Technological Advances in TDL Training
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Overview

- Plan a Complete Training Package

**Training DLOD – RN Handbook**
“...As NEC concepts develop collective, joint and combined training will need to adapt. A combination of federated, synthetic and live training is expected to deliver the requisite balance between Single Service, Joint and Multinational training....”

- Know your Target Audience

**VMT Concept**
“...A flexible, responsive, fully integrated warfare training paradigm that supports operational capability, by ensuring that individuals and teams have the competencies required to carry out allocated tasks, and units have the ability to train when deployed....”

- Examples and Case Studies
Section 1

PLAN A COMPLETE TRAINING PACKAGE
Training Lifecycle

- Training Resource Estimate
- Training Needs Analysis
- Provision of Training Equipment/Media
- Ready for Training Date (RFTD)
- Training Delivery ‘through life’
Training Staff

- Instructors/Assessors
- Synthetic Environment Operators
- Role Players
- Maintainers
- Administrators
Training Design

- Formal Training Statements
  - Knowledge, Skills and Attitudes
  - Methods & Media Analysis
  - Fidelity Analysis
- Course Specification
- Instructional Specification
  - Theory – ‘Chalk and Talk’
  - Practical – ‘Hands On’
- Assessment Strategy
- Assessment Specification
- KSA Development
  - Via Cues, Stimuli and Responses
- ‘Train the Trainer’
Chalk and Talk Material

• Classroom Based

• Theory not Practice

• Progressive/Coherent
  • Introduction to TDLs
  • Initiation of a Link 16 Network
  • Principles/Theory of Filtering

• Computer Aided Instruction (CAI)
• Defence Learning Portal (DLP)
  • Individual Continuation Training
Training Equipment

- **Legacy** (fixed and typically standalone)
  - Part Task Trainer (PTT)
  - Cockpit Procedures Trainer/Flight Training Device
  - Rear Crew Trainer/Full Mission Simulator
  - Command Team Trainer
  - Scenario Generator (to support the training device)
- **Future** (reconfigurable and interoperable)
  - Computer Based Training (CBT)
  - Classroom Based Skills Trainer (CBST)
  - Warfare Team Trainer (WTT)
  - Synthetic Environment (within which multiple reconfigurable training devices operate)
    - Supports Distributed Training
    - Supports Live, Virtual and Constructive (LVC) concept

- **Attitudes**
- **Skills**
- **Knowledge**
- **CBT CAI**
- **Legacy**
- **WTT**
Synthetic Environment

- Key Functions
  - Data Preparation
  - Scenario Generation
  - Scenario Animation
  - Interoperability

- Multiple Concurrent Scenarios

- Thousands of Simulated Entities

- Interoperability Gateway for Joint and Multinational Training
Distributed Training

- Open Standards
  - Distributed Interactive Simulation (DIS)
  - High Level Architecture (HLA)
- Rapidly Reconfigurable and Adaptable
- Maximum use of COTS technology and products
- DIS Architecture
  - Plug and Play (largely)
  - Protocol Data Units (PDUs) and DIS Radio
  - SIMPLE packets for TDL
- HLA Architecture
  - No Protocol, so not Plug and Play
  - Standardized set of Services
  - Federation Object Model defines Services used
- DIS to HLA gateways
Live, Virtual and Constructive Modelling and Simulation

Orange = Virtual Entities
White = Constructive Entities
Section 2

KNOW YOUR TARGET AUDIENCE
Military Personnel

- Large Platforms (Air or Sea)
  - Operators
  - Specialists
  - Directors
  - Officers
- Small Air Platforms
  - Pilots/Co-Pilots
  - Crew
- Army – Troops, Vehicles, Command
- Maintainers
Individual Training

- CAI and CBST for Generic Skills
- CBT and WTT for Targeted Skills Training
  - TDL User
  - Network Manager
  - Comms Manager
- Training Pipeline Concept
  - Generic -
    - By Rank/Rate
    - By Role
  - Targeted by Platform
- Career Training Skills Pipeline (TDL User)
  - TDL Theory
  - Use of TDL Data within Combat System
  - Picture Compilers (Air/Surface/Subsurface)
  - Above Water Sensor Manager (AWSM)
Collective Training

- Learn to operate as part of a team
  - Environmental Sub-Team (EST)
  - Command Direction Team (CDT)
  - Platform Warfare Team (PWT)
- Interact with
  - Team Members
  - Role Players
  - Other Teams
  - Live, Virtual and Constructive (LVC) components
- Interoperate with other platforms
- Reconfigurable WTT supports all modes
- IO Gateway provides external links
Computer Based Training

Timeslot Emulation

Network Emulation

Instructor Control Panel

Type 45 NMS

Type 42 NCIDPF
Classroom Based Skills Trainer

- F-16 Fighter Pilot Trainer
  - Realistic F-16 Cockpit Displays
  - Link 16 Network Simulation

- HMS Generic
  - Generic Naval CMS
  - Generic equipment environment

- Basic warfare skills and concepts taught within dynamic scenarios.

- Builds individual and team knowledge and skills through operator interaction in a progressive and controlled manner.

- Allows trainees to be assembled in representations of AAW, AsuW, ASW and CDT team contexts
Warfare Team Trainer - Configurability

- Reconfigurable Architecture
  - Operator Consoles (×42) aka “MARTIAN”
  - User Desk (×4)
  - Visual Presentation Facilities (×4)
  - Server

- Instances of Platform Specific Training
  - Platform Warfare Team (×1)
  - Command Direction Team (×1)
  - Environmental Sub-Team (×2)
    - Anti-Air Warfare (AAW)
    - Anti-Surface Warfare (ASuW)
    - Anti-Submarine Warfare (ASW)
  - Individual Career (×4)
Warfare Team Trainer - Functionality

- Operational Software
  - Combat Systems
  - Command Support System
  - Electronic Warfare
  - Tactical Data Links
  - Sonar 2087 User Interface
  - PAAMS Command & Control
  - NATO ICC

- Sensor Simulations and Models
  - Radar
  - Sonar
  - Electronic Warfare

- Photo-Realistic Panels
Section 3

EXAMPLES AND CASE STUDIES
TDL Training Examples (1)

- Wedgetail/PeaceEagle Trainer
  - Link Network Simulator (LNS)
  - Link 11/Link 16
- Nimrod MR2/MRA4 Trainer
  - Data Link Simulator
  - Link 11/Link 16
- Sea King Whisky (SKW) Trainer
  - Link 16
- F-16 Part Task Trainer
  - Link 16
- JRE Gateway Trainer
  - Joint Distributed Operational Training System (JDOTS)
  - Link 16/JREAP A, B and C/SADL
TDL Training Examples (2)

- RN Standalone CBT
  - Link 16 SAC
  - NCIDPSS

- Command Team Trainer (CTT)
  - Link 11

- Maritime Composite Training System (MCTS)
  - Link 11/Link 16/STDL
  - Link Role Player
  - Operational Software
  - NCIDPSS and NMS CBTs
Integrated Aircrew Training (IAT)

- Close Air Support Demo

- Aims
  - Demonstrate how to enhance Live Flying Training
  - Provide Joint Air-Land Training Capability
  - Prove concept for Airborne Synthetics
    - 1 x Live, 1 x Virtual & 4 x Constructive
    - In the Real Environment
  - Allow Advanced Targeting Pod (ATP) Training
    - Without real equipment
    - Regardless of weather
    - Using real weapon system
IAT Demonstration Architecture

- Synthetic Cockpit Display
- Rugged PC
- Live Tornado Aircraft
- Telemetry Equipment
- FAC Display
- Environment Representation
- Visualisation Facility
Intelligent Voice

- Constructive Element of Training
- Voice Agent responds to Trainee
- Agent can also be Third Party/Overseer
  - ATC Trainee talks to Pilot Trainee
  - Agent watches and comments on validity of interaction
- Background voice traffic
  - Multiple Voices
  - Multiple Languages
- Use for Procedural Training
- Assessed as part of Air-Land Trainer
Maritime Composite Training System (MCTS)

- 3 Classroom/Brief/Debrief Rooms
- 1 Electronic Classroom Trainer
- 2 Warfare Team Trainers
- Common Synthetic Environment Control
- 4 Brief/Debrief Rooms
- 8 Electronic Classroom Trainers
- 3 Warfare Team Trainers
- Legacy Trainers
- Legacy Classrooms
- 3 Classroom/Brief/Debrief Rooms
- 1 Electronic Classroom Trainer
- 2 Warfare Team Trainers

Workplace Training (26 Platforms)
Progressive, Coherent Training

Training Media

Generic
(Rate / Role Related)

Targeted
(Platform Specific)

Continuation

HMS Collingwood

HMNB Devonport

Workplace Training

DLP Access

Training Location

CAI
CBST
CBT
WTT
The Complete Training Package

**Generic KSA**
- Classroom Based Skills Trainer (CBST)
- Computer Based Training (CBT)
- Computer Aided Instruction (CAI)
- Legacy

**Targeted KSA**
- **Combat System**
  - DNA(2) (T23)
  - CMS (T45)
  - ADAWS (T42, CVS, LPD, LPH)
- **Warfare Team Trainer (WTT)**
- **Common Synthetic Environment Control (CSEC)**

**Training Management Information System (TMIS)**

**Training Service**

**Buildings and Infrastructure**

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**Interoperate**

(WTS)
Thank you