Methodology for Rapid Development of C2 Planning Systems

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Introduction

- Developing Geospatial C2 Systems
- Requires more interaction
  - cannot automate solutions
- Support for Decision Makers
- Urgent Operational Requests
- Need for more flexible design methodologies
  - improved capture of user requirements

C2 System Development Issues

- Large scale projects
  - fixed price and/or time
  - long procurement time scales
- User Requirements
  - difficult to elicit and validate
  - finding the real user
  - ‘future proof’
- Inflexible methodologies
  - ‘opaque to the user’
  - over ambitious

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Structured Systems Analysis & Design Methodology (SSADM)

- A British Standard, based on waterfall model:
  - coherent and widely used framework
  - high level of control
  - additional specification added to reflect some of C2 issues
- Limited adoption by C2 project organisations
  - limited, controlled user input
    - input to what not how
  - often associated with
    - systems failure, long time scales, high cost

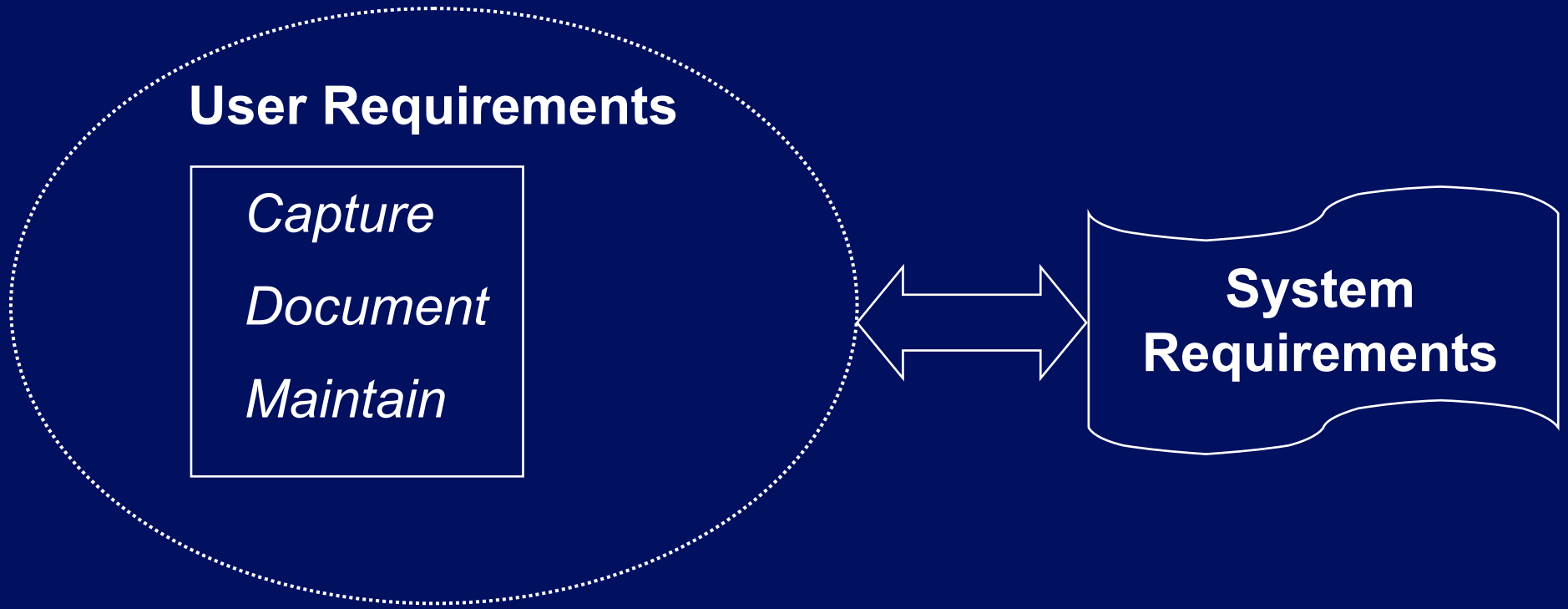
Disadvantages of traditional methodologies

- Technical bias of formal methods
  - disengages the end user
  - neglect of human issues
- Based on assumptions
  - users can state requirements
  - cost, benefit and work could be measured in advance
  - perfect system could be produced first time
- Do not address the difficulties of
  - defining what is required
  - measuring pioneering work

Newer Methodologies

- Rapid developments in technology
    - Object Oriented (OO) design
        - code re-use
        - component software (COTS)
- Facilitates rapid
    - design
    - user feedback
    - procurement
- However...

Requirements Engineering Process



Prototyping

- Technology demonstration
- New concepts/ideas
- User requirement validation

} Sophisticated URs

- Cost effective method for C2 development
  - new technology
  - complexity in all areas
  - data structures
- Known as Rapid Application Development (RAD) methodology

Rapid Application Development (RAD)

- C2 Decision support is ‘different’
  - explore problem by generating scenarios
    - explore solution space (war gaming)
- Cannot be captured by standard, structured development paradigms
- Need extensive user involvement
  - best way through use of prototypes
  - further developed by us to reflect C2 decision making

Design should be driven by the decision maker

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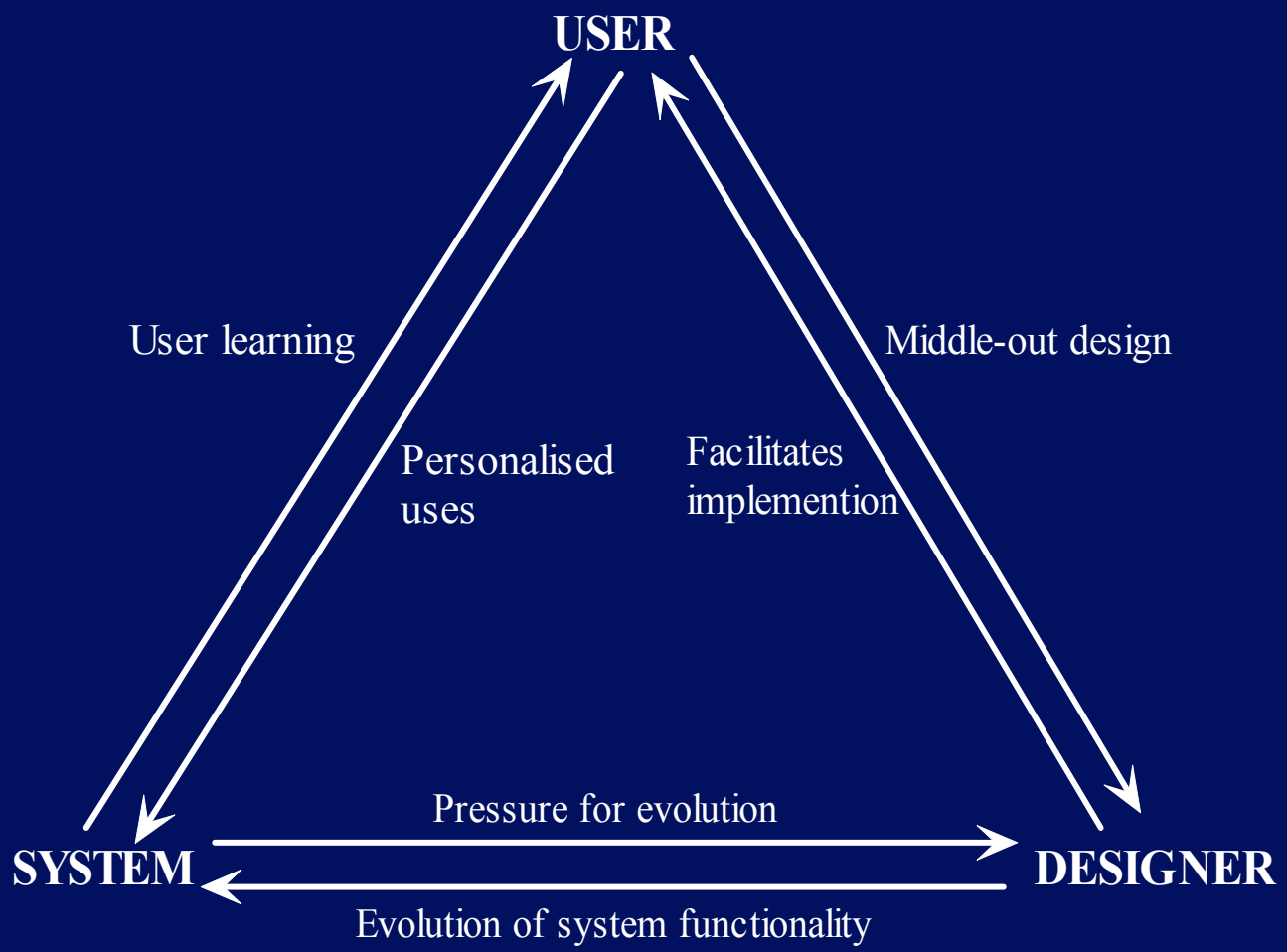
C2 RAD Methodology



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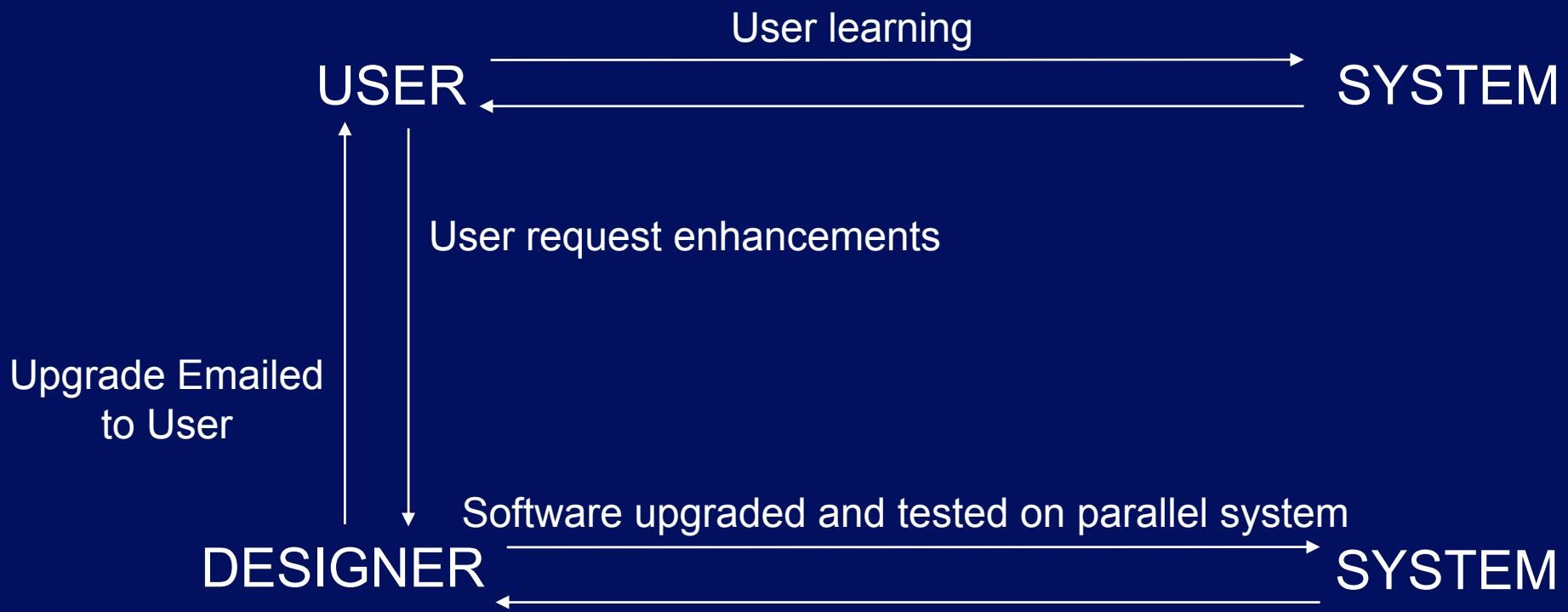
Urgent Operational Requirement (UOR)

- Issue with extremely short time scales
  - cannot use current methodologies
- Recent example of planning system
  - prototype developed rapidly
  - parallel system with secure communications
- Extremely rapid application prototyping
  - evolution of RAD method into PRAD

Parallel RAD (PRAD) Method



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PRAD Benefits

- System lives on…
  - identifies gaps in current procurement programs
  - captures future requirements
  - spreads ideas and concepts
  - endorsement from real user - ‘feet in the mud’ validation
- Users get the system they want
  - ownership

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Conclusions

- Particular issues of C2 need more flexible design methodologies
- Middle-out RAD approach based on prototypes starting to address this
- Refined method of PRAD applicable to UOR
- Processes/method still being refined but believe good basis for rapid development of C2 planning systems

Any questions?

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