Architectural Description of the UK Common Core Combat System

Lyn Owen
Rodger Manning
QinetiQ

Claire Burt
Dstl

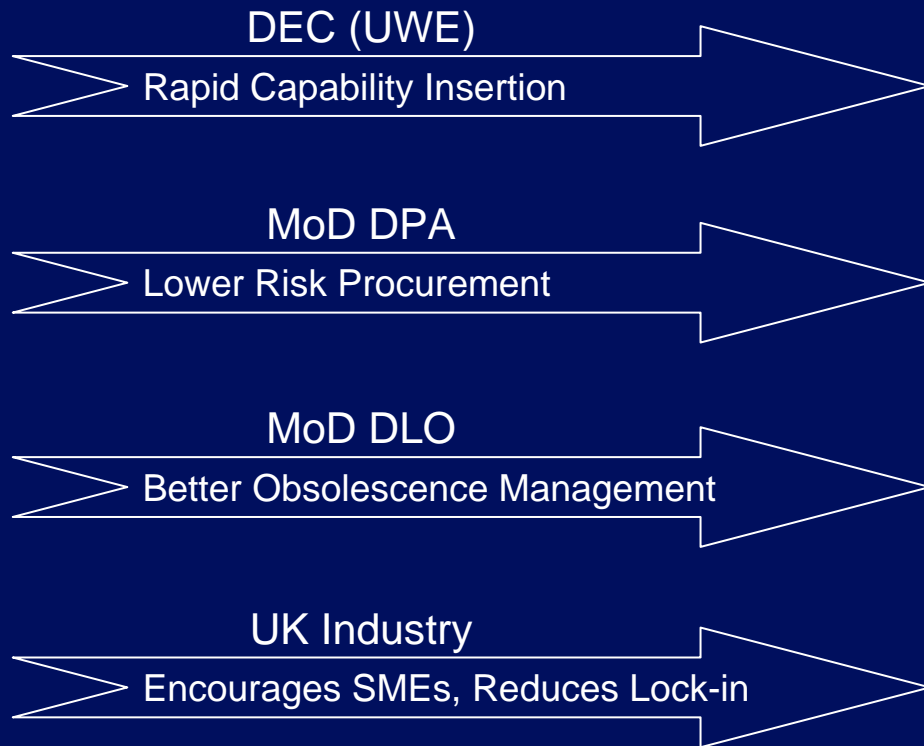Andrew Flinn
British Embassy
Washington

[dst1]

QinetiQ

Common core combat system

- A UK submarine Common Core Combat System programme

- Managed by the MoD

- To control the evolution of RN submarine combat systems towards a single common open system

- Policy Statement:

    – *The Common Core Combat System is to be a co-ordinated programme to achieve reduction in WLC. CCCS will deliver the system engineering and software development outputs, necessary to consolidate separate Sonar, Command System and Data Highway initiatives into a coherent Common Core Combat System for RN submarines, based on open systems*

A wide ranging initiative

DEC (UWE)

Rapid Capability Insertion

MoD DPA

Lower Risk Procurement

MoD DLO

Better Obsolescence Management

UK Industry

Encourages SMEs, Reduces Lock-in

Common Core Combat System

[dst1]

QinetiQ

Contents

- CCCS Architecture Description

- Architecture Definition Process

- CCCS Architectural Testbed

CCCS Architecture Description

CCCS main architecture drivers

- Variation

  – The CCCS Architecture Description is a *generic* architectural specification, in the same manner as the DeRSCI GOA. It describes a practical *common core* of functionality that can be reused across platforms

- Evolution

  – The CCCS AD represents a future increment of the CCCS - a *Vision System*. Without being forward-looking from the very start it would be difficult to break out of the mould of current combat system design

- Support to procurement

  – The CCCS AD provides source information for Invitation To Tender (ITT) and paves the way for an architectural compliance process

[dst1]

QinetiQ

Current AAWG members

- Dstl
- QinetiQ
- DML
- SEA
- Ultra
- Tenet

- Raytheon
- TUS
- Insyte
- BAe
- Advansys

Meetings held monthly
Specialist presentations as appropriate
All work is being conducted under DEFCON 703
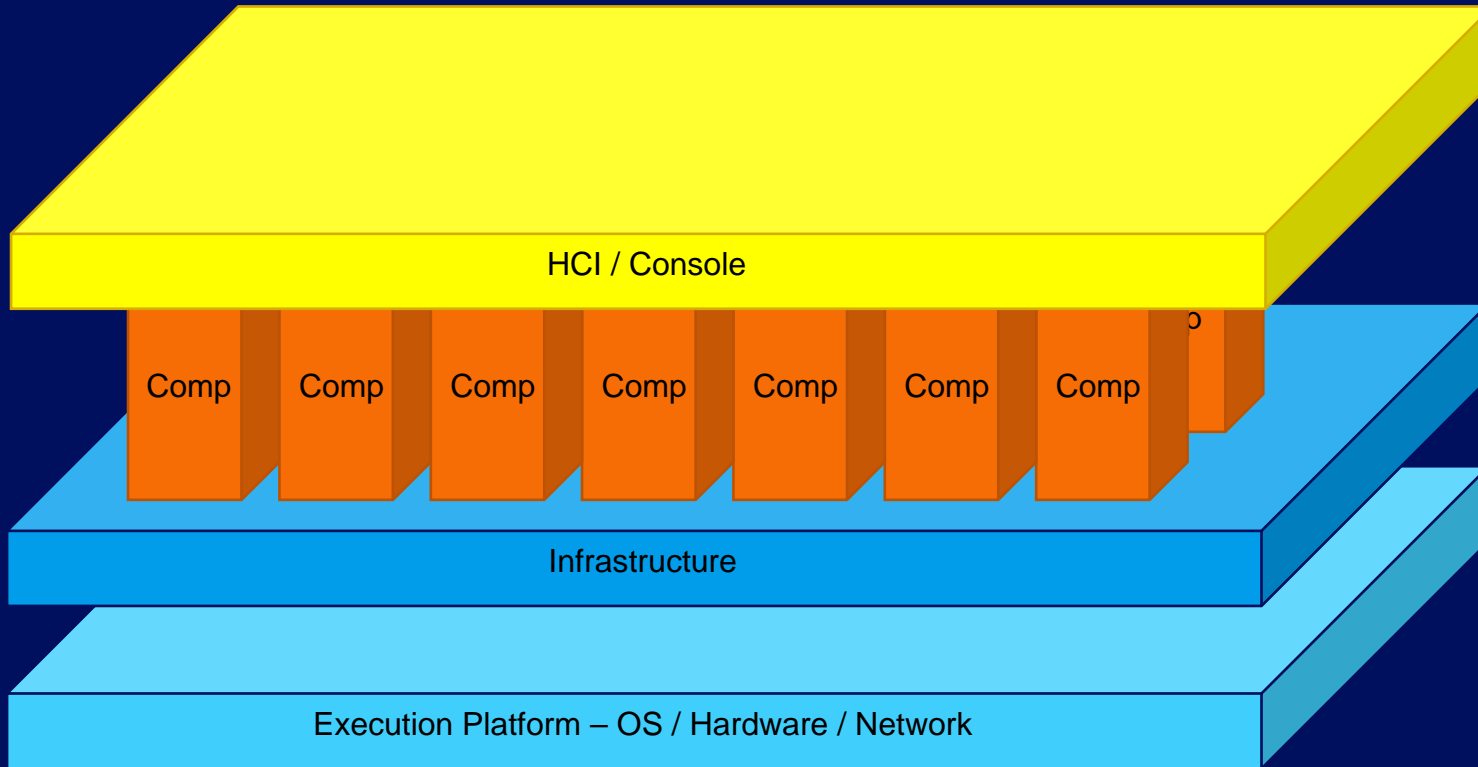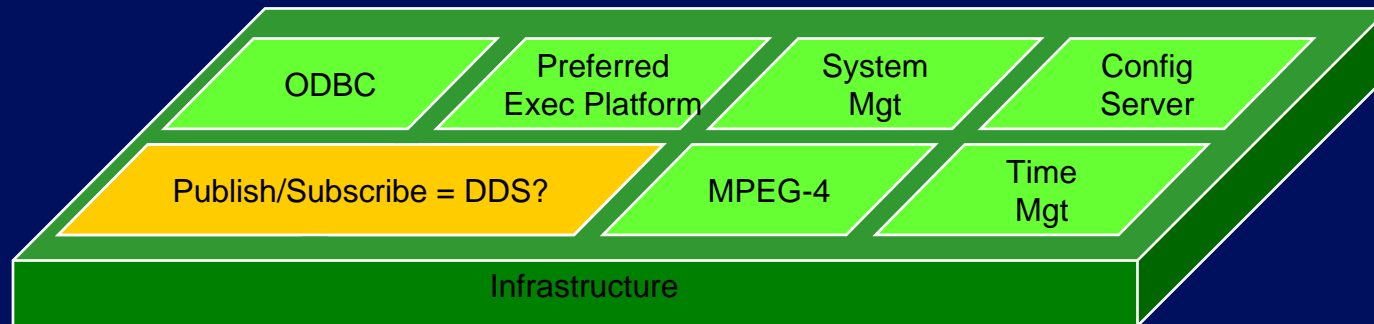MOD ownership of IPR

[dst1]

QinetiQ

IEEE 1471 architectural viewpoints

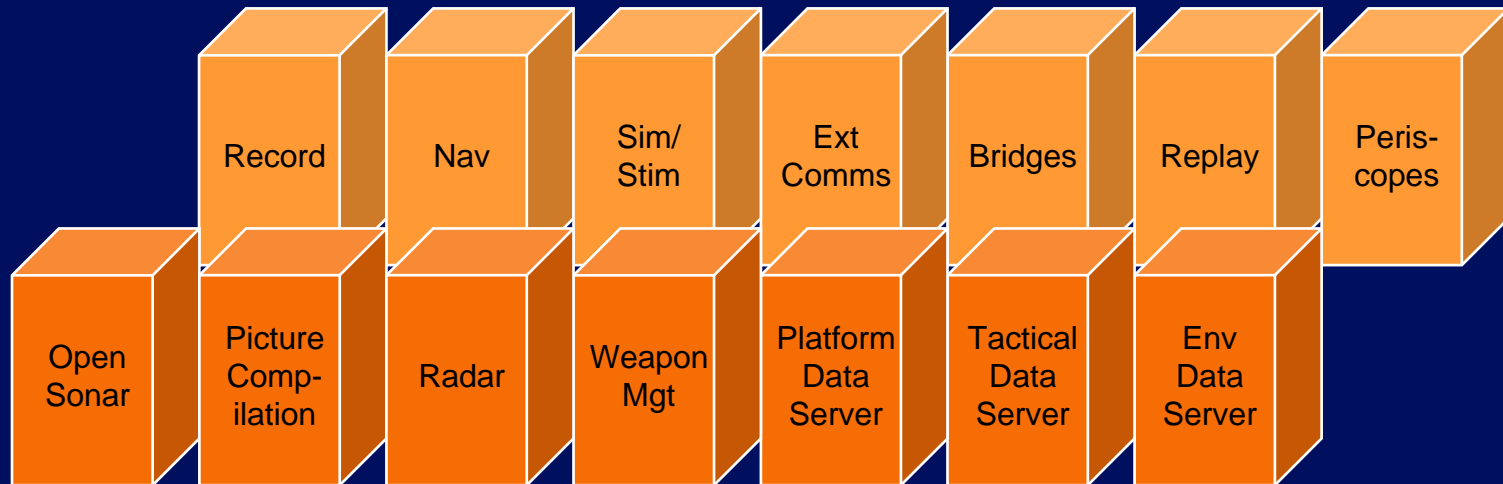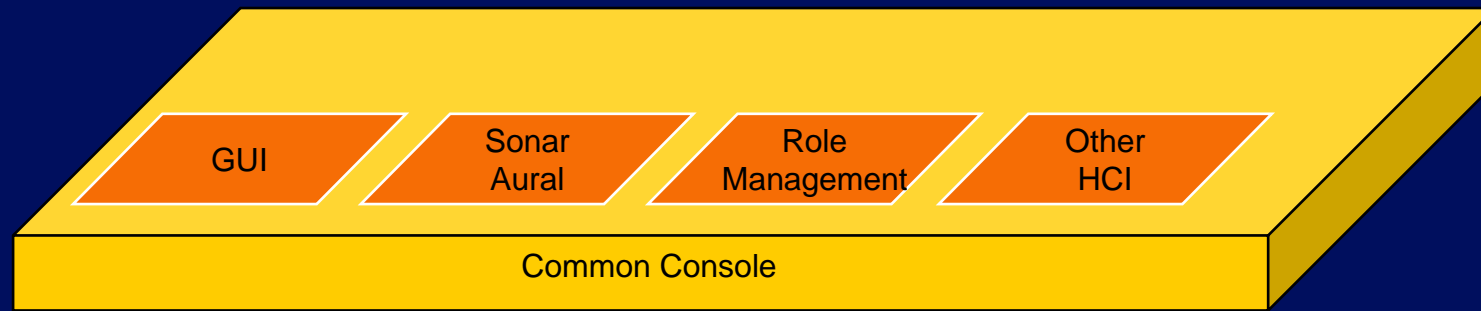| Domain	Viewpoint
Overview	VP.O.1 CCCS Architecture Strategy
Structural	VP.S.1 Context and External Interfaces
	VP.S 2 Granularity
	VP.S.3 Physical Data Model
	VP.S.4 Subsystem Services
	VP.S.5 Service Definitions
	VP.S.6 Subsystem-Centric Service Connectivity
Behavioural	VP.B.1 Operational
	VP.B.2 Security Policy
	VP.B.3 Safety Case
	VP.B.4 ARM Plan
	VP.B.5 HCI
	VP.B.6 System Modes
Infrastructure and Technical Standards	VP.I.1 Reference
	VP.I.2 Data Transfer
	VP.I.3 Preferred Execution Platform
Developmental	VP.D.1 Development Tools
	VP.D.2 Test and Acceptance
	VP.D.3 CCCS Roadmap

A layered architecture

HCI / Console

Comp | Comp | Comp | Comp | Comp | Comp | Comp

Infrastructure

Execution Platform – OS / Hardware / Network

Standards / Reference Frames

Network / Processor Capacity Plan

Timing / Behavioural etc

[dst1]

QinetiQ

Infrastructure

ODBC | Preferred Exec Platform | System Mgt | Config Server
Publish/Subscribe = DDS? | MPEG-4 | Time Mgt
Infrastructure

Some subsystems

Open Sonar

Record

Picture Compilation

Nav

Radar

Sim/Stim

Weapon Mgt

Ext Comms

Platform Data Server

Bridges

Tactical Data Server

Replay

Env Data Server

Peris-copes

[dst1]

QinetiQ

Common console

GUI

Sonar Aural

Role Management

Other HCI

Common Console

[dst1]

QinetiQ

Standards

Geodetic Reference Frame - WGS84

Gimbaling conventions – roll direction etc

Network – IPv4

Map format – AML / S57

Steaming video – MPEG-4

etc

Standards

Standards

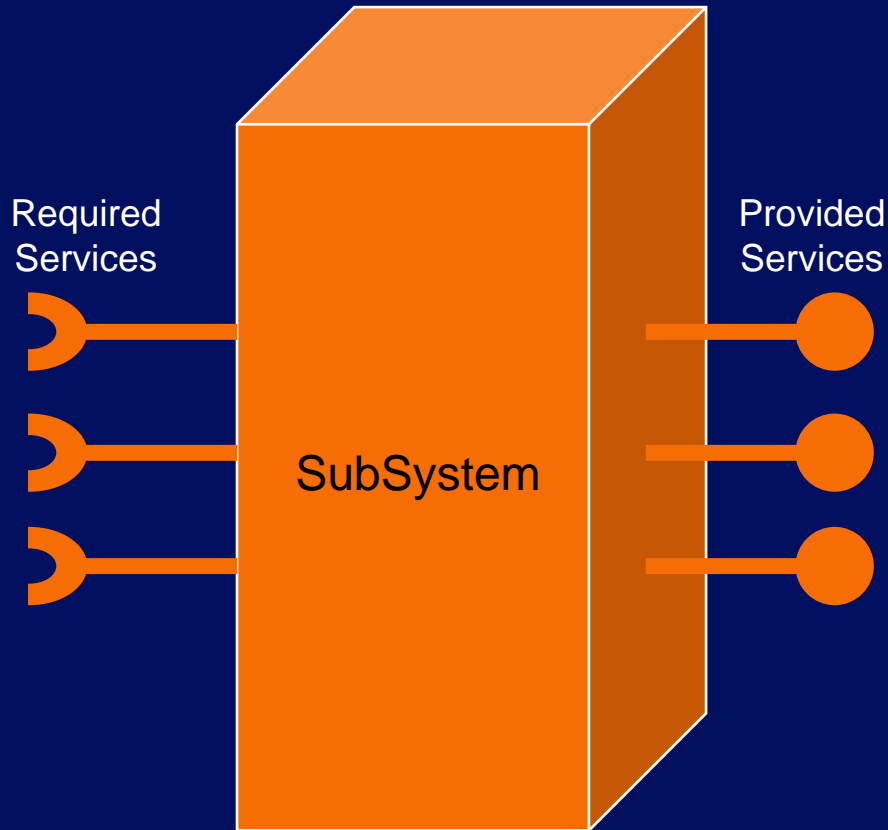[dst1]

QinetiQ

Three levels of granularity

CCCS

Subsystem

Components

Subsystem

Components

Subsystem

Components
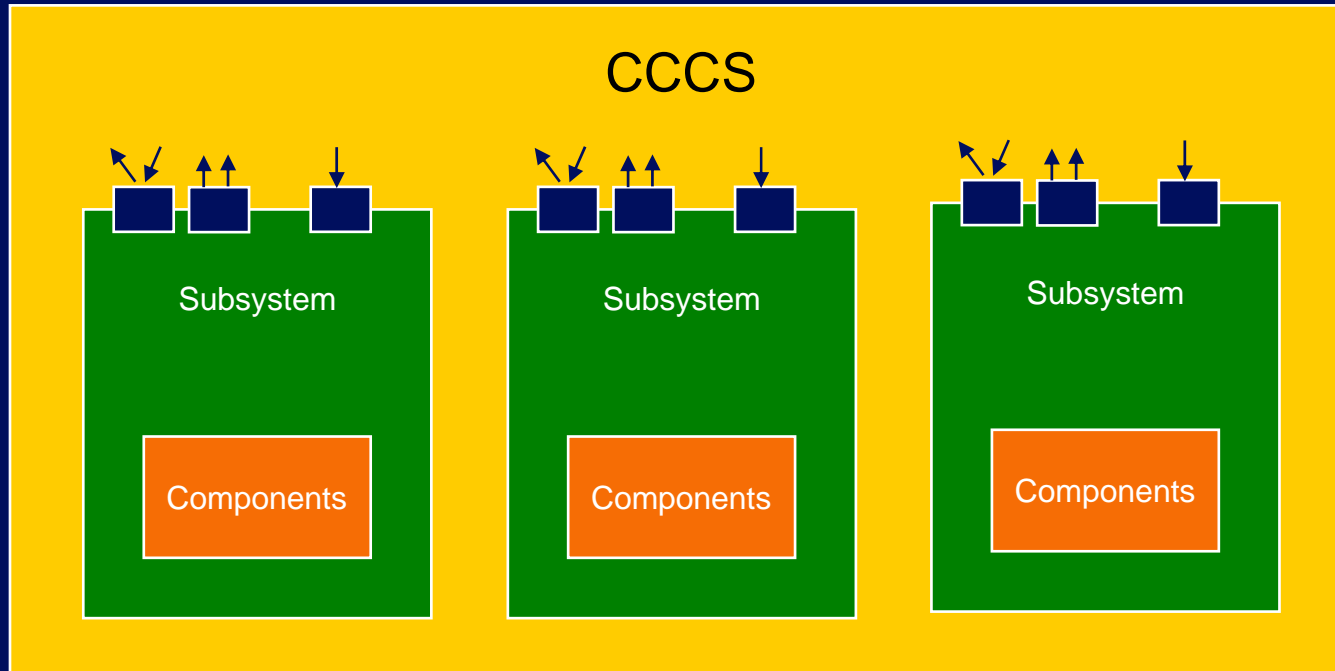
Highly modular

Supports flexibility, reuse and upgrade

Architectural mandates at the various levels predispose towards commonality

[dst1]

QinetiQ

A service oriented approach

Required
Services

SubSystem

Provided
Services

A service is defined by

Data format

Protocol/carrier, eg DDS

Rate and volume

Number of allowed connections

Access protocols

etc

[dstl]

QinetiQ

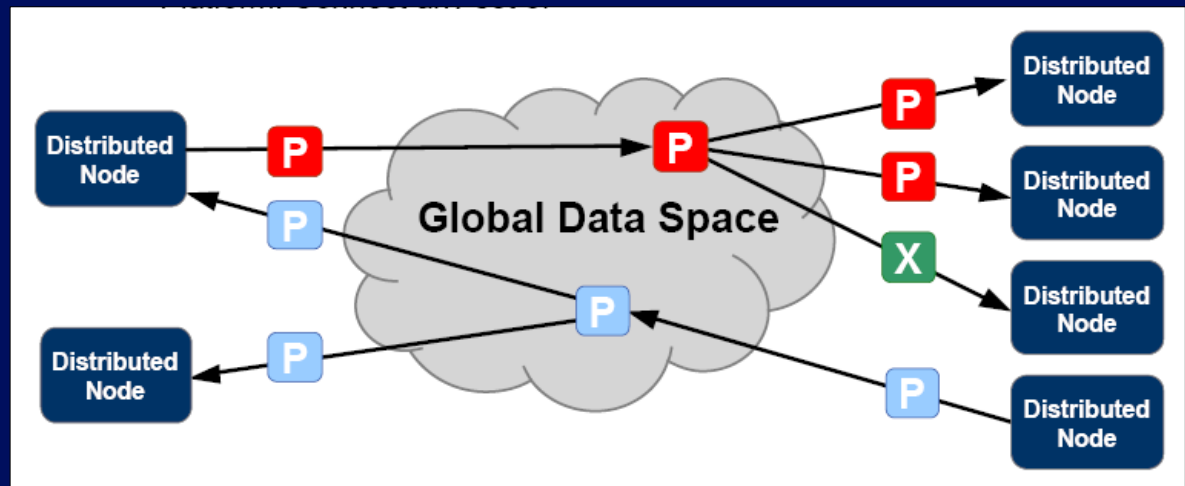# Underpinned by publish/subscribe
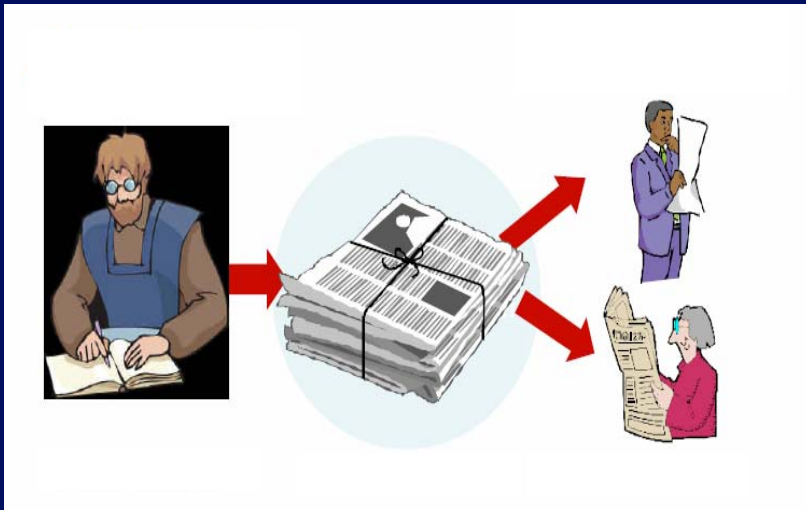
Opens up data access. Services potentially available to all

The right data in the right place at the right price

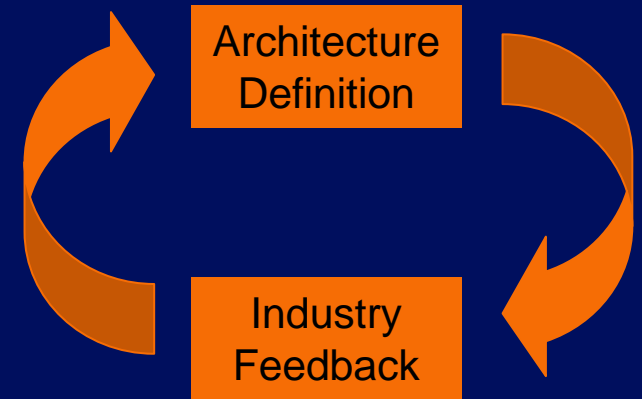De-emphasises hard subsystem boundaries
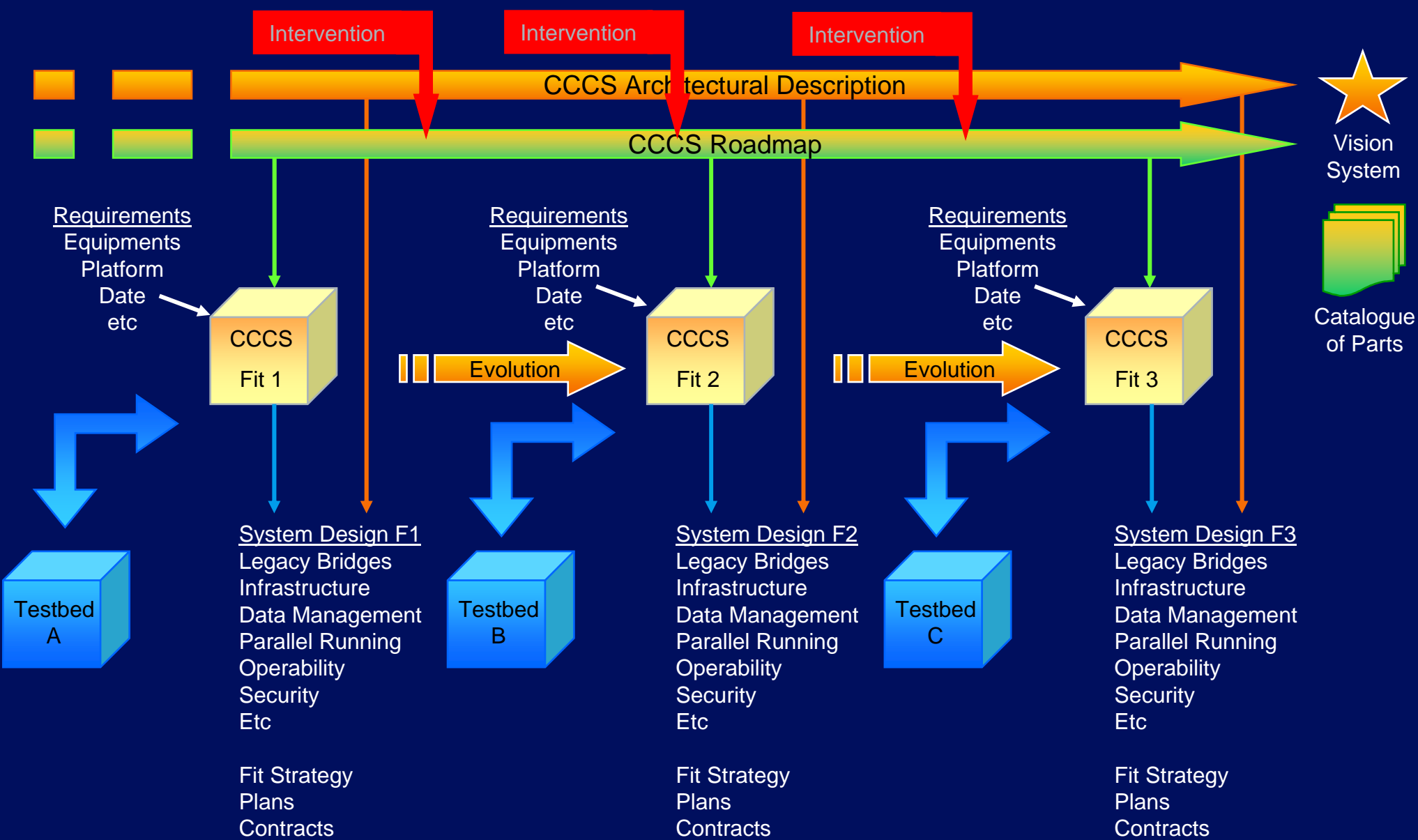
Encourages functional mobility

Joining it all up

Architecture Definition Process

Industry feedback on architecture

- Tenet
- DML
- SEA
- Ultra

- TUS
- Insyte
- BAe
- Advansys

Architecture Definition

Industry Feedback

Consensus incorporated in current version

CCCS Architecture Description v1.2

dst1

QinetiQ

Testbed aims

- De-risk ASTUTE B4 combat system

- Improved capability at lower cost

- More open, COTS-based, achievable

- Embarks on all relevant accreditation processes
  - Develops and trials a security solution that is both usable and *accreditable*, though not necessarily *accredited* in the Testbed
  - Complies with all appropriate safety requirements
  - Meets ARM requirements

- Shore test at first, sea trials later of partial system

[dst1]

QinetiQ

The End

Architectural Description of the
UK Common Core Combat System