

NAVAL COMBAT SYSTEMS ENGINEERING COURSE

5-day residential course at Portsmouth Technology Park (near Portsmouth).

An Introduction to Combat Systems & NCSISS – Lecture by a serving RN Lt Cdr

This is an overview of the range of current Combat System equipments and what they actually are and do, including roles of the different ships and how this affects the equipment fit. Specific section on the Naval Combat System Integration & Support Service what it is and means to Combat System integration.

Use of the Combat System - Lecture by Industry

A virtual insight in to an operations room of a warship and how the training, management, understanding and use of combat system equipment influences the successful outcome of engagements with the enemy during conflict. Lessons learnt from past conflicts are also discussed.

Combat System Component Architecture – Lecture by Industry

This will enable an understanding of why we need component based architectures plus what a component based architecture is. There will also be an exercise to create your own Component based architecture.

Systems Engineering - Principles & Practice – Lecture by Industry

An overview of general Systems Engineering thinking and its application. This gives a wider perspective than Naval Combat Systems Engineering and uses many examples from System Engineering projects from around the world. The lecturer will involve the delegates in discussion and exercises and will cover any Systems Engineering issues that are raised.

Use of Architectures in Concepts, Requirements and Interoperability Engineering - Lecture by Industry

The importance of Requirements Engineering as a discipline. Understanding stakeholders. Requirement writing & analysis. Requirements Management. Smart Requirements. Dealing with constraints from legacy equipment, designated technology, standards and Corporate knowledge. Introducing the framework for System of Systems integration. Use of architectures is a theme interwoven through the above subjects.

Combat System Sensor Fusion – The Future – Lecture by Dstl

This will be tackled from a Situational Awareness perspective to address Situational Awareness gaps and how they may be filled. This will pull together fusion aspects, system engineering and sensor aspects. This is a very leading edge lecture explaining some current research projects that DSTL are working with.

Combat System Change Processes – Lecture by MoD

The Change Impact Assessment Process and how it is used within Combat System change management for configuration control, plus other relevant processes concerned with configuration management are discussed.

Electromagnetic Environmental Effects (E3) in Naval Environments – Lecture by Industry

The E3 environment. EMC, MI, EMP protection – inc. overview of Tempest & Spectrum Management. Prediction and measurement tools. Who to ask for further advice and support plus lessons learnt are also covered.

Royal Naval Communications - Lecture by Industry

An overview of communications in the Royal Navy and how these systems co-operate with Combat Systems. It will cover current use of communication equipment, how interoperability is achieved and how COTS is part of the communications world. Current problems and issues are covered. A brief is given on how the future looks for Royal Navy communications.

Alignment – Lecture by ex MoD

Describes why alignment is important and how systems are aligned, and what it means to the combat system if the ship is incorrectly aligned. There are also a couple of practical demonstrations to get the delegates thinking about Datums, Tilt, and cumulative errors.

Geospatial Errors – Lecture by Industry

The background of the need to address errors including research projects. Sources of error and how to express them. Current practice. Standards and the need for meta-data (data to describe data). A very complex area presented in a comprehensible manner.

Warship Vulnerability Reduction - Lecture by MoD

The need to reduce warship vulnerability. Current threats. Damage mechanisms. Vulnerability assessment and reduction measures. An AAW system example shows how overall system vulnerabilities can be reduced by careful design.

Maritime Systems Safety - Lecture by MoD.

Policy on MoD Ship & Equipment Safety Management, the complex regulatory framework and current MoD safety concerns. During the presentation many examples are shown of where safety has failed in the past and how this has shaped the current policies in place.

Human Factors Integration - Lecture by Industry

The rationale for Human Factors Integration and the HFI approach within UK Defence procurement. Human Computer Interaction within combat and ship platform systems. Task analysis. Implementation issues such as workstation design, stress and hazards, vision and lighting, controls and the importance of Style Guides. Human Factors analysis to help identify issues and risks.

QEC Mission System Case Study – Lecture by a serving RN Lt Cdr

The case study into how the QEC Mission System was designed, and how some of the integration issues were resolved.

Submarine Common Combat System Initiative – Lecture by MoD

This is a programme to tackle the whole life costs of submarine combat systems. This lecture will explain how COTS components are used and how this programme is enabling a migration towards open

architecture combat systems. It will also explain how the use of virtual machines have benefited the programme.

Shared Infrastructure – Lecture by industry

This lecture discusses the benefits and reasons for the MoD to migrate Combat Systems to a shared infrastructure for surface platforms. It covers the use of virtualisation, the shared Network Infrastructure and explains the shared computing environment and shared storage. A view will also be given of the MoD roadmap to virtualisation and shared infrastructure.

Maritime Composite Training System / Bridge Navigation Trainer visit – HMS Collingwood.

A visit to see Operations Room training and how it is undertaken in the MCTS facility. Delegates will gain an appreciation of how modern computing techniques revolutionise the Royal Navy's 'Team Training'. Then a visit to the Bridge Navigation Trainer to see it in operation. How does the Navy train its navigators today, how do they use the equipment procured; is it what they require? There may be opportunity for delegates to experience the 'VIP scenario' if there are no students being trained at the time of the visit!

Standards, Data Management and Integration - Naval Platforms – Lecture by Industry

The System Integration regime that supports the Combat System Highway with unified Fleet-wide Integration Policies & Procedures – backed by relatively simple Networking Standards. The 'staged' v. 'big-bang' approach to system testing & integration. Also covers system and contractual relationships, shore and ship based integration.

Combat System Networks / Network characteristics - Lecture by Industry

T23/T42, T45, QEC, T26 & submarine Combat System Networks their characteristics and why they are specifically designed. The complexity of even the simplest protocols and how they can go wrong is explained. Current developments & future trends are also covered.

Combat System Evolution + T26 Global Combat Ship – Lecture by Industry

What will Combat Systems look in the future? How is the T26 Combat System shaping up, how will it be integrated? What are the challenges that are faced by the Maritime Combat Systems Group over the next few years?

Supportability Engineering – Lecture by MoD

This presentation provides an understanding of why Supportability Engineering is key to the success of a project. The cost of Development and Manufacture is just the tip of the iceberg. Through the Support Solutions Envelope, and now Defence Lines of Development, MoD is trying to influence the acquisition of new equipments to ensure they are affordable and supportable through-life.

Shore Integration Facility & Maritime Integration Support Centre Tour – Lecture by Industry

A presentation and tour to explain how the T23 Shore Integration Facility and the T45 / QEC Maritime Integration Support Centre supports the Royal Navy. The value of these facilities versus using RN vessels are discussed through the Combat System Integration process. Also how these facilities can be utilised for urgent operational defect (OPDEF) rectification.

Autonomous Systems – Lecture by Industry

What are autonomous systems? Why is the MoD starting to focus on these systems? Insight into where these systems could be applied. What are the implications for Combat System Engineering.

Maritime Force Capability Assurance – Lecture by Industry

What is Maritime Force Capability Assurance? How is it measured over the force? What are the benefits of a good tactical picture. These and many more questions will be answered by this lecture.

Combat System Design Strategy - Lecture by Industry

System of Systems in a warship context. Combat Systems Engineering as a set of multi-disciplinary engineering activities. The combat system life cycle and engineering processes. Management plans, Configuration Management, Risk Management, and Support. The MoD's Systems Engineering guide: Def Stan 21-59.

Closing Remarks – Lecture by a serving RN Captain

This will tie up all the themes throughout the course and present a view on how valuable the information and techniques learnt are for those involved in Maritime Combat System Integration. He will also give an insight in to what the challenges are for Maritime Combat Systems in the future.

Throughout the course, delegate networking is actively encouraged and supplemented by a number of evening activities, such as a visit to a Wardroom for a formal RN dinner plus a more relaxed evening in a local hostelry.