

The following presentation was given at:

**SCAF Workshop**  
**“Integrated Cost and Schedule Risk Analysis”**

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# Cost Assurance And Analysis Service

Risk Analysis for Acquisition Programs  
NATO SAS-109 Research Task Group Study

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Disclaimer: These are our personal views and not the views of Ministry of Defence

# Contents

- Background – How SAS-109 started.
- How UK involvement developed.
- The development of SAS-109.
- Way forward.

# Background

- North Atlantic Treaty Organization (NATO) identified limited research studies and various critical gaps with respect to common risk methods and techniques applied across various Nations
- NATO sponsored an Exploratory Team in July 2013.
- NATO SAS-109 Research Working Group was established in Jan 2014 with first meeting held in June 2014.

# Introduction

- Three Main Study Objectives at the Time of Inception
  - Develop a collective understanding of risk and related analytical approaches.
  - Develop improved data sources and estimation techniques for acquisition programs.
  - Develop a Trade Space/Risk Interdependencies Framework.
- Eight Nations
  - Canada
  - Czech Republic
  - Germany
  - Norway
  - Turkey
  - UK
  - US
  - Sweden (PfP nation)

# Introduction

- A number of syndicates were created
- UK led in Cost Risk and provided support to Schedule Risk.
- Bi- Annual meetings were held where the group would manage the business of the programme.
- This was supported with regular telecom meetings between nations.

# Report

- The report has undergone a number of re-organisations as the group clarified the structure.
- Current status of the report is in development with the aim of having a completed draft in March 17.



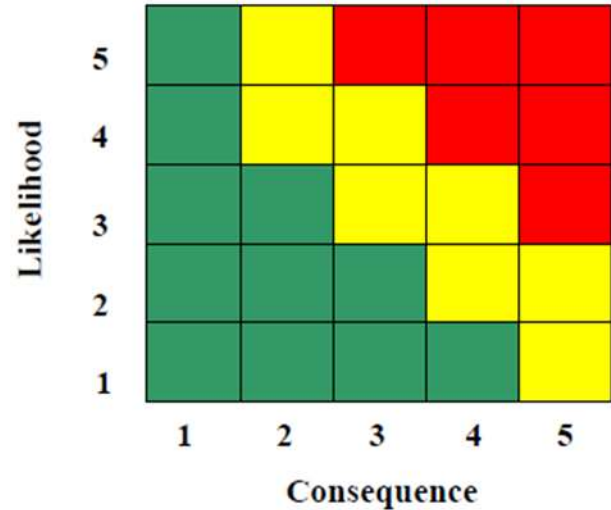
# Chapter 1

- Introduction of subject
- High level explanation of Risk and its uses
- Brief explanation of what can be provided

# Chapter 2 – Key Definitions, Terms and Principles

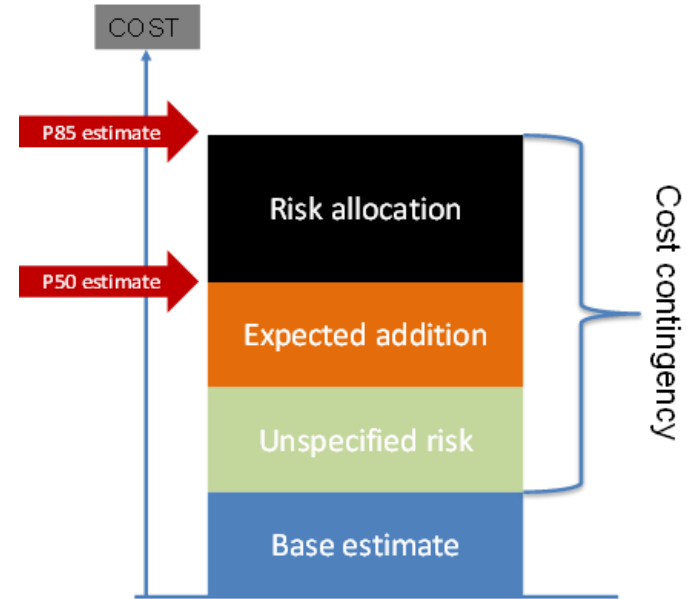


- NATO Life Cycle Model
- Risk Taxonomy
- Readiness Levels
- Constraints, Limitations and Assumptions
- Models, Verification and Validation
- Risk Identification
- Risk Reporting



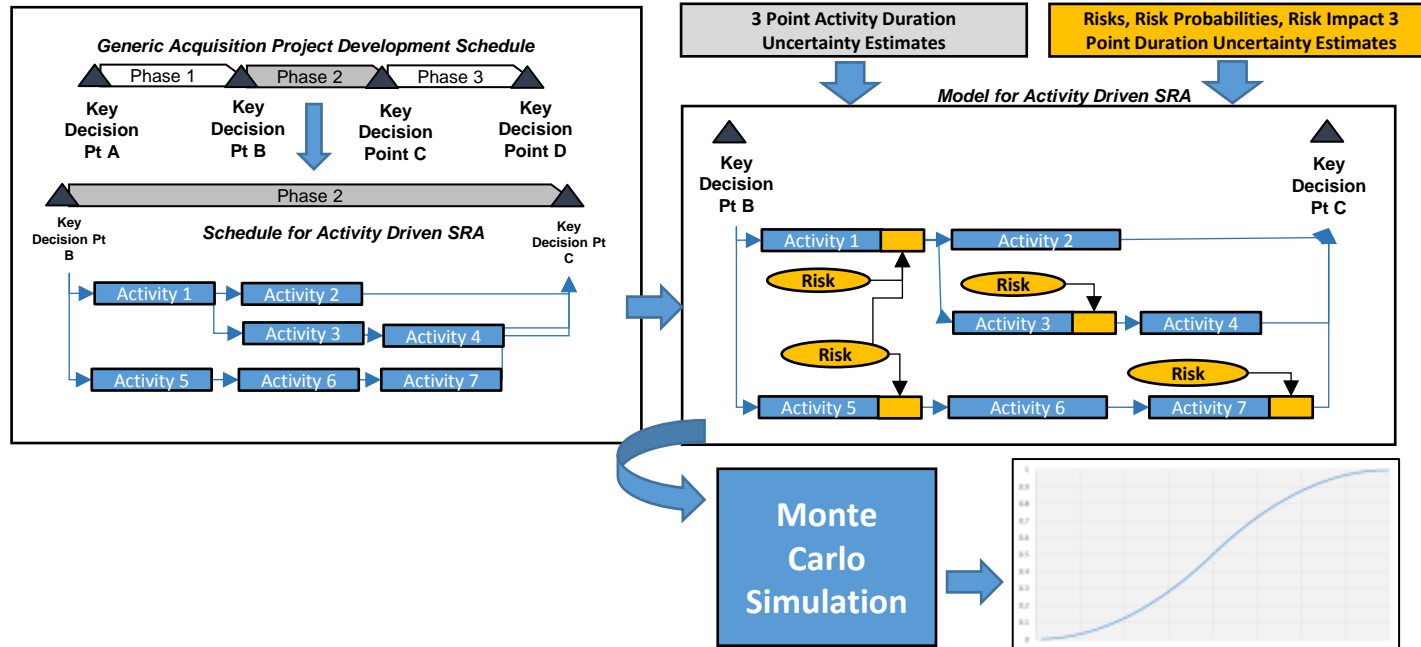
# Chapter 3 – Cost Risk Analysis

- Introduction
- Methods
  - Qualitative Methods
  - Quantitative Methods
- Data
- Cost Contingency
- Risk Outside of Cost



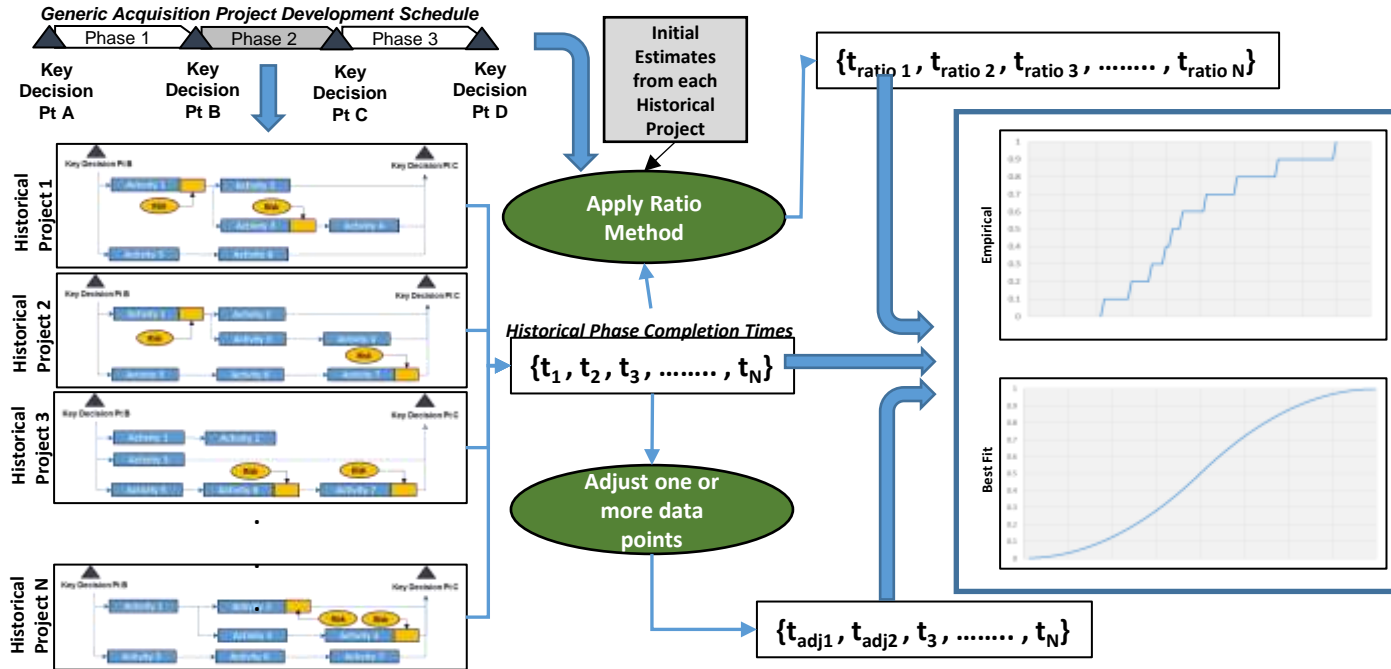
# Chapter 4 – Schedule Risk Analysis

- Activity Driven Approach – Models individual project schedule activities



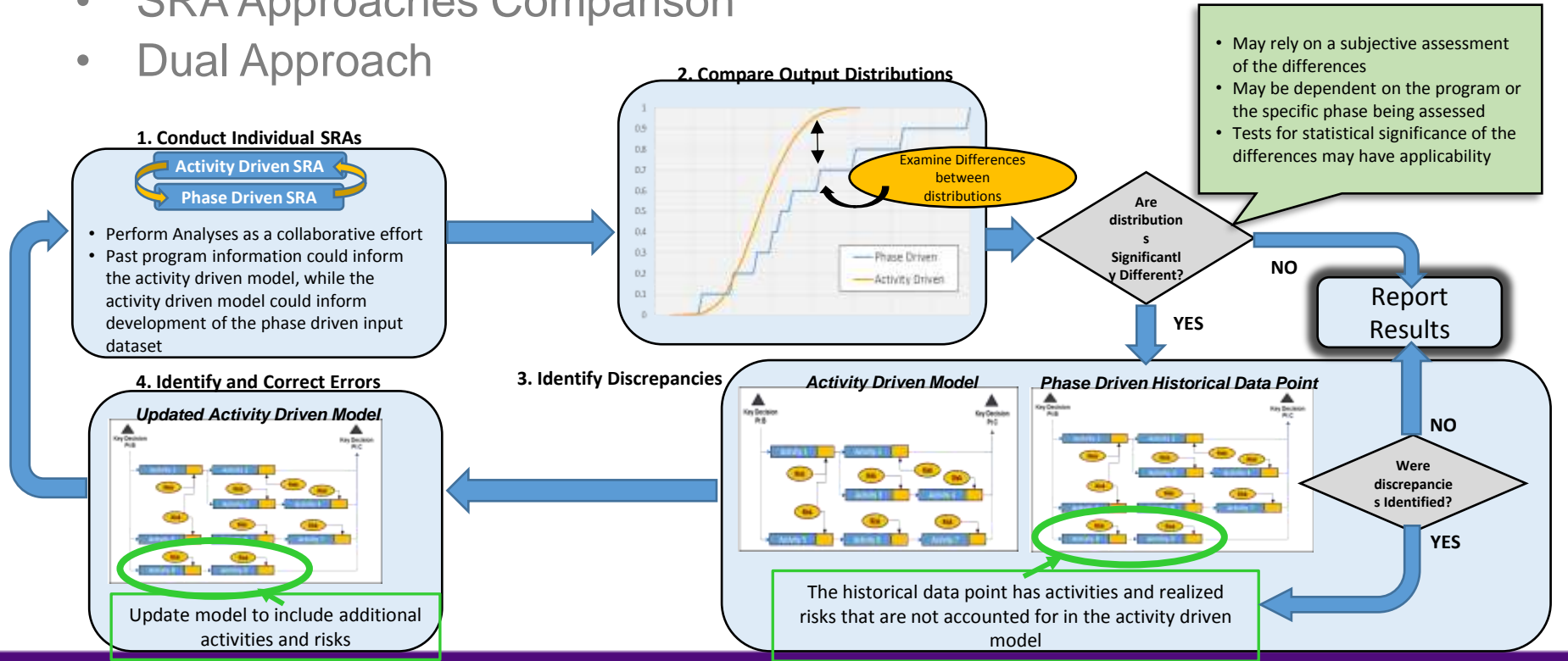
# Chapter 4 – Schedule Risk Analysis

- Phase Driven Approach – Uses historical project phase level data



# Chapter 4 – Schedule Risk Analysis (Spare ?)

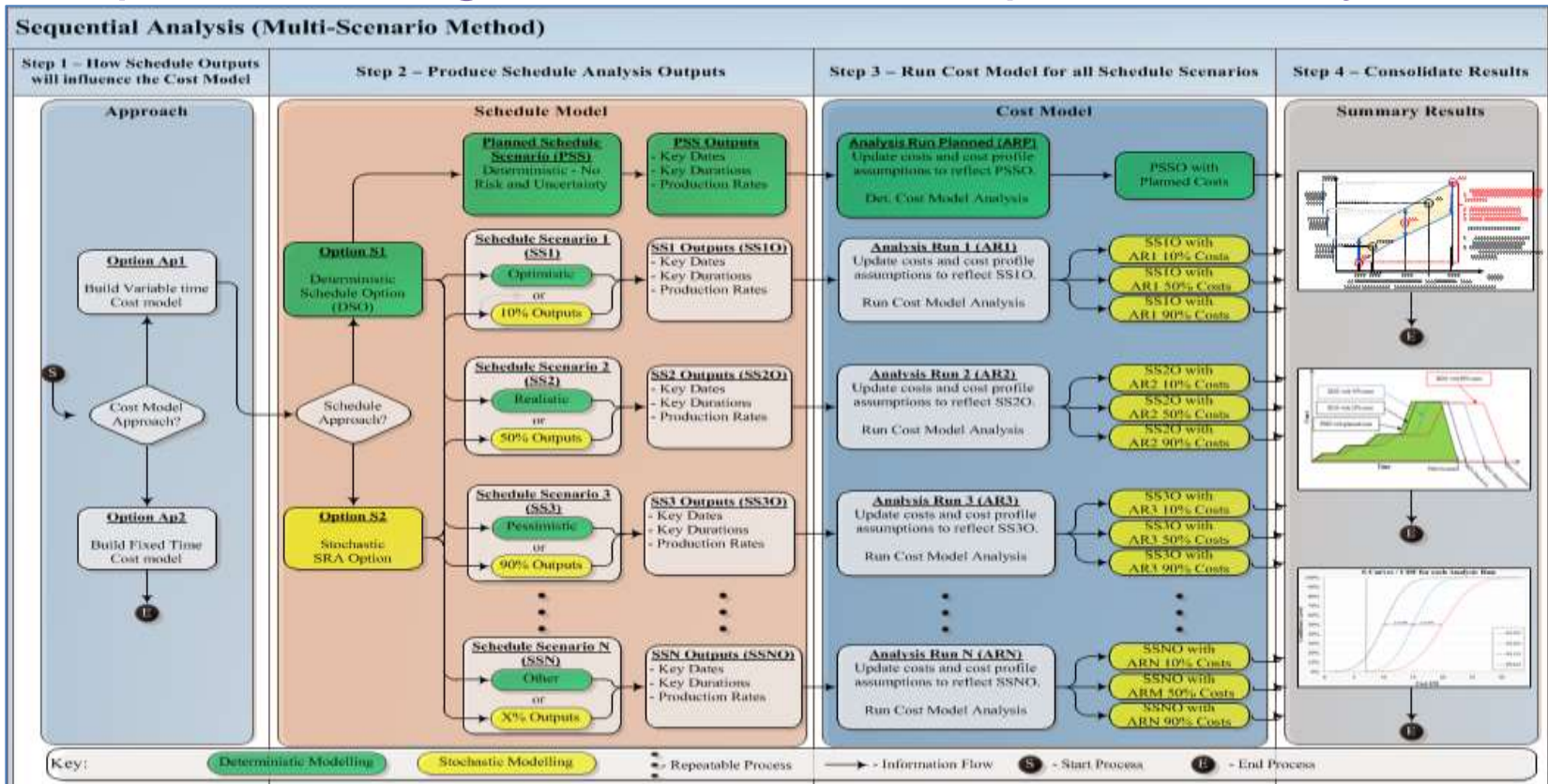
- SRA Approaches Comparison
- Dual Approach



# Chapter 5 – Integrated Cost/Schedule Risk Analysis

- High level overview of three techniques
- Chapter objectives:
  - Raise awareness and stimulate discussion
  - Provide reference material for further study
- Challenges of only considering cost
- Benefits of integrated analysis
- Current maturity of techniques is low

# Chapter 5 – Integrated C/SRA - Sequential Analysis

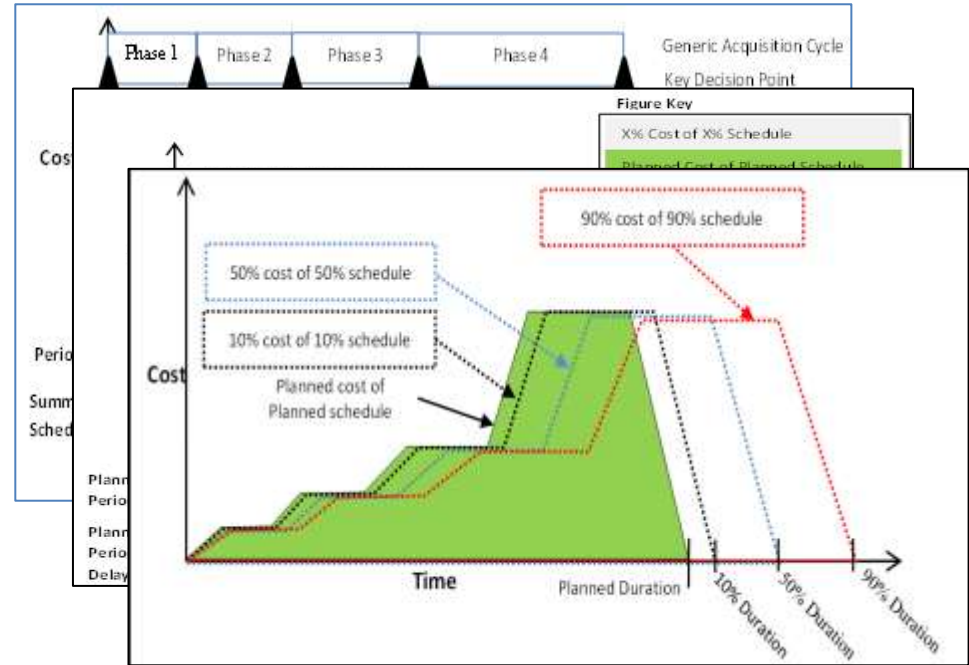




# Chapter 5 – Integrated C/SRA – Spreadsheet Based

8 Steps:

1. CM capable of det. & prob. outputs (TD / TI costs id.)
2. SRA in spreadsheet
3. Inc. risks from register
4. Days delay calculation
5. Cost of Delay
6. Total costs generated
7. Profiling of costs at CC
8. Outturn cost profiles



# Chapter 5 – Integrated C/SRA – Schedule Based

6 Steps:

1. Summary analysis schedule
2. Costs allocated to schedule activities (TD /TI costs need to be identified)
3. Risk inclusion
4. Apply uncertainty to SPE
5. Conduct Monte Carlo Sim.
6. Review outputs / interpret results



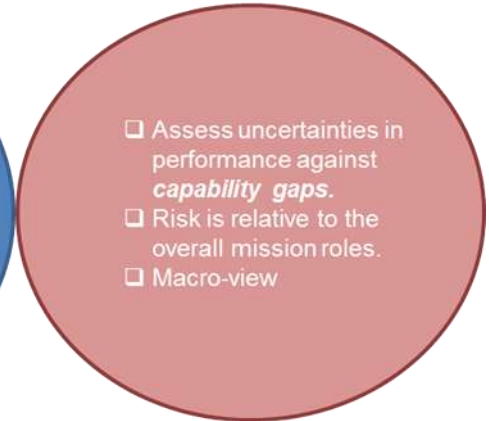
# Chapter 6 – Performance Risk Analysis

- System Performance Risk Analysis
- Operational Performance Risk Analysis

## System Performance Risk



## Operational Performance Risk



# Chapter 7 – Trade Space Analysis

- Trade space analysis is the process by which the costs, benefits and risk associated with different options and alternatives, and procurement strategies are evaluated
- Purpose of Trade Space Analysis
- Introduction to Trades
- Trades Process/Methodology

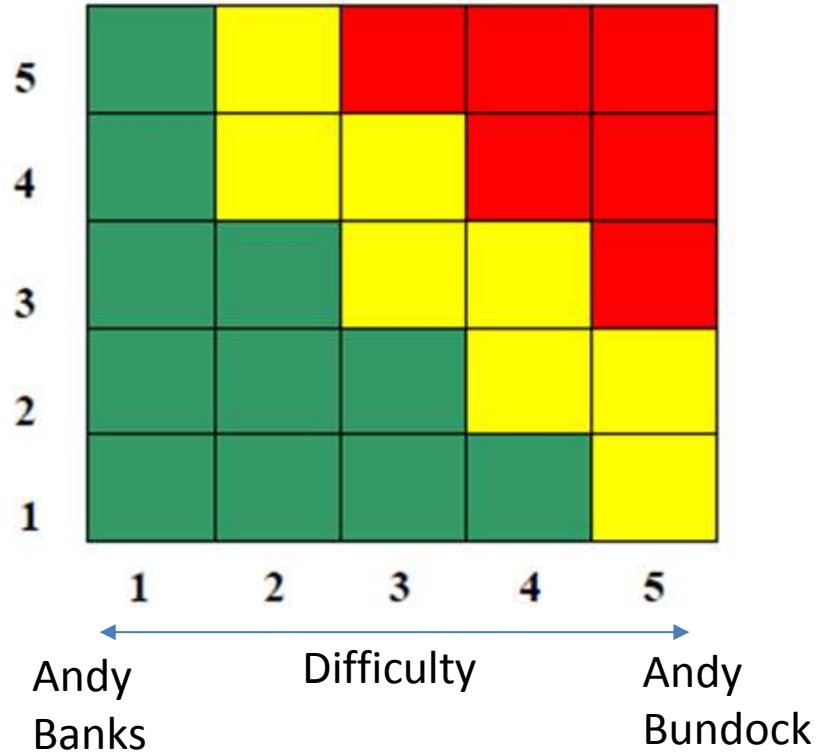
# What's Next

- Working Groups complete in March
- Outputs – report will undergo UK peer review, NATO edit and review, training, trifold document.
- Exploitation – UK-SCAF and CAAS conferences.

# Summary

- What Has the UK gained – Departmental and Personnel development.
- Greater understanding of other techniques and approaches to risk.
- Benchmarking UK level of Risk management in an international forum.

# Questions ?



# Reference Material for Chapter 5

- Hulett, D., 2011. Integrated Cost-Schedule Risk Analysis. s.l.:Ashgate Publishing.
- Multiple, 2014. Joint Agency Cost Schedule Risk and Uncertainty Handbook, US: US Joint Agency.
- NASA, 2015. NASA Cost Estimating Handbook version 4.0, s.l.: NASA.
- Seasman, M., 2013. Society for Cost and Forecasting (SCAF). [Online] Available at: [http://www.scaf.org.uk/library/prespaper/2013\\_06/Improving%20Realism%20Combining%20Cost%20and%20Schedule%20Risk%20Analysis%20-Martin%20Seasman,%20CAAS.pdf](http://www.scaf.org.uk/library/prespaper/2013_06/Improving%20Realism%20Combining%20Cost%20and%20Schedule%20Risk%20Analysis%20-Martin%20Seasman,%20CAAS.pdf) [Accessed 21 February 2016]