear descriptions of processes
- Doctrine doesn’t convey flexibility of processes
- Interpretation is often too-littoral
- Access to products-in-progress is difficult
- Emphasis placed on products rather than processes

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- What is Planning?
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- Recommendations for supporting Planning
Current Planning support systems

- Tools mainly support op/tactical domains
- Emphasis placed on finding discrete, localised solutions & implementation
- Limited attention paid to
  - Problem framing and understanding
  - Plan monitoring and maintenance
- Emphasis on process/activities rather than problem solving

Technology-drive/narrow-focus leads to

- Passive experts
- Reduced adaptability
- Hidden mechanisms & logic
- Data push rather than interpretation
- Style over function
- Data deluge

[Klein 2001]
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So why is MS Office so popular?

• Process neutral
• Full inter-application integration
• Pervasive & familiar
• Applications are user-experience scalable

It demonstrates key characteristics of an appropriate support technology
Q: £M's, A:? 

- Current enterprise-wide planning systems are constraining, inflexible, stultifying and generally inappropriate
- Round-table discussions, MS Office & Whiteboarding meets a significant proportion of user requirements!
- Majority of investment targeted at specific, discrete planning aids (solution finding) at the operational/tactical level
- The complexity and knowledge intensive nature of planning is hard to define in concrete requirements terms

Agenda

- What is Planning?
- Why is supporting Planning difficult?
- Issues for current Planning support systems
- Why are ‘low-tech’ solutions in evidence?
- Recommendations for supporting Planning
Message based on 5+ yrs research

• ARP 19k then ARP 13
• AI Planning approaches through to Process and Info Management solutions (PlanMan)
• Main problem with PlanMan was process-product disjoint

Functional Reqts - 4 Layers examples

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<thead>
<tr>
<th>TOOLS</th>
<th>e.g. textual, temporal and spatial planning, re-planning and planning for contingencies</th>
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<tr>
<td>FORMATS</td>
<td>e.g. process description, plan description, product templates (briefings, documents), task checklists</td>
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<td>MGT</td>
<td>e.g. product mgt, process mgt, group brainstorming and authoring; plan reuse, decision traceability</td>
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<td>INFO</td>
<td>e.g. staff status, status of Op resources, geo, int, log, financial, historical, open-source, etc.</td>
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Recommendations

• Focus on enabling technologies
  – tools that a target organisation can evolve and maintain
  – framework applications
• De-couple logic and process from core systems
  – do not hardwire or prescribe
• Harness OO techniques for user not just developer benefit
  – Interfaces that directly manipulate business objects
  – OO for organisational agility not re-use
• Understand what doesn’t change

Recommendations

• Focus on group decision-making
  – human factors does not just mean GUI design
  – Planning environments must be collaborative
• Allow support and (multiple) representation(s) of processes and products - and the means to translate
• Shift emphasis from process support to problem solving
• Support full planning spectrum - crisis thro’ deliberate
• Discrete (integrable) solutions are necessary
Software Engineers - Remember...

Planning is a complex, dynamic, flexible, human-directed group activity

Technology can help if employed appropriately

Questions?