



Reducing the Risk of a Software Intensive Programme (SIP)

“How do you assess a SIP ?”

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If you had to approve a SIP....

- What questions would you ask ?
- What information would you expect to see ?
- What issues would set off the alarm bells ?
- What would provide confidence in the achievability of the programme ?



2 Initiatives within DPA

- System Readiness Levels
- Key Success Factors

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System Readiness Levels

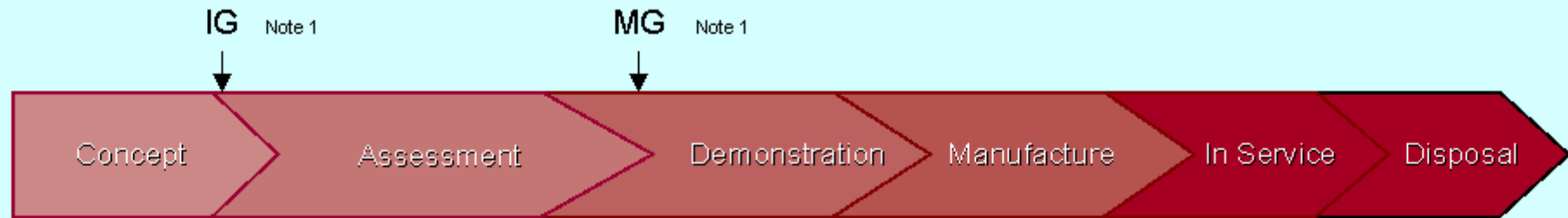
- An extension of Technology Readiness Levels
- TRL's considered successful by Scrutineers and NAO
- MPR 2003 mentioned SRL's & the wish to implements them
- MPR 2004 includes a definition only



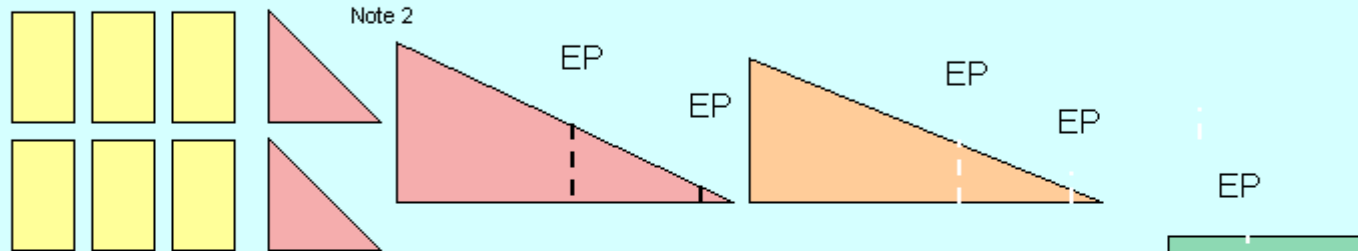
System Readiness Levels

- User Requirements Identified
- System Requirements Identified
- Architectural Design (*is nominally complete*)
- Detailed Design is nominally complete
- Sub-systems verification in laboratory environment
- Sub-systems verification in representative environment
- System prototype demonstrated
- Pre-production system complete
- System proven through successful representative mission profile

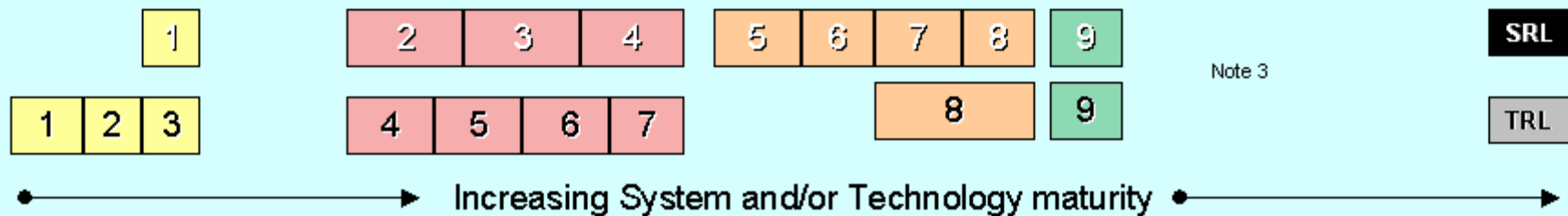
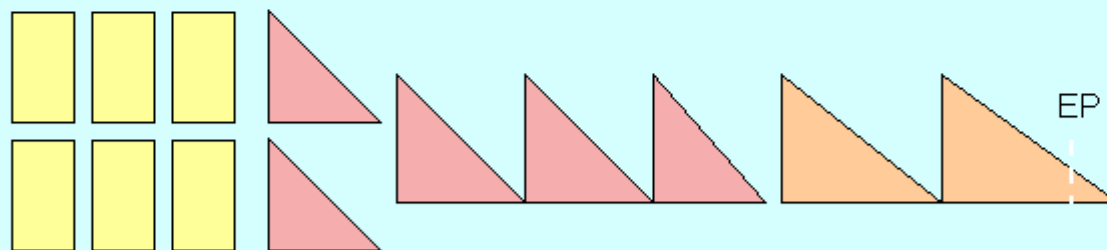
'Staged' Contracts - SRLs and TRLs



Single Contracts with Exit Points (EP):



or 'Sequential' Contracts:



- Notes:
1. Timing of IG and MG business cases determined by System and/or Technology maturity and satisfactory completion of earlier stages
 2. Assumes competition available for selection of AP1 contractors
 3. TRL/SRL9 and demonstration where applicable, of 'repeatability' of production quantities meeting contract acceptance criteria



SRL Problems

- Simple link to standard development products
- No mention of uncertainty/volatility
- No mention of “novelty”
- Highlights the mismatch between S/W development and CADMID
- Sets a very low “BAR”



SRL Promises

- ✦ Standard approach to all SIPs procurements
- ✦ TRL's have had some benefit
- ✦ Low "BAR" better than no "BAR"





Critical Success Factors

- From: Software Intensive Systems Acquisition Improvement Group (SISAIG)
Task 1
- To: Published Guidance on AMS
- Purpose: Improve Business Case Submissions
 - Help Scrutineers assess SIPs
 - Encourage Best Practice by IPTS



History

- Nov 03 Presentation by PFG to SISAIG
- Dec 03 1st Draft Decision Support Framework
- Jan 04 2nd Draft DSF (re-written)
- Mar 04 Draft CSFs published on AMS
- Mid 04 Draft Metrics (“objective”)
- End 04 Indep. Review of Metrics Maturity and Competencies



Focus of 4 CSFs

- Software estimate is realistic
- Critical interfaces & dependencies are well specified & managed
- Software & system risks are continuously identified & managed
- Program reviews demonstrate feasibility, achievability, knowledge acquired and risk reduced



Estimation – Key Questions

- Are the estimating methods & tools proposed & used visible, valid & relevant ?
- Have the estimating methods & tools been applied correctly?
- Are the estimates timely and valid?



Interfaces – Key Questions

- Have all SIS Interfaces and Dependencies been identified ?
- Have appropriate control mechanisms been defined ?
- Are the risks associated with “linked” programmes & systems acceptable ?



Goal Abstraction Sheet

GOAL:

Measurement Goals should be defined by specifying *purpose* (what object & why), *perspective* (what aspect and who) and *context* characteristics.

QUESTIONS & METRICS:

“What are the possible metrics to measure an object of a goal ?”

VARIATION FACTORS:

“Which (environmental) factors do we expect to influence the metrics”

BASELINE HYPOTHESES:

“What is the project’s current knowledge with respect to the above metrics”

IMPACT OF VARIATION FACTORS:

“How could these variation factors influence the actual measurements ?
What kind of dependencies between the metrics & factors are assumed ?”



An Example

GOAL:

The supplier's ability to deliver and/or maintain the SIS (ie. The team can develop, validate, deploy, and transition to operation the software-intensive system within the established cost, performance, and schedule constraints.)

CSF1: "The software cost & schedule estimate is realistic"

QUESTIONS & METRICS:

Are the estimating methods & tools visible, valid and relevant ?

- % CADMID covered by estimates
- Est. method designed for SIS (scale 1-4)

VARIATION FACTORS:

Match between estimating methods & processes proposed or used

- Est. methods limited to only part of CADMID
- Est. methods used out of context

BASELINE HYPOTHESES:

- Estimate covers 80-100% of CADMID
- Est. method designed for SIS (No, Partly, Mostly, Yes)

IMPACT OF VARIATION FACTORS:

- Partial coverage of CADMID -> uncertainty
- Mismatch -> no rationale for choice



CSFs - Problems

- Not trialled with IPTs
- Want “objective” measures, BUT where do we set the target value ?
- Objective measures → less expertise, BUT could be misled
- Can 4 CSFs guarantee success ?
- Potential PR problems



CSFs - Promises

- Improve Scrutineering process
- Reward good IPTs
- Provide audit trail of improvements
- May not guarantee success, but should reduce risk



2 Initiatives – will they work ?

- + Some good ideas
- Not joined up
- + Essential if SIPs are to lose bad image
- Need to work with IPTs & Suppliers
- + Should be an evolutionary programme



References

- SRL's <http://www.ams.mod.uk/ams/content/docs/sirl/sirl.htm>
- MEC <http://www.ams.mod.uk/ams/content/docs/toolkit/gateway/guidance/mecon.htm>
- CSFs V1 www.ams.dii.r.mil.uk/content/docs/iabguide/part1axf.doc (MoD only)