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see www.integrated-ea.com

Human Views for MODAF

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The need for Human Views

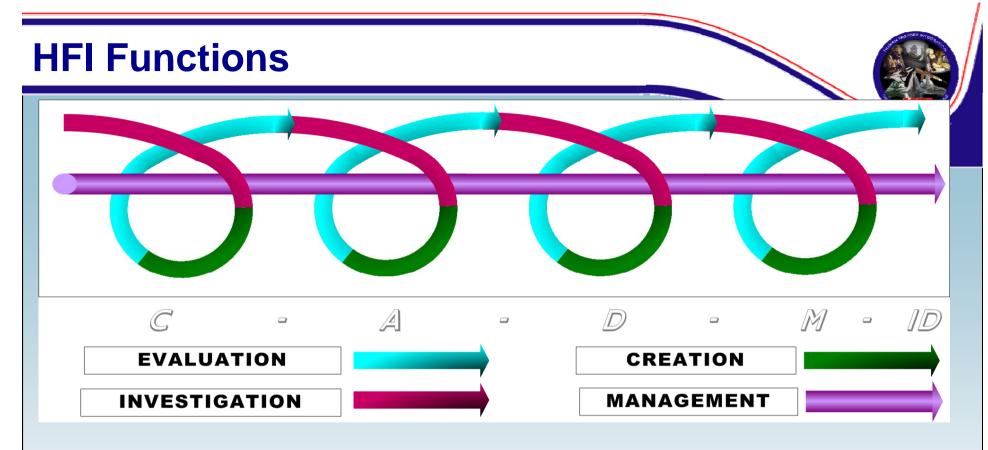


- Ensure Human Factors Integration (HFI)
- SE needs HFI
 - Enable socio-technical systems design
 - Need to specify people-related design decision areas
 - Explicitly; Correctly; Early
 - MODAF (version 1.0) has shortfalls in that
- HFI needs SE
 - Coping with design of complex systems
 - Opportunity for early involvement



What is HFI?

HFI domains **Human Factors Engineering** Manpower 4 Personnel HFI Health Hazards 1 **Training** System Safety **Organisational** & Social



- HFI creates value through:
 - Raising potential issues and preventing risks
 - Establishing validated insight
 - Providing methods, processes, data, standards, expertise
 - Enabling user involvement
 - Undertaking a design mediation and communication role

HFI Value Chain



Design activities

(activity cost)

Lack of design activities (activity cost saving)

Design features

(savings potential)

Design flaws (cost potential)

Problem prevention

(impact cost saving)

Problem occurrence (impact cost)

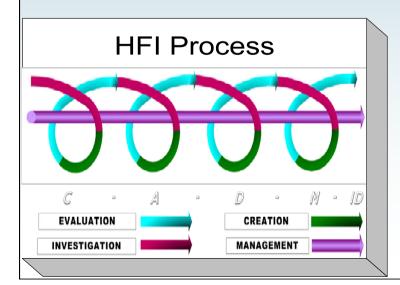
Risk prevention activity

Likelihood of risk prevention

Risk cause

Likelihood of `risk occurrence

Problem effects



HFI Value Chain



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Likelihood of risk occurrence

Problem effects



COST (efficiency)

PERFOR-MANCE (effectiveness)

SAFETY (legislation)

HFI Value Chain



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Lack of design activities (activity cost saving)

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Problem prevention

(impact cost saving)

Problem occurrence (impact cost)

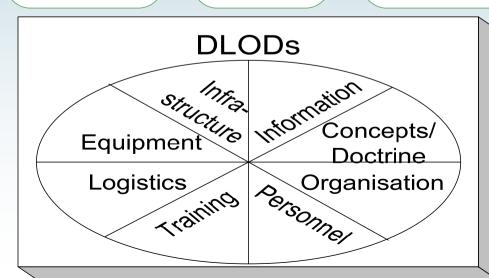
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Problem effects



What are Human Views (HVs)?



- Capturing specific human-related components of Enterprise models to enable effective HFI
 - Ensures common modelling approach
 - Helps HFI to relate to SE concepts/methods
- HFI design decision areas that can generally be perceived as formal definitions.
 - Not:
 - the 'soft' issues that may be observed
 - Informal dependencies and behaviours (they are constraints and results)
- Functional definitions
 - extending traditional meaning of 'functional' to HFI design areas

The HFI question



 "Can this person/these people, in this job, with this training, perform these tasks, using this equipment, to these standards, under these conditions"?

The HV question?



"Can these operational and capability requirements be achieved -

- grounded in these HFI objectives and standards,
- through these technological and organisational structures,
- with these human resources,
- fulfilling these functions,
- interacting as part of these organisational/task/process dependencies,
- in these roles/jobs,
- requiring these skills and characteristics,
- in these locations,
- using this equipment,
- over these timescales?"



MODAF developments

MODAF v. 1.1 (6 Viewpoints, 38 Views)



All Views (AV)
AV-1 Overview &
Summary
Information
AV-2 Integrated
Dictionary

Strategic Views (StV)

StV-I Enterprise Vision

StV-2 Capability Taxonomy

StV-3 Capability Phasing

StV-4 Capability Dependencies

StV-5 Capability to Organisation Deployment Mapping

StV-6 Operational Activity to Capability Mapping

All Views Provide information pertinent to an

architecture

Technical Standards Views
Articulate policy, standards, guidance,
constraints & forecasts

STRATEGIC Views

Articulate high-level requirements for enterprise change over time – capabilities, goals, enduring tasks

OPERATIONAL Views

Articulate operational scenarios, activities, and information flows

SYSTEM Views

Articulate the solution specification – resources, functions & interactions

Technical Standards Views (TV)

TV-I Standards Profile

TV-2 Standards Forecast

Acquisition Views (AcV)

AcV-I Acquisition Clusters

AcV-2 Programme Timelines

Articulate programme dependencies, milestones

ind statuses

Acquisition

Views

Operational Views (OV)

OV-1a High-Level Operational Concept Graphic

OV-1b Operational Concept Description

OV-1c Operational Performance Attributes

OV-2 Operational Node Relationships Description

OV-3 Operational Information Exchange Matrix

OV-4 Organisational Relationships Chart

OV-5 Operational Activity Model

OV-6a Operational Rules Model

OV-6b Operational State Transition
Description

OV-6c Operational Event-Trace Description

OV-7 Information Model

System Views (SV)

SV-I Resource Interaction Specification

SV-2a System Port Specification

SV-2b System Port Connectivity Description

SV-2c System Connectivity Clusters

SV-3 Resource Interaction Matrix

SV-4 Functionality Description

SV-5 Function to Operational Activity Traceability Matrix

SV-6 Systems Data Exchange Matrix

SV-7 Resource Performance Parameters Matrix

SV-8 Capability Configuration Management

SV-9 Technology & Skills Forecast

SV-10a Resource Constraints Specification

SV-10b Resource State Transition Description

SV-10c Resource Event-Trace Description

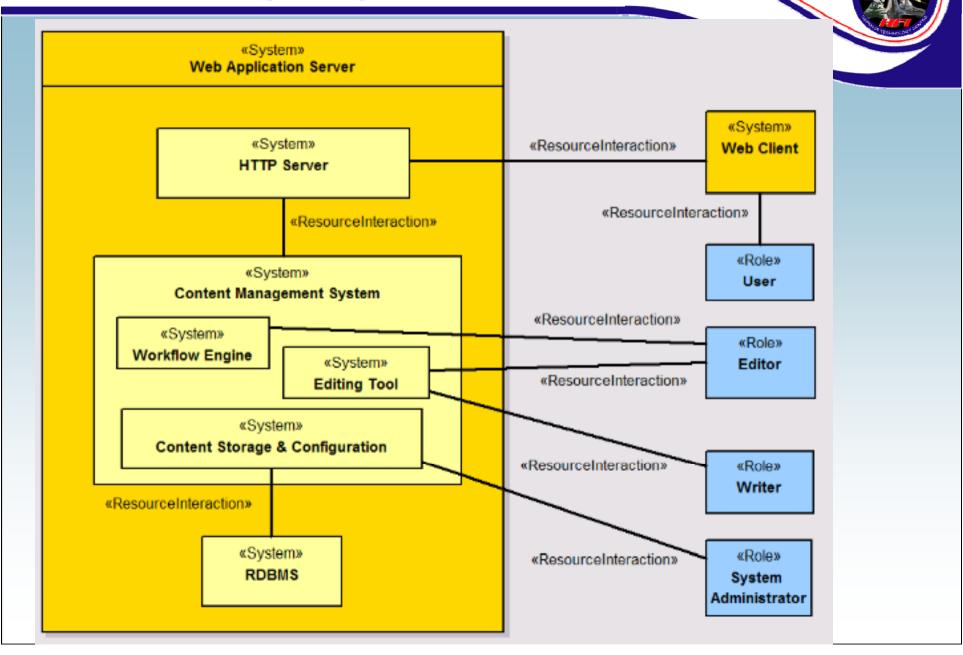
SV-11 Physical Schema

Architecture characteristics



- Separation of component concerns
- Generic: Conceptual Data Model / Meta Model
- Instantiation: Logical and Physical Data Model
- View: window/snapshot onto model
- Architectural products
- Viewpoints
- Levels of abstraction
 - Complexity
 - Requirements-solutions

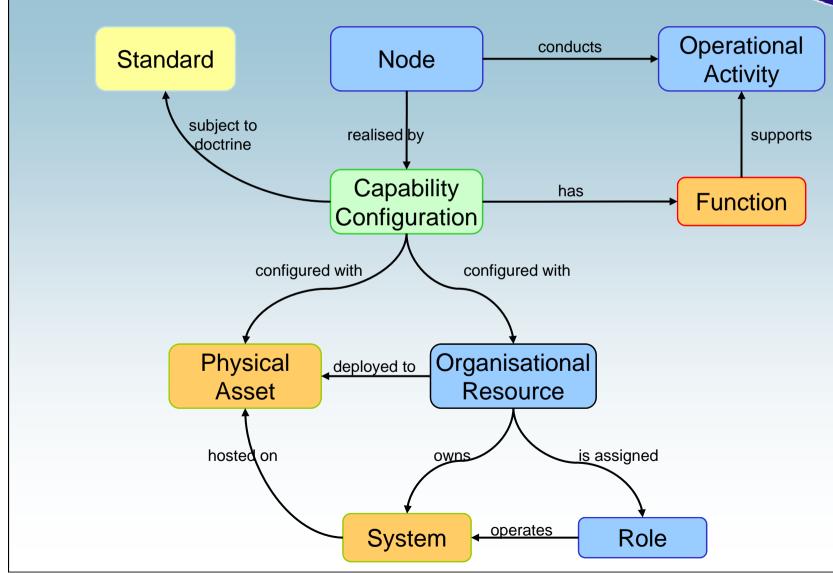
MODAF SV-1 (v 1.1)



MODAF Meta-Model: New



Capability Deployment



New MODAF v1.1 M3 definitions



- ResourceInteraction (SV-1)
 - An assertion that two <<FunctionalResource>>s interact.
 - Examples: data exchange between systems, conversations between people, people using systems
- Function (SV-4)
 - An activity which is specified in context of the resource (human or machine) that performs it.
 - Note1: Contrast with << Operational Activity>>, where the actor
 performing the activity is not known (i.e. it is just a logical node). A
 << Function>> is implementation-specific.
- Role (SV-1, OV-4)
 - An aspect of a person or organization that enables them to fulfil a particular function.
- PostType (OV-4)
 - A type of point of contact or responsible person. Note that this is the type of post - e.g. Desk Officer, Commander Land Component, etc.

SOA focus in DoDAF v 1.5



Operational Activity to Services Traceability Matrix (SV-5c)

	Capability 1				Capability 2				Capability 3				Capability 4				Capability 5			
Services	Operational Activity A	Operational Activity B	Operational Activity C	Operational Activity D	Operational Activity E	Operational Activity F	Operational Activity G	Operational Activity H	Operational Activity I	Operational Activity J	Operational Activity K	Operational Activity L	Operational Activity M	Operational Activity N	Operational Activity O	Operational Activity P	Operational Activity Q	Operational Activity R	Operational Activity S	Operational Activity T
Service 1							X	X	X))		0					
Service 2	Χ	Χ									Χ									
Service 3			Χ	Χ														Χ		
Service 4	Χ	Χ	Χ											X	Χ		Χ			
Service 5			Χ							Χ								Χ		
Service 6	Χ						Χ	Χ	Χ		Χ									
Service 7		Χ		Χ										Χ						
Service 8			Χ				X		X			X					Χ		Χ	Χ



MODAF Human Views

UK work: progress / plan



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HV concepts to IA

Draft HV Handbook

Input towards MODAF v1.1

Stakeholder Review

Revised HV Handbook

Published HV Handbook (Issue 1)

Applications and Updates

end Dec 06

8 Feb 07

12 March 07

30 March 07

end July 07

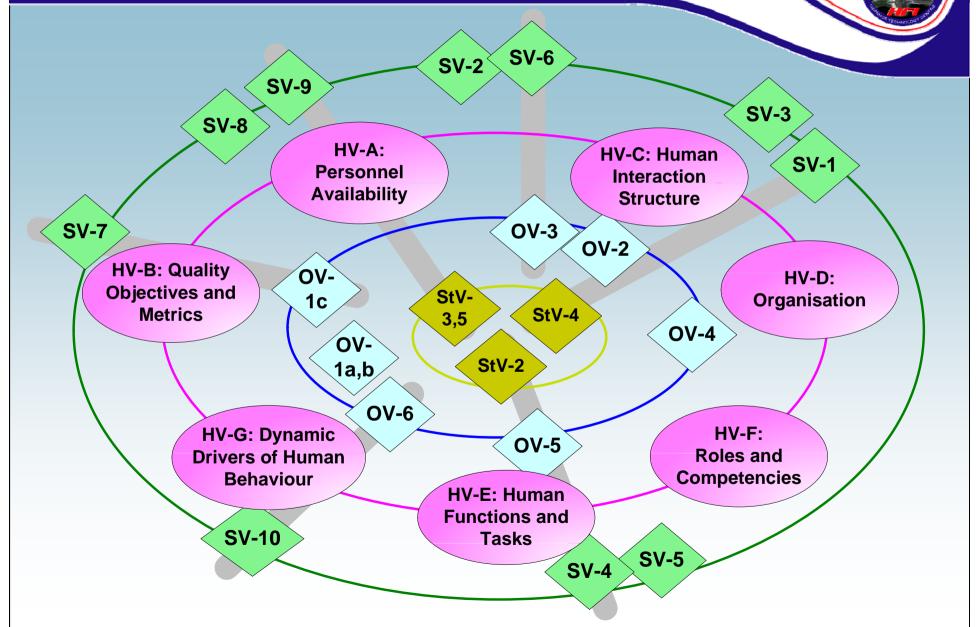
mid Sept 07

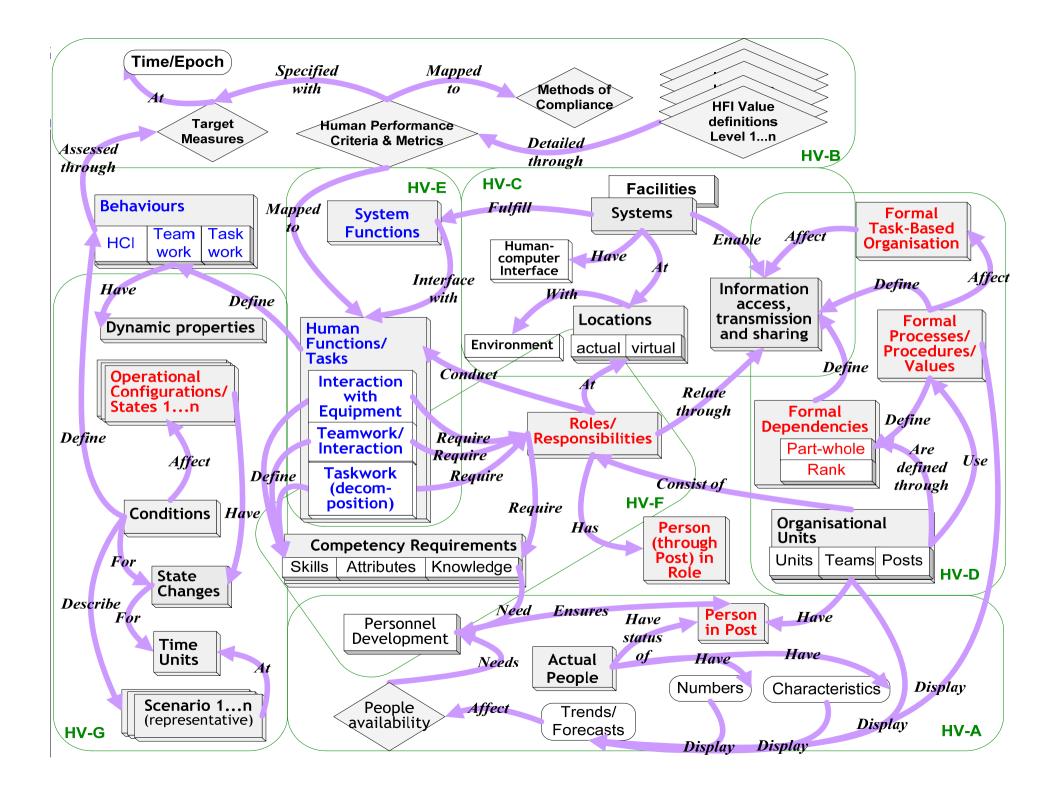
Jan 08

ongoing

HVs between OV and SV level

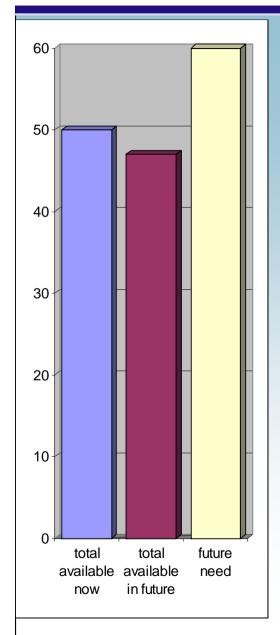


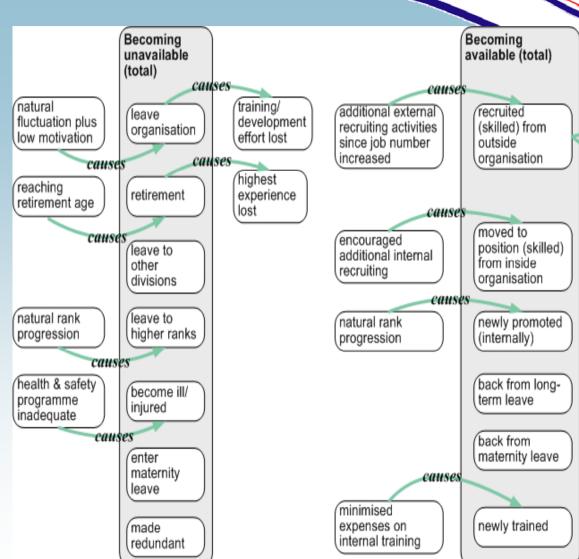




HV-A: Personnel Availability (example)







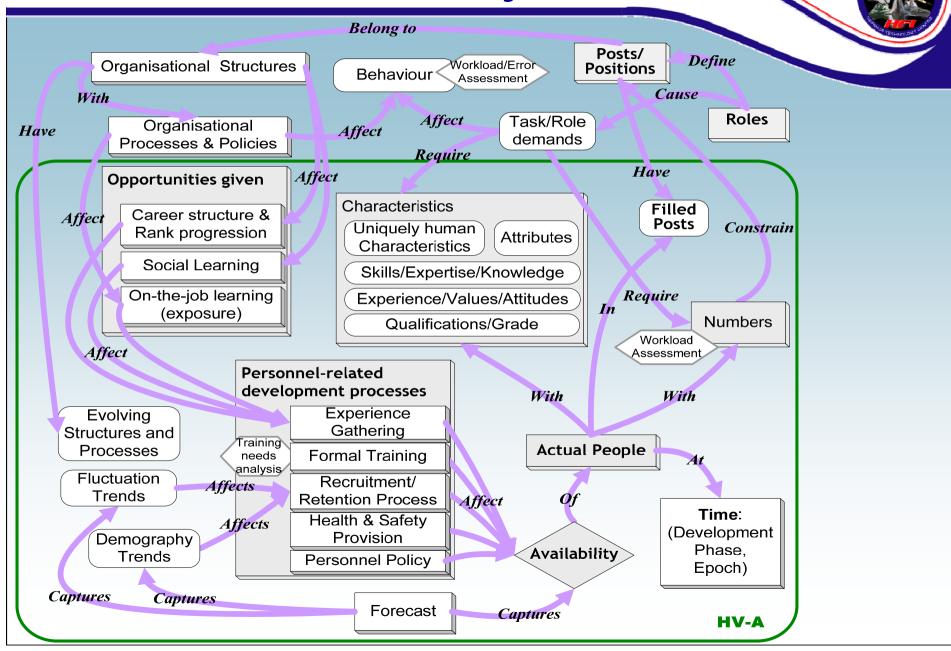
high recruiting cost

causes

causes

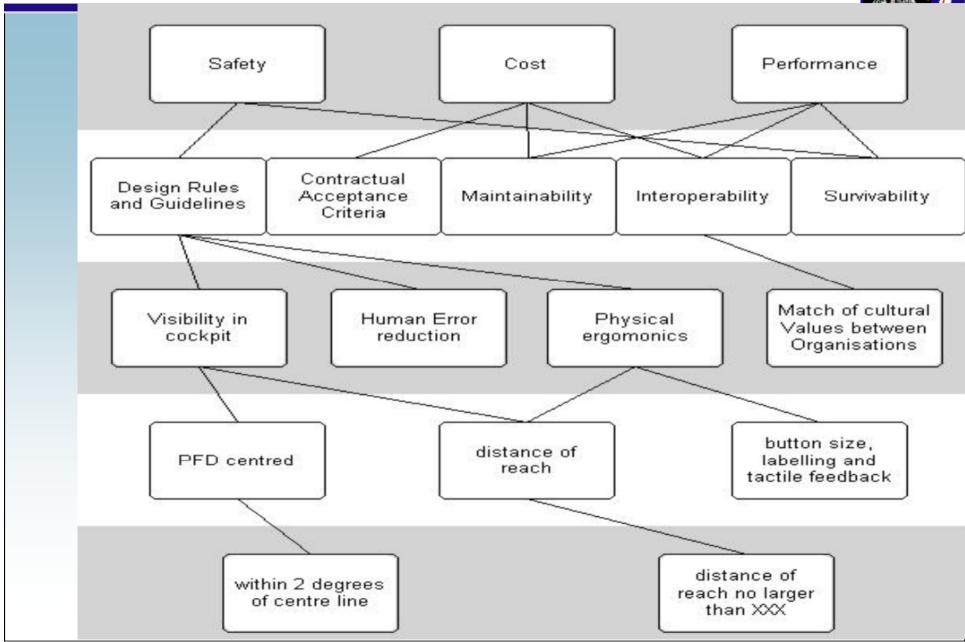
requires coaching/ training/ experience gathering

HV-A: Personnel Availability



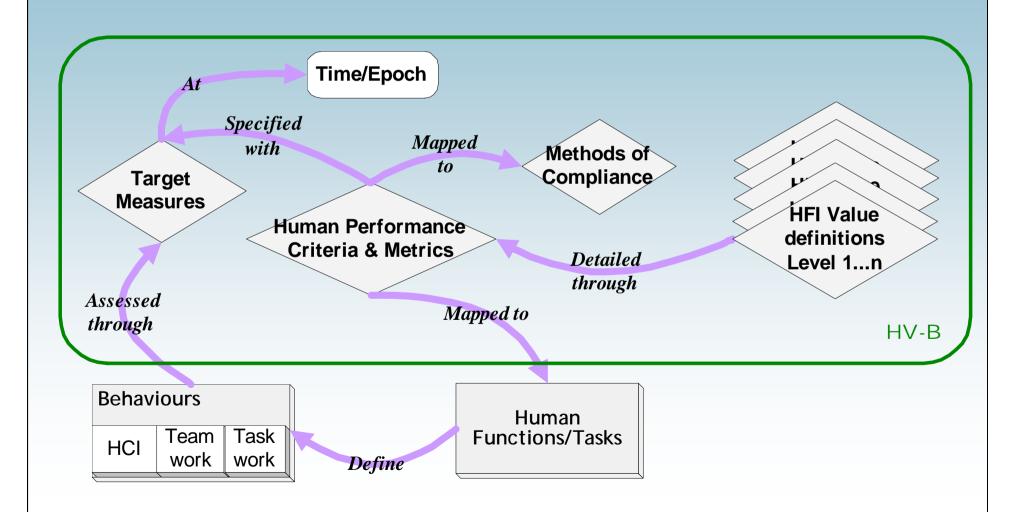
HV-B: Quality Objectives and Metrics (example)



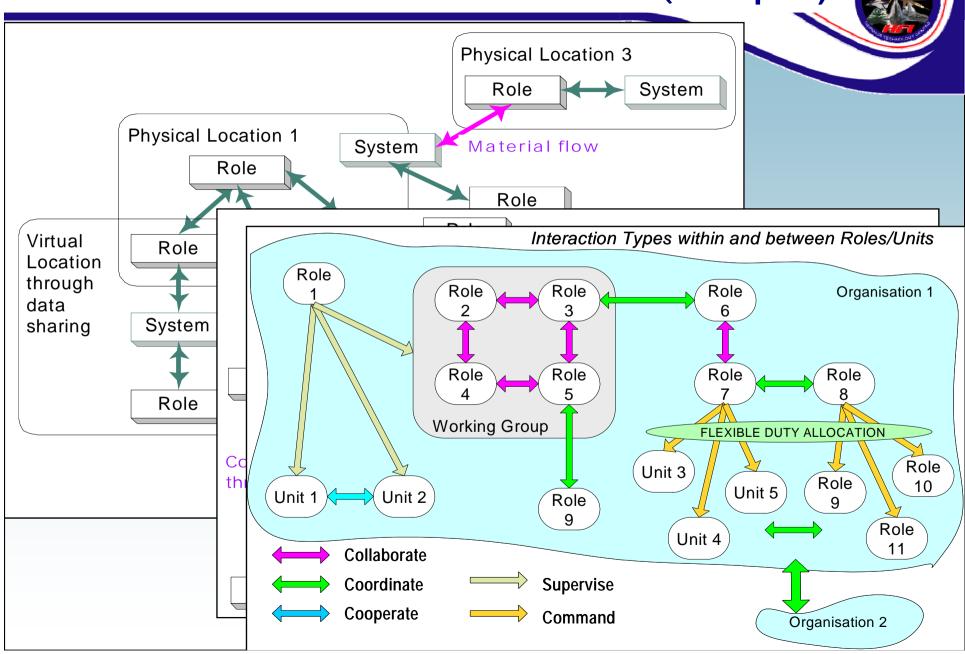


HV-B: Quality Objectives and Metrics

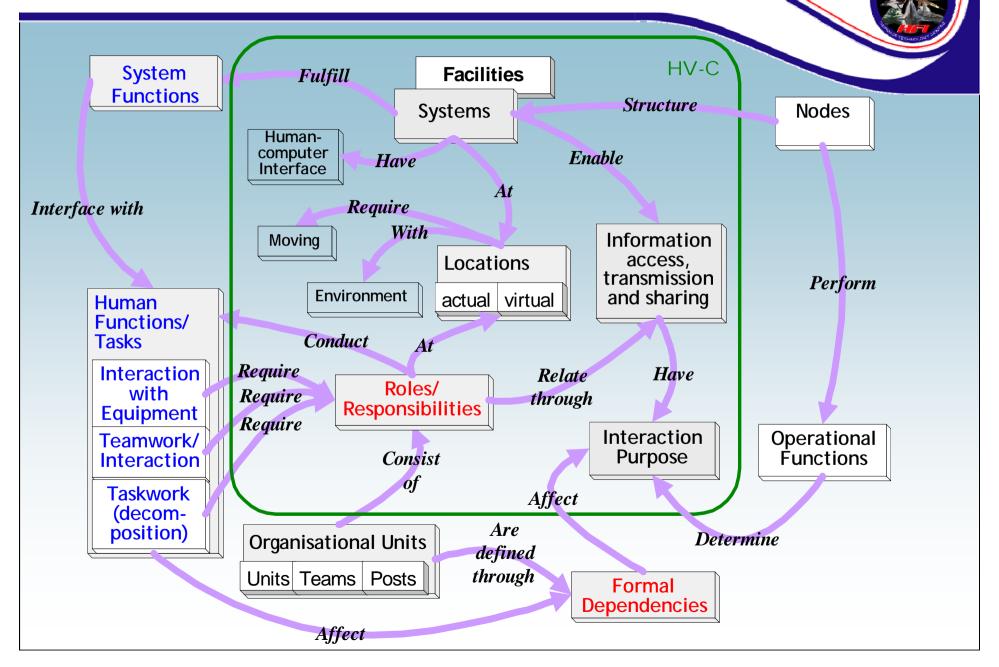




HV-C: Human Interaction Structure (examples)



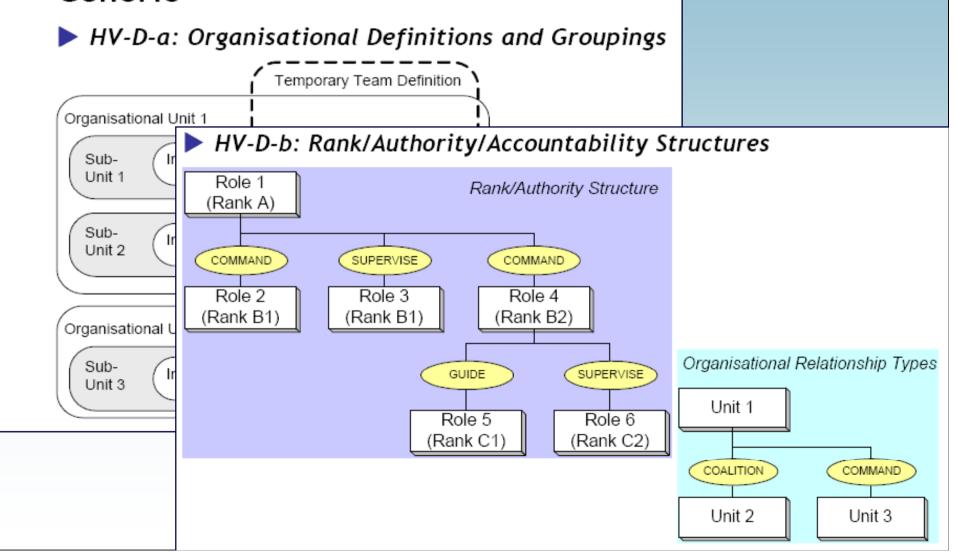
HV-C: Human Interaction Structure



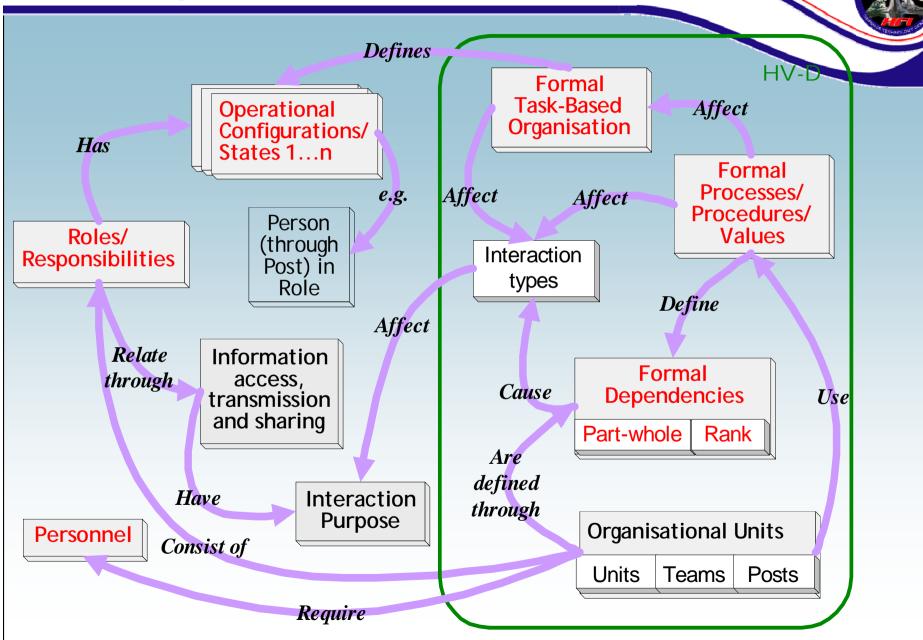
HV-D: Organisation (examples)

VISUALISATION

Generic

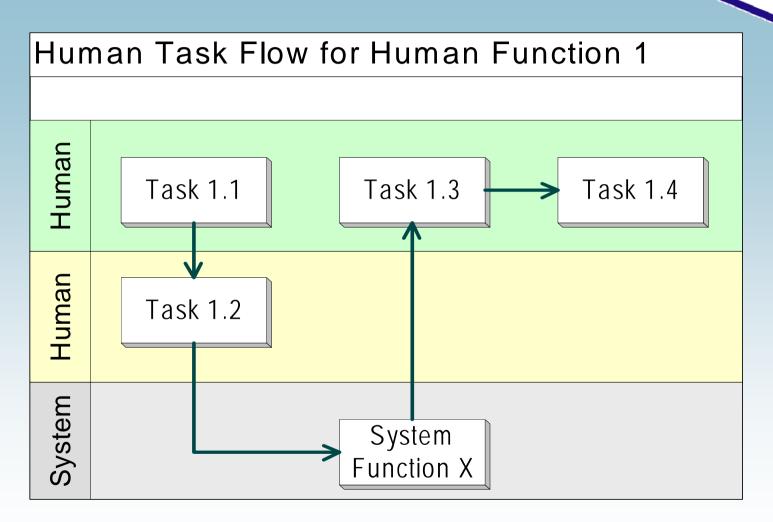


HV-D: Organisation



HV-E: Human Functions and Tasks (example)

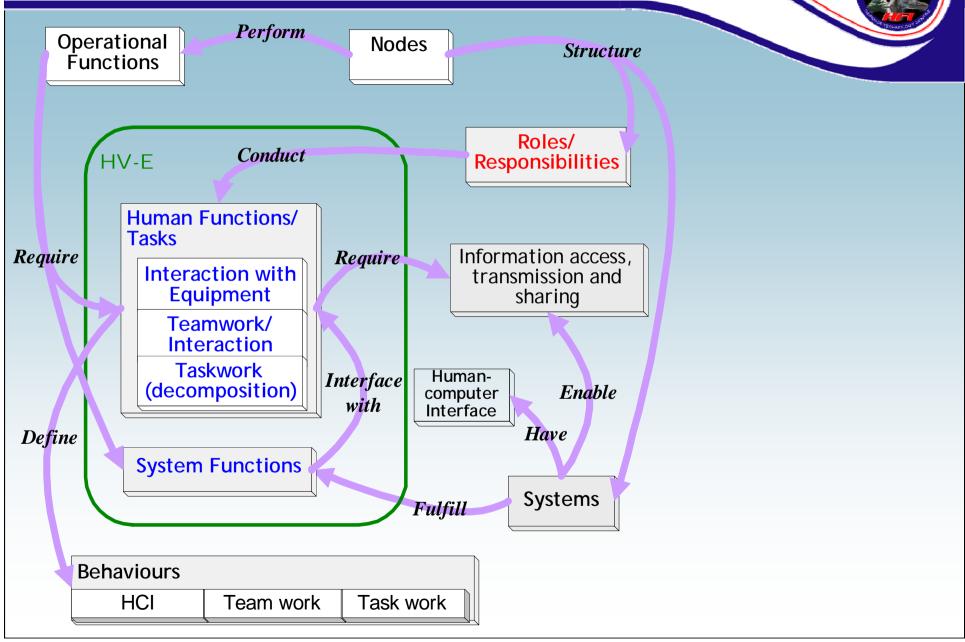




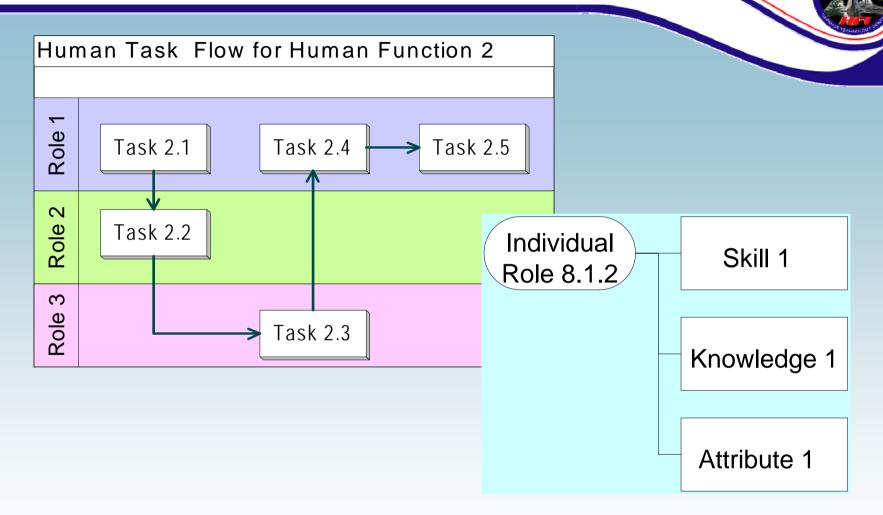
Note: 'system' is used here for hardware/technology (in line with MODAF terminology)

HV-E: Human Functions and Tasks





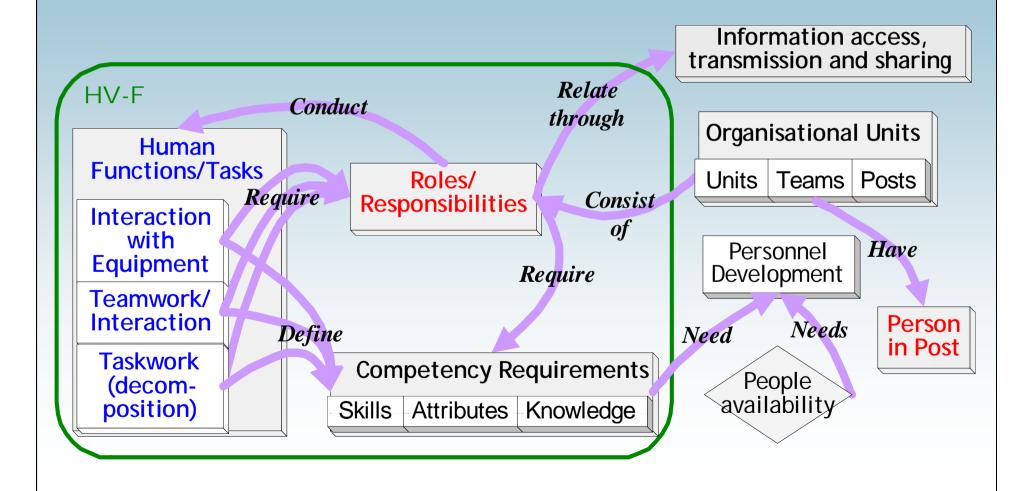
HV-F: Roles and Competencies (examples)



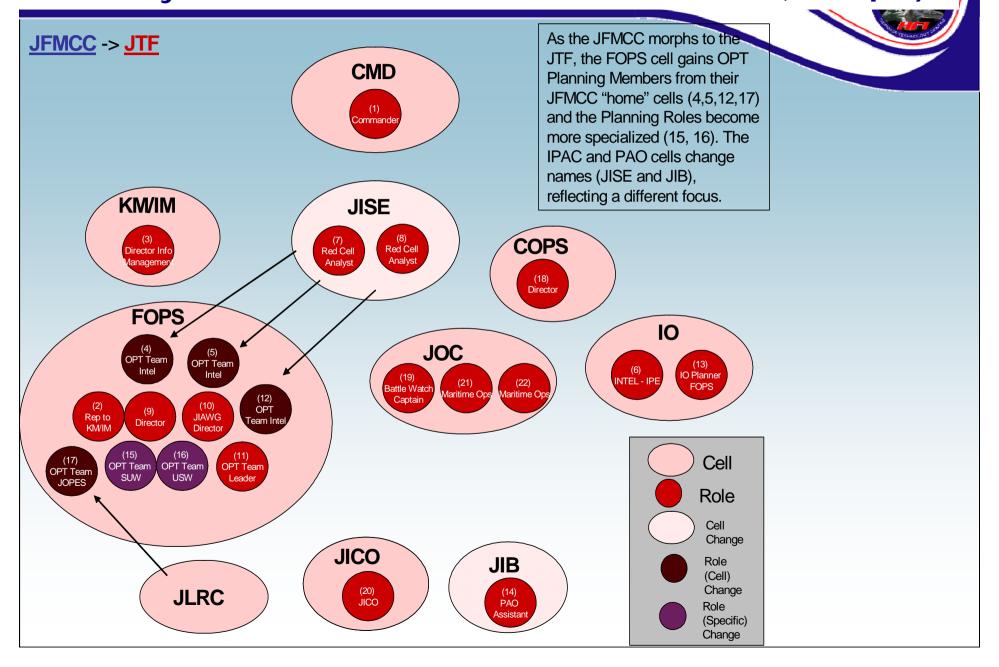
Note: The 'A' in KSA (Knowledge, Skills & Attributes) is sometimes also referred to as Aptitudes, or Abilities.

HV-F: Roles and Competencies

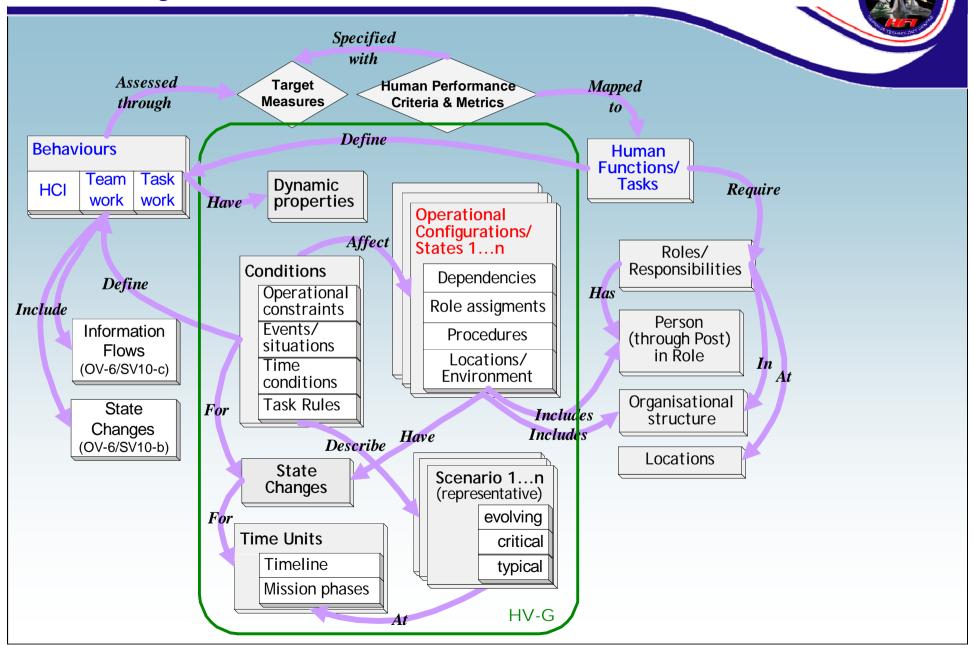




HV-G: Dynamic Drivers of Human Behaviour (example)



HV-G: Dynamic Drivers of Human Behaviour



Summary



- The need to model an entire Enterprise as a socio-technical system is well recognised.
 - Enterprise Architectures are being conceived to specify requirements and solutions for all DLOD.
 - MODAF version 1.1 has significantly modified many of its underlying definitions.
 - The HVs further expand on this development.
- The complementary HVs for MODAF aim to bring together SE and HFI as two related disciplines.
 - Whilst SE and HFI depend on each other, each is grounded in a set of approaches and philosophies not immediately compatible.
 - By choosing a SE approach to express HFI design decision areas, HFI professionals are provided with means to communicate to Systems Engineers.
 - HV elements have the potential of changing traditional SE approaches that can be overly technology focused.