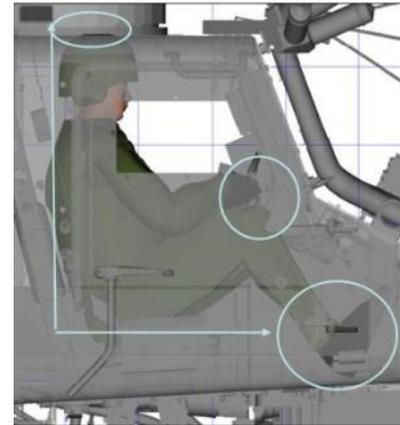


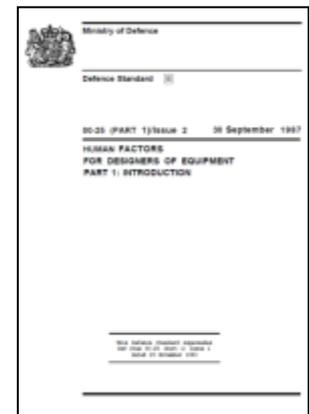
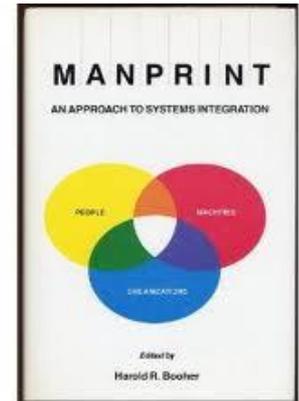
Presentation Aim

- To provide an overview of the UK MOD Approach to HFI and its Key Components



HFI – A Short History (1)

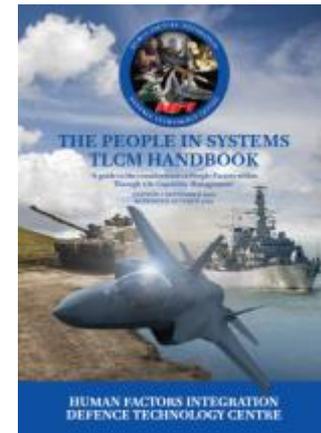
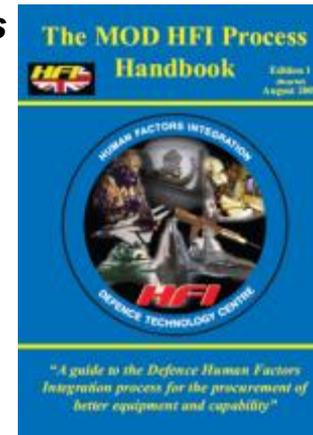
- 1971 – Human Factors for Designers of Naval Equipment
- 1983 – Def Stan 00-25: Human Factors for Designers of Equipment (Tri-Service, 12 Parts)
- Mid 1980s – US Army – MANPRINT (MANpower PeRsonnel INTegration)
- Late 1980s – UK Army adopt MANPRINT
- Late 1980s – Tri-Service MOD MANPRINT initiative established (re-titled ‘HFI’)
- 1989 – MoD-Industry HFI Working Group formed
- 1992 - Def Stan 00-25: Human Factors for Designers of Equipment (Issue 2)
- 2000 – Def Stan 00-25: Part 14 – Military Land Vehicle Design Issue 1



HFI – A Short History (2)



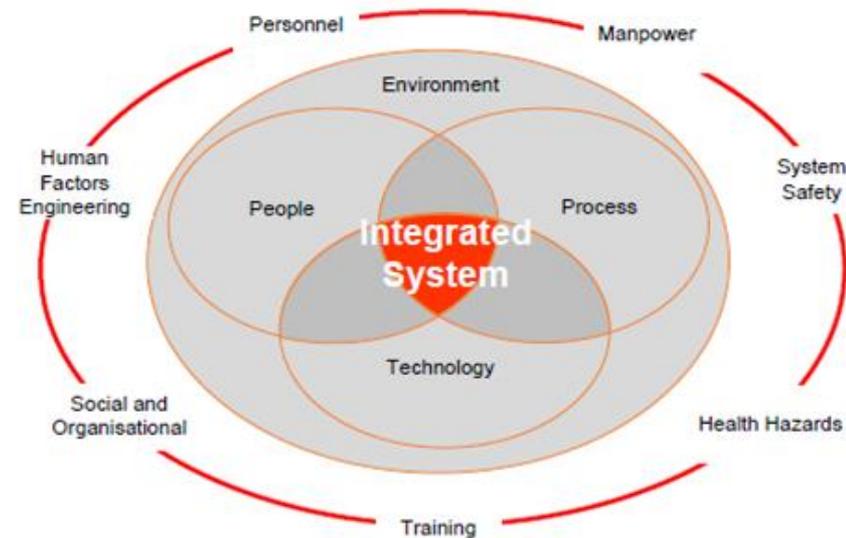
- 2001 – HFI Practical Guidance for IPTs
- 2002 – STGP 10 *HFI Management Guide* and STGP 11 *HFI Technical Guide* Issued
- 2004 – Def Stan 00-25 *Human Factors for Designers of Systems - Restructured and reissued*
- 2005 – The MOD HFI Process Handbook (the ‘Blue Book’)
- 2006 – MAP-01-010 and MAP-01-011 Issued (updates to STGPs)
- 2008 – Def Stan 00-250: *Human Factors for Designers of Systems*
- 2009 – The People in Systems TLCM Handbook (HFI DTC)
- 2010 – JSP 912: *HFI for Defence Systems*
- 2013 – JSP 912: *HFI for Defence Systems v2.0*
- 2015 – Def Stan 00-251: *HFI for Defence Systems*
- 2015 – JSP 912 update
- 2015 – Human Factors Integration Management System (HuFIMS) created



Human Factors Integration

Human Factors Integration is the UK MOD's process by which the People Component of Capability is considered during Capability Delivery and Support.

It is a systematic **process** for identifying, tracking and resolving human related issues to ensure a balanced development of both technologies and human aspects of Capability.



Can these personnel with this equipment and training perform their tasks to a specific standard under agreed conditions?

Context and Drivers for HFI

- Organisational Drivers:
 - Project Cost
 - Project Risk
 - Requirements Driven Acquisition
 - Commercial Aspects of Acquisition
- HFI is now MOD Policy JSP912 v3
- Civilian First – Move away from bespoke Military Stds when possible
- Development of wider acquisition processes: Guide to Engineering Activities and Review – GEAR and SOSA
- Focus of Acquisition on Equipment and Logistics DLODs - HFI operates in both Acquisition and Integrated Logistics Support, but has wider implications

HFI and the Defence Lines Of Development

- Lines of Development
 - Concepts and Doctrine
 - Organisation
 - Personnel
 - Training
 - Equipment
 - Logistics
 - Information
 - Infrastructure



Current Problems with HFI

- Generally only applied in the procurement space.
- HFI was founded upon trades being undertaken between HFI Domains (and DLODs) - but majority of trades are against Equipment DLOD.
- Is often confused with Human Factors (HF) and Human Factors Engineering (HFE).
- Poor human factors requirements.
- Appears resource intensive and is not well understood.
- Transversal activity – organisational problems.
- Is often viewed as a sub part of ILS and/or a secondary or tertiary duty.

Risk Based Management of Human Factors

- The HFI process is both goal-based and risk-based.
- Provided these goals are achieved, the means by which they are achieved can be tailored to the circumstances of individual projects.
- As a consequence, the extent and depth of HFI activities should be tailored to the degree of project risk presented.



HFI Domains

- HFI involves the identification and management of the human related issues that could impact upon defence acquisition of capability
- In order to ensure that all human-related issues are considered, they have been categorised into 7 main areas or domains
- These domains essentially form a viewpoint/aide memoir/checklist for consideration and risk assessment
- None of the domains should be considered in isolation. Any decision in one domain can easily impact on another.

HFI & HSI Domains

HFI

MANPOWER

PERSONNEL

TRAINING

HUMAN FACTORS ENGINEERING

SYSTEM SAFETY

HEALTH HAZARDS

SOCIAL & ORGANISATIONAL

HSI

MANPOWER

PERSONNEL

TRAINING

HUMAN FACTORS ENGINEERING

SYSTEM SAFETY

HEALTH HAZARDS

SURVIVABILITY

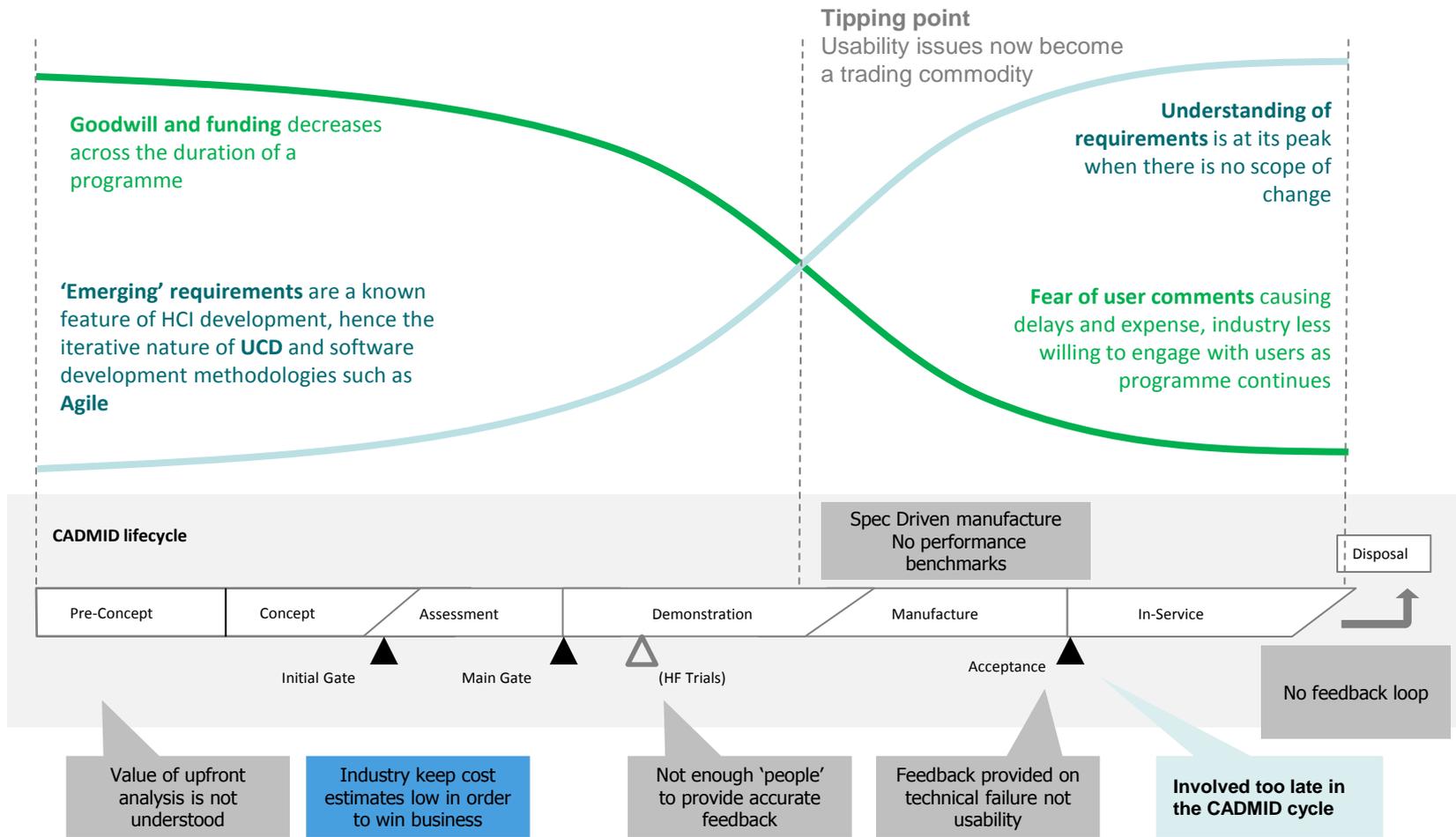
HABITABILITY

ENVIRONMENT (USAF)

Application of the HFI Domains

- Domains not used explicitly in requirements.
- Used as viewpoints to look at risk and design.
- None of the Domains should be considered in isolation.
- Significant overlap with the DLODs.
- Focus tends to migrate towards HFE on most projects.

User engagement across the CADMID lifecycle



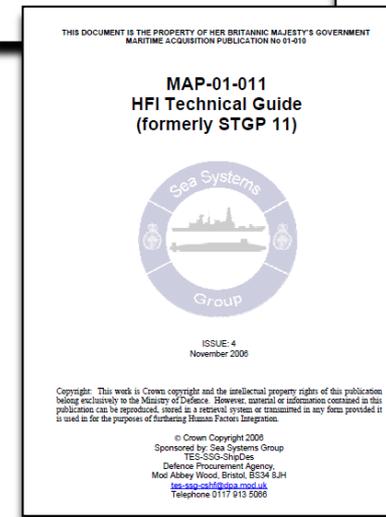
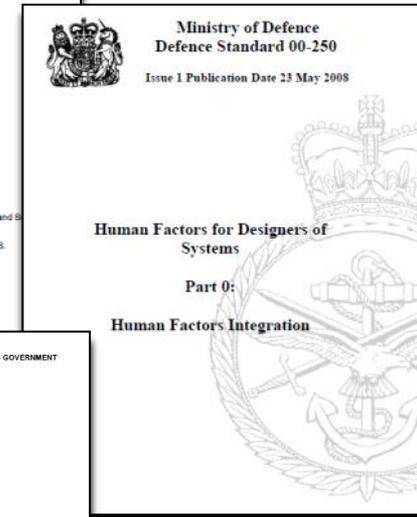
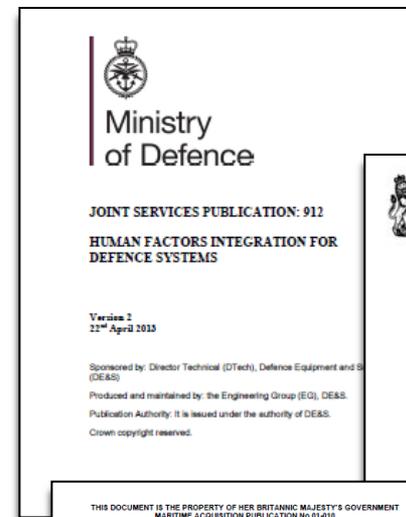
HFI Policy and Standard Development

Rationalisation of HFI Policy, Process & Guidance

- Issues which triggered review:
 - New JSP structure and purpose
 - Inconsistency, conflict between documents
 - Range of documents
 - No documented common HFI process
 - Size: Def Stan runs to 1000+ pages
 - Ability to update Def Stan
 - Structure for accessibility by variety of end users

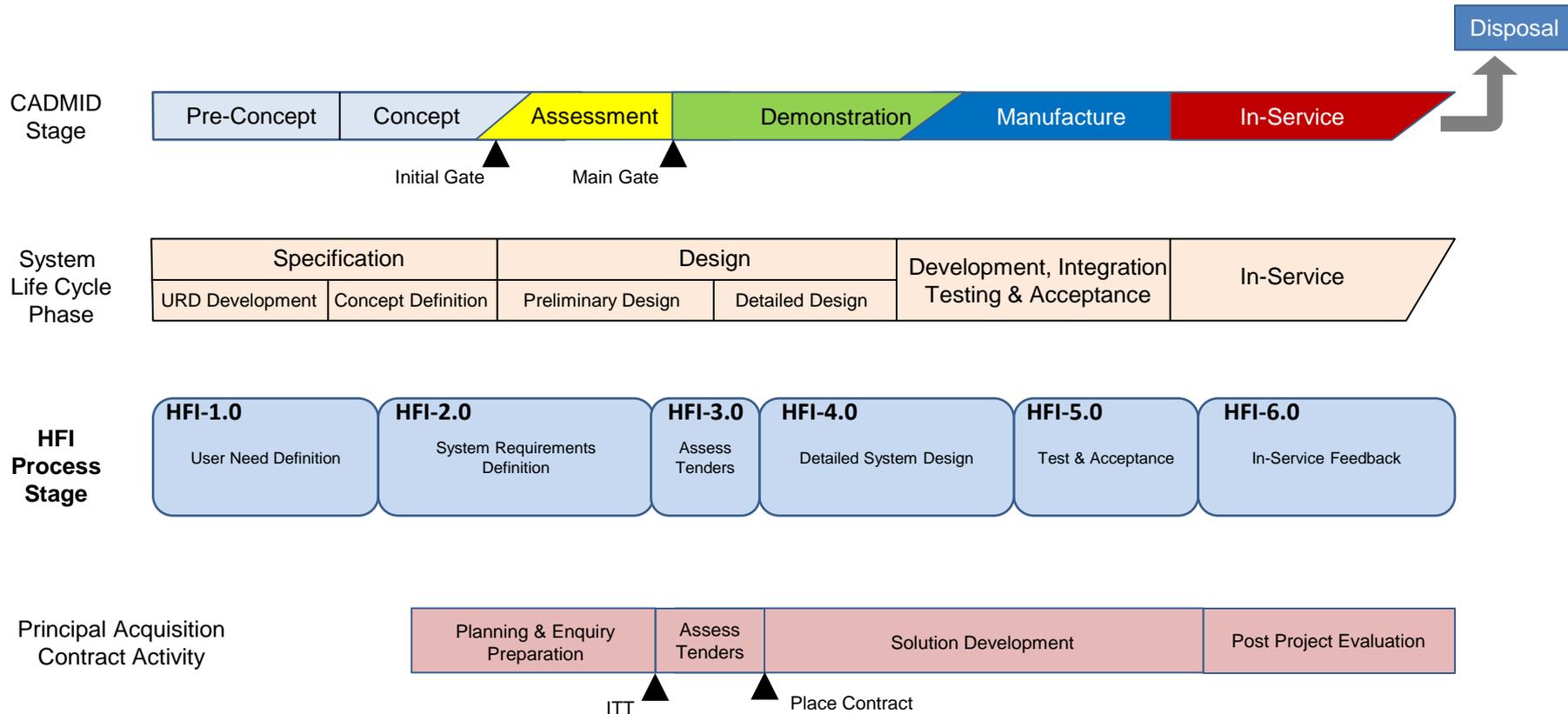
The Objectives

- Revise MOD HFI Policy & Process and Guidance Material to:
 - Ensure they are fit for purpose
 - Facilitate Contracting
 - Designed for the intended audience(s)
 - Organise to facilitate uptake
- Key Legacy Documents:
 - JSP 912
 - Def Stan 00-250
 - Supporting Guidance material (e.g. Single Service/Tri-Service)



Revised HFI Process

Mapping to CADMID Cycle, System Life Cycle Phases and Principal Acquisition Contract Activity



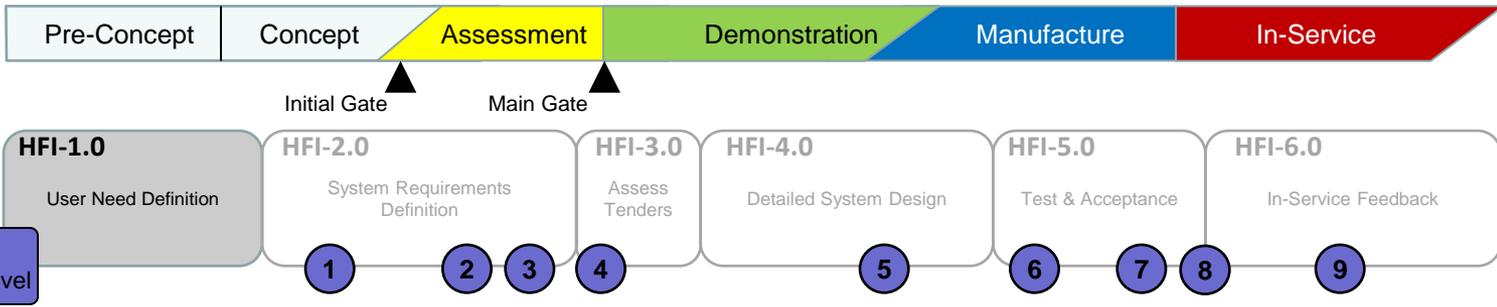
HFI Roles and Responsibilities

Three principal groups of involved in the management of HFI:

- Capability Sponsor - responsible for developing and specifying the User Requirements for the required Capability.
- Capability Acquirer - responsible for developing and specifying the System Requirements for the required Capability.
- Supplier (or 'Solution Provider') - responsible for developing the Solution.

Audience and Documents

HFI Policy	HFI Process	HF Requirements & Contracting Document	Example Detailed Technical Requirements	HF Technical Guidance
JSP 912 Parts 1 & 2	Summaries in JSP Parts 1 + 2 Detail in HFI Process Leaflets	DEF STAN 00-251	<ul style="list-style-type: none"> - Technical Guides - Extant Def Stan 00-250 - Civil Standards - Alternative Sources 	<ul style="list-style-type: none"> - Technical Guides - Extant Def Stan 00-250 - Civil Standards - Alternative Sources
<p>The diagram illustrates the audience for HFI documents. It features three overlapping ovals: a green oval labeled 'FLC/CAP' in the top-left, an orange oval labeled 'ACQUIRER' in the center, and a blue oval labeled 'SOLUTION PROVIDER' in the bottom-right. The 'ACQUIRER' oval overlaps with both the 'FLC/CAP' and 'SOLUTION PROVIDER' ovals.</p>				



HFI-1.0 User Need Definition

HFI-1.1
Appoint HFIF(Cap)
FLC/CAP

HFI-1.2
Define the HFI Strategy
FLC/CAP

HFI-1.3
Analyse Legacy System Data & Feedback
FLC/CAP

HFI-1.4
Identify Human Component of Capability Need
FLC/CAP

HFI-1.5
Provide HFI Input to Single Statement of User Need
FLC/CAP

HFI-1.6
Provide HFI Input to URD
FLC/CAP

HFI-1.7
Provide HFI Input to CONEMP
FLC/CAP

HFI-1.8
Define the Target Audience
FLC/CAP

Goal: To ensure that appropriate human considerations are included in the definition of user requirements and that sufficient information is provided to the acquisition authority to support the development of people related system requirements

FLC Project Inputs
HFI RAIDO from predecessor systems
In-Service Feedback

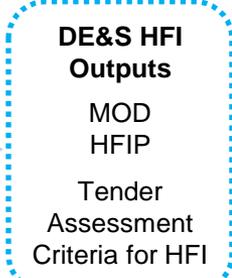
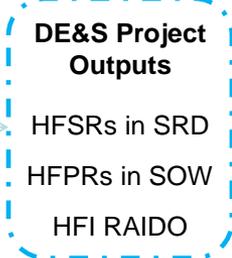
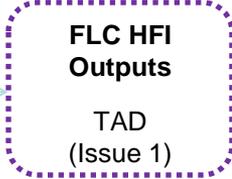
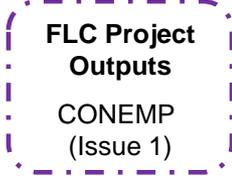
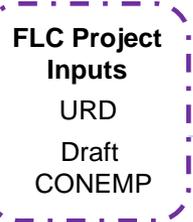
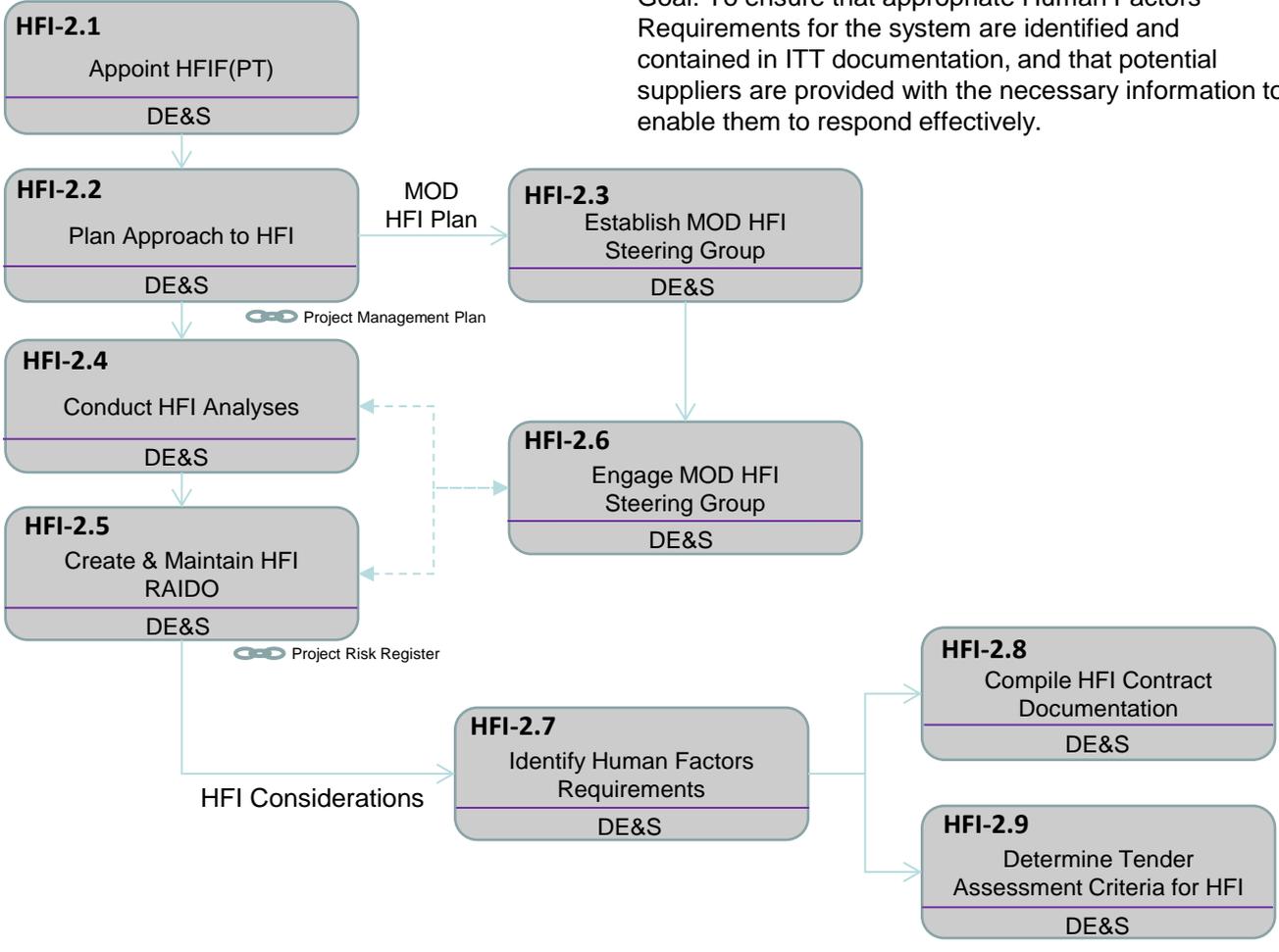
FLC Project Outputs
URD
Draft CONEMP

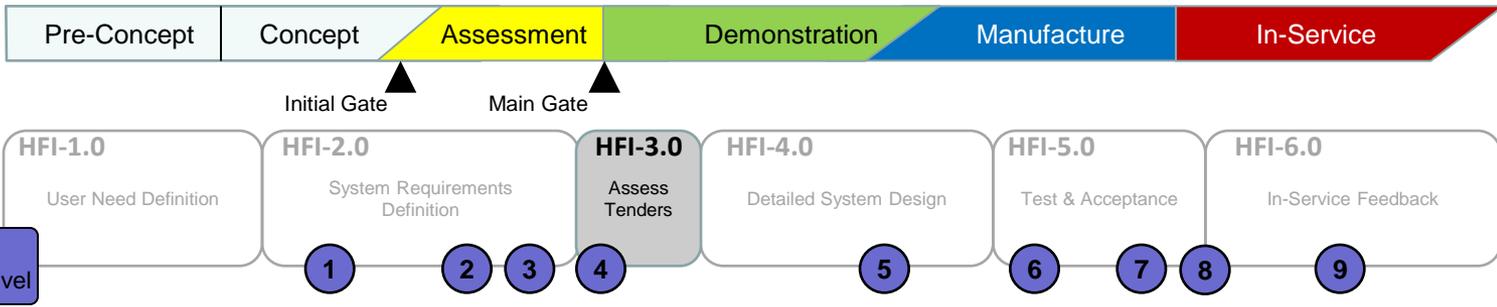
FLC HFI Outputs
HFI Strategy
Draft TAD



HFI-2.0 System Requirements Definition

Goal: To ensure that appropriate Human Factors Requirements for the system are identified and contained in ITT documentation, and that potential suppliers are provided with the necessary information to enable them to respond effectively.





HFI-3.0 Assess Tenders

Goal: To ensure that the Solution Provider's tender suitably addresses Human Factors requirements.

FLC HFI Inputs
TAD

DE&S Project Inputs
HFSRs in SRD
HFPRs in SOW

DE&S HFI Inputs
HFI RAIDO
Tenderer Assessment Criteria for HFI

SP Project Inputs
Tender Response(s) (incl. Compliance Statements)

HFI3.1
Assess Tenderer Response
DE&S

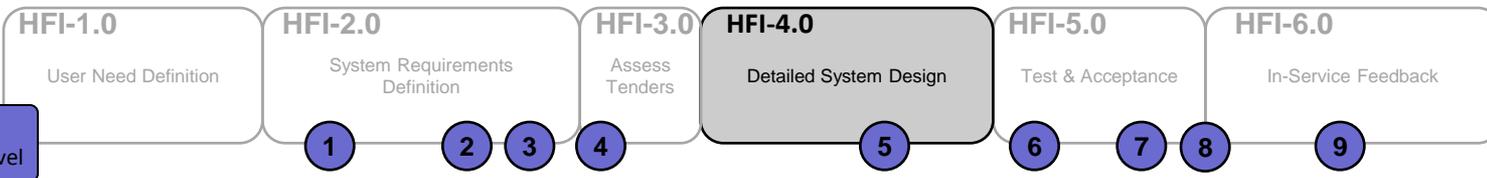
HFI3.2
Liaise with CIWG / RWG
DE&S

HFI3.3
Support Solution Provider Selection
DE&S

DE&S HFI Outputs
HFI Input to tenderer selection



Initial Gate Main Gate



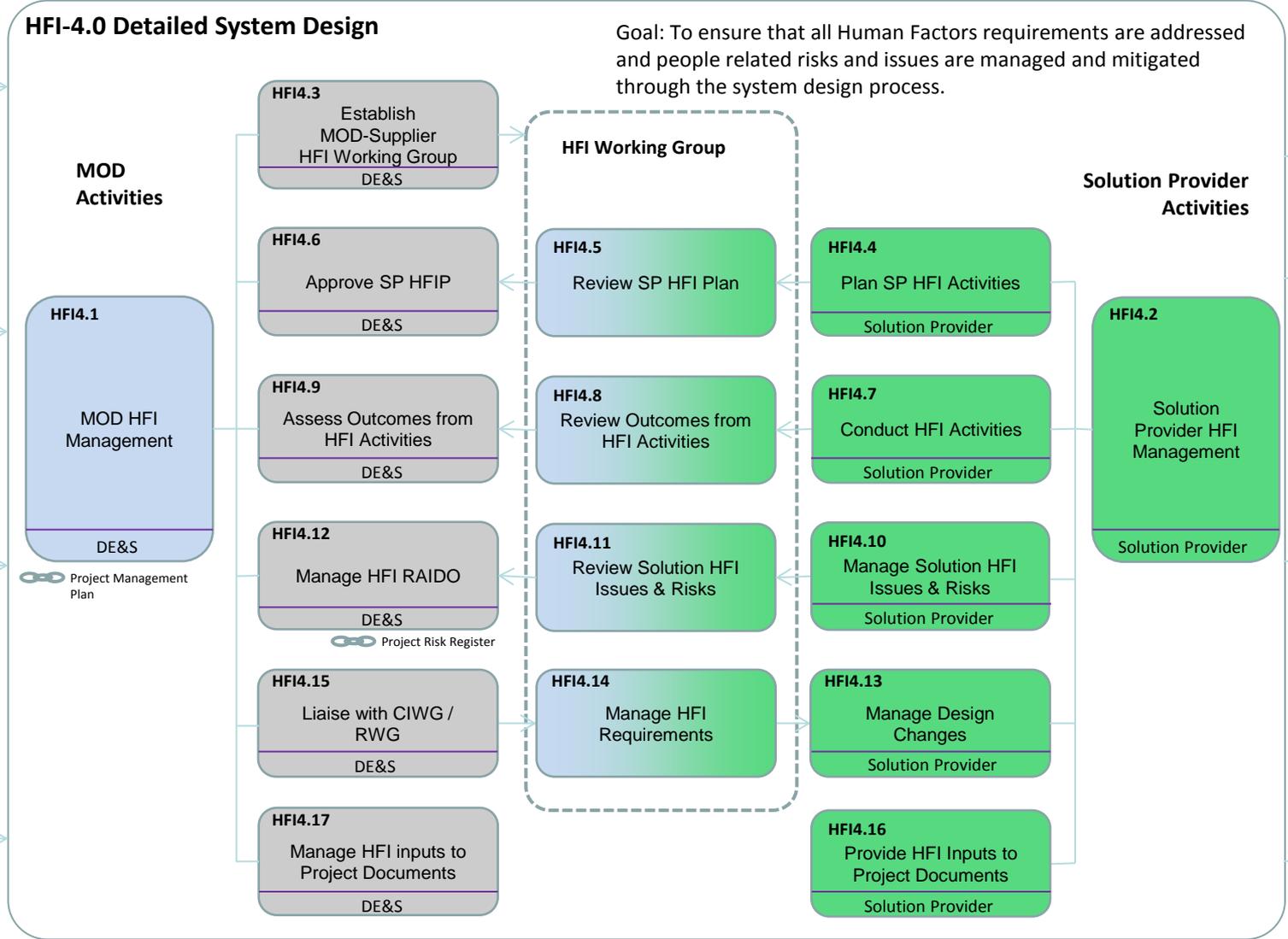
SRL/HFI Maturity Level

FLC Project Inputs
 URD
 CONEMP
 TAD

DE&S Project Inputs
 HFSRs in SRD
 HFPRs in SOW

DE&S HFI Inputs
 MOD HFIP
 HFI
 RAIDO

SP Project Inputs
 Tender Response(s)
 (incl. Compliance Statements)



FLC Project Outputs
 CONUSE

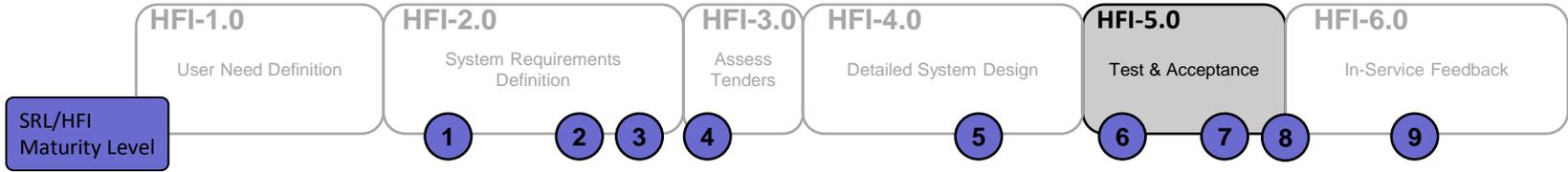
DE&S HFI Outputs
 HFI
 RAIDO

SP Project Outputs
 System Design
 Subsystem Specs
 ITEAP
 Safety Case
 Support Solution
 Training Solution

SP HFI Outputs
 SP HFIP
 HFI Case

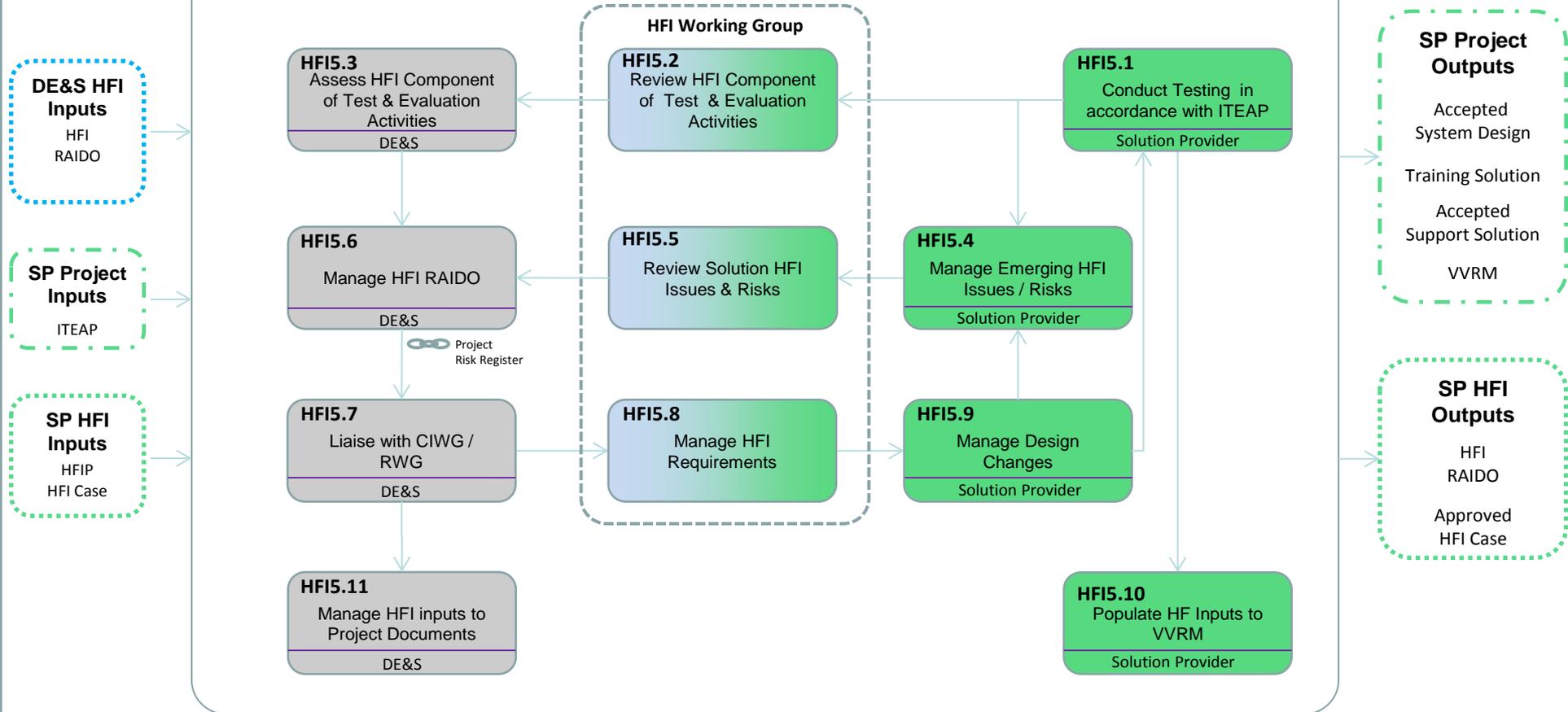


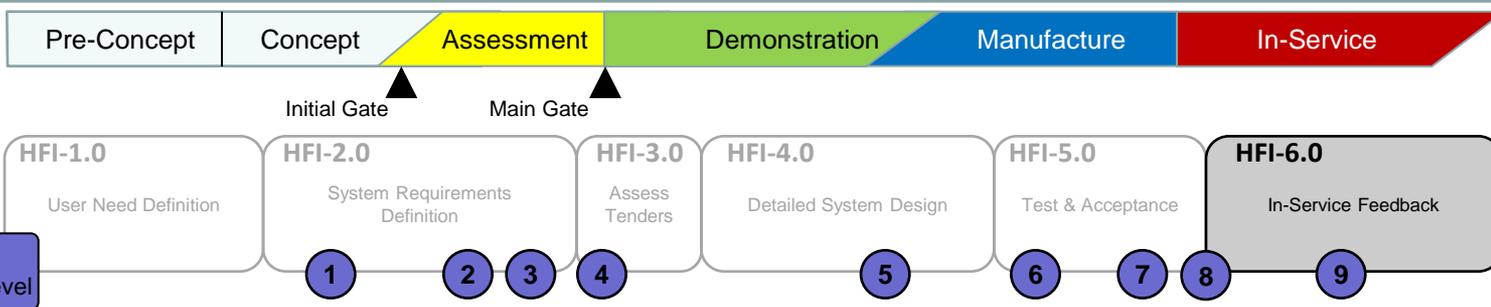
Initial Gate Main Gate



HFI-5.0 Test & Acceptance

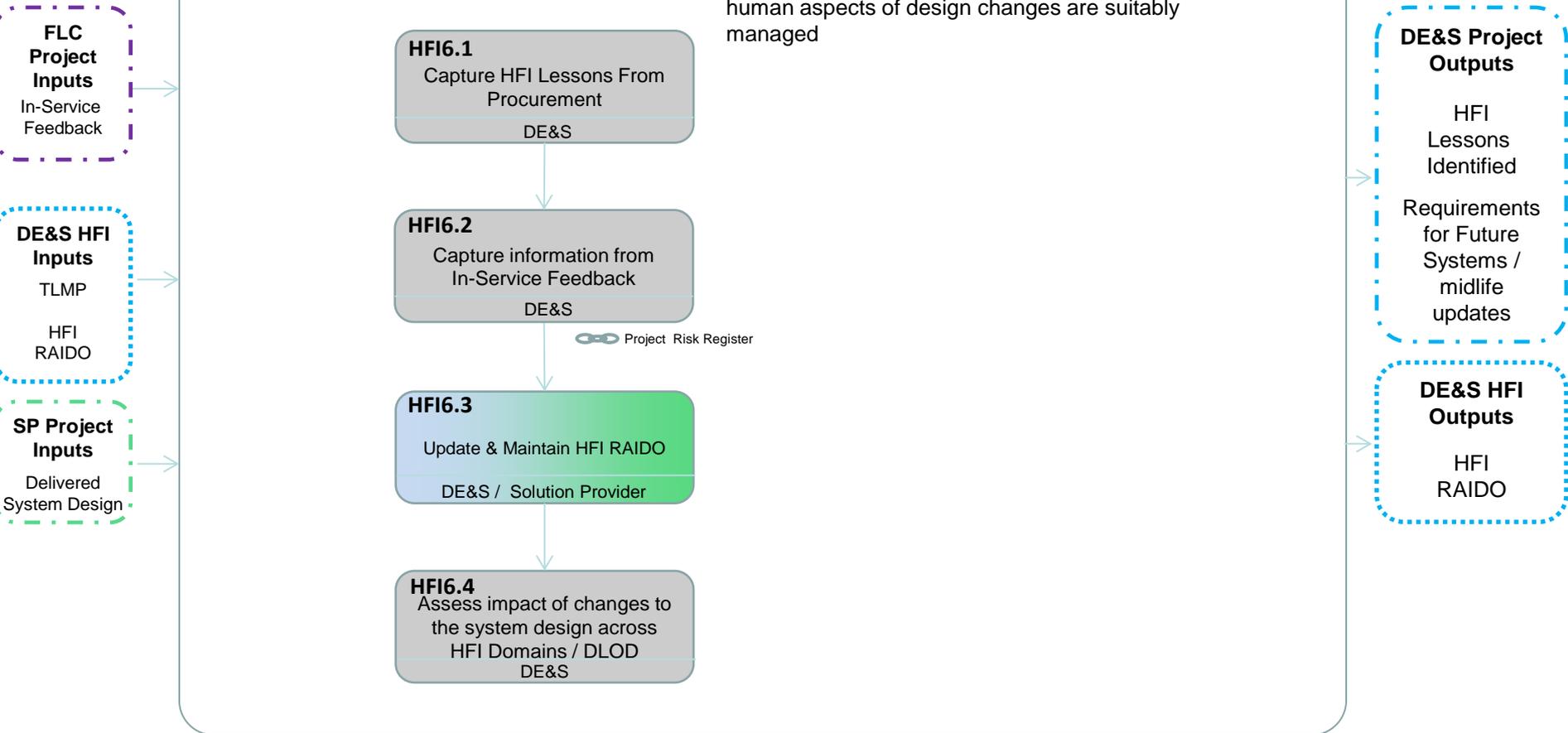
Goal: To ensure that all Human Factors requirements are tested and accepted in accordance with the Integrated Test and Acceptance Plan (ITEAP)





HFI-6.0 In-Service Feedback

Goal: To ensure that the delivered system meets the customer capability needs through life and that the human aspects of design changes are suitably managed

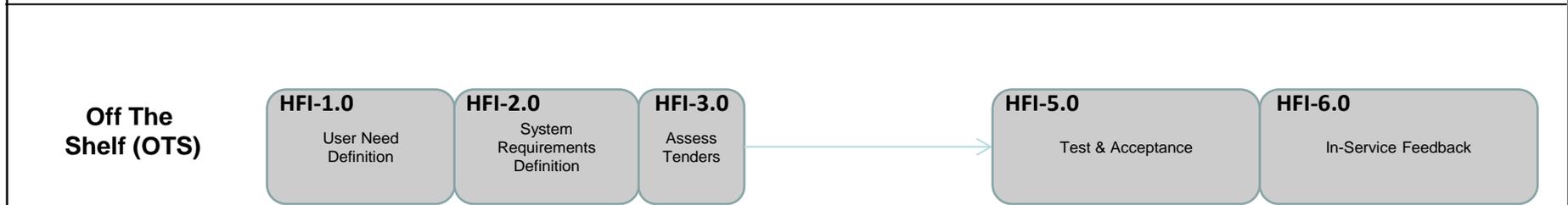


Process Tailoring

NB: Tailoring guidance will be included in each of the process leaflets which will detail the activities associated with each process step.



A completely new item developed and designed when existing systems or products cannot meet the Operational Requirements (OR), this is usually referred to as a Development Item (DI). It is designed to meet certain performance specifications. The HFI process should be followed in full. Some tailoring of the individual activities may be required and the level of effort and attention afforded to sub-activities will depend on the size, complexity and cost of the system being acquired. Guidance on tailoring is included in individual process leaflets.



These are a subset of NDI, where the product has been developed to commercial rather than military standards, with minimal MOD influence on the design. Design data on which to base HFI test and acceptance activities may not be available from commercial sources. If such information is required it may need to be calculated, predicted or measured on delivered products. This procurement strategy often applies to products that have undergone significant user requirements analysis and user acceptance testing during design. Although the HFI Process may not be able to influence the design, the process should be used to:

- Identify risks and concerns associated with the design.
- Identify any necessary risk mitigation activities associated with introduction of the item.
- Identify any required modifications to the design which may be necessary to ensure the item is fit for purpose in its military context.

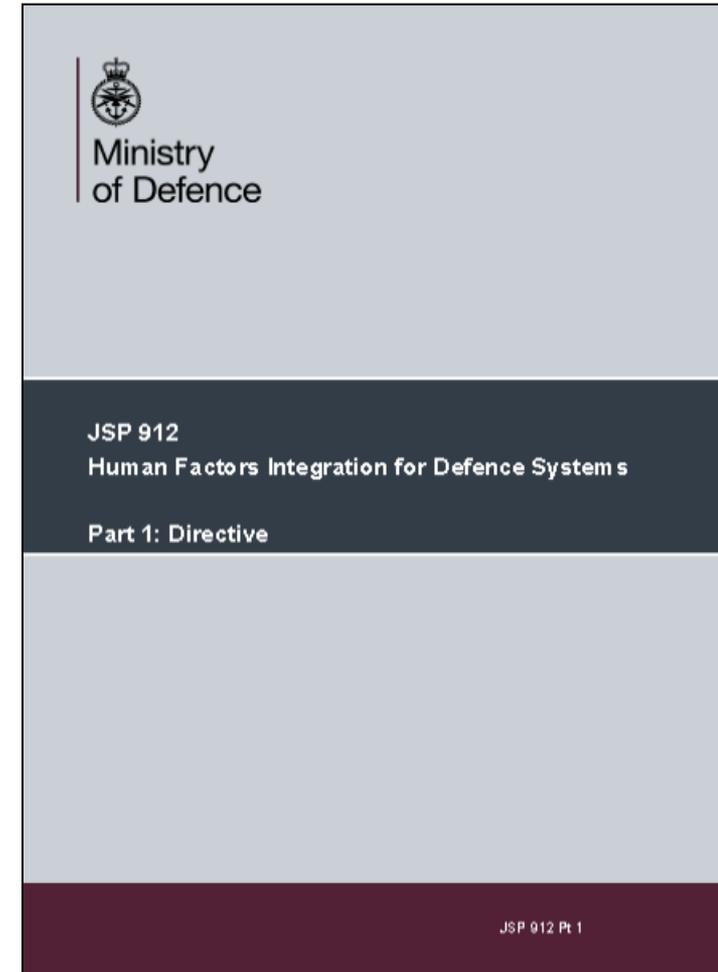
Revised JSP 912

Part 1

- 1.Introduction (Policy, Scope, Applicability)
- 2.MOD HFI Process
- 3.MOD Staff Responsibilities
- 4.HFI Resource Competencies
- 5.References
- 6.Acronyms and Abbreviations

Part 2

- 1.Introduction to HFI
- 2.Overview of HFI Process
- 3.HFI Process: Stages and Steps
- 4.Tailoring the Process
- 5.Roles and Responsibilities
- 6.HFI Resource Competencies
- 7.References



DEF STAN 00-251

Presented as 4 Parts

Part 0

Introduction to HFI, HFI Domains
MoD Contracting Process Using
new HF Process and System
Requirements.

Part 1 - Early Lifecycle HFI Process Requirements

Part 2 - HFI Process Requirements for Solution Provider

Part 3 - HFI Technical Requirements

- Candidate HFURs (5/6)
- Candidate HFSRs (15)



Ministry
of Defence

Defence Standard 00-251 part 0
Draft issue

**Human Factors Integration for
Defence Systems**

**Part 0: Human Factors
Integration**

Critical Factors to HF success

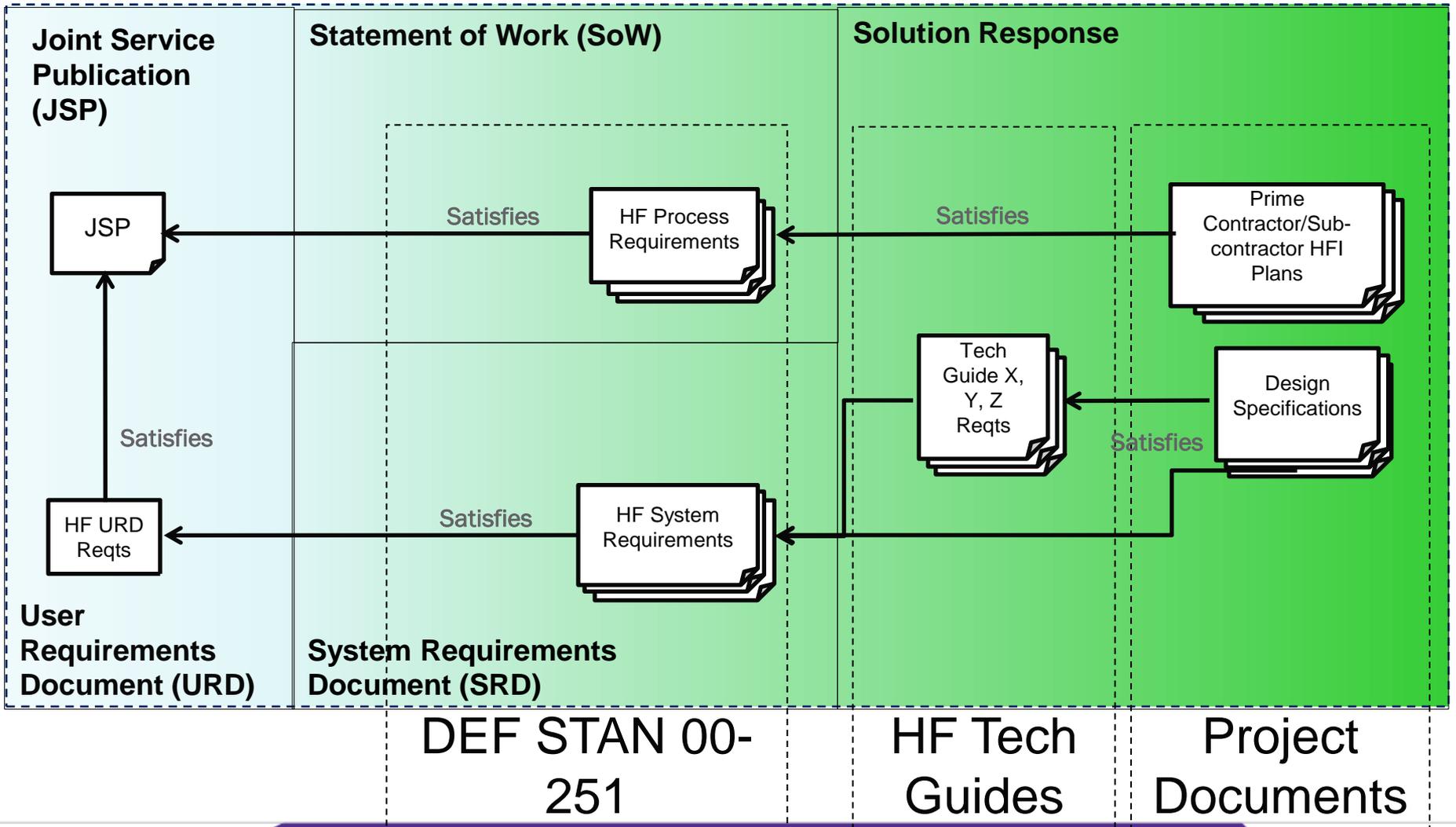
- Right Requirements
 - HF requirements notoriously difficult to write.
 - SMART Requirements (Specific Measurable Achievable Relevant Time Bounded/Traceable).
 - evidence based MOPs.
- Right HF elements within the SOW / Contract with Industry (including contracted deliverables at the right time to provide incremental assurance and acceptance), to facilitate:
 - the adoption of good HFI management processes, integrated with wider project activities.
 - the timely conduct of HF technical activities aligned with the wider schedule.
 - close Project Team / Industry / military user working relationship and Human/User Centred Design processes.

HF Requirements Hierarchy

Colour Key

Customer

Supplier



HFI Process Stage

**HFI-1.0
User
Needs
Definition**

Goal Statement

On behalf of MoD, the Customer Friend role ('the Supplier') shall ensure that appropriate human considerations are included in the definition of user requirements and that sufficient information is provided to the acquisition authority to support the development of people related system requirements.

DEF STAN HF Process Requirement (HFPR)

HFPR-1.1 An HFI Focus shall be appointed to represent the Front Line Command Organisation (HFI 1.1)

HFPR-1.2 The HFI Focus shall provide an HFI Strategy (HFI 1.2)

HFPR-1.3 The Human Component of Capability need shall be identified (HFI 1.4)

HFPR-1.4 The Human Component of Capability shall be adequately reflected in the User Requirement Document (URD) (HFI 1.6)

HFPR-1.5 HFI Input to the Single Statement of User Need (SSON) shall be provided (HFI 1.5)

HFPR-1.6 HFI input to the Concept of Employment (CONEMP) shall be provided (HFI 1.7)

HFPR-1.7 The Target Audience shall be identified (HFI 1.8)

HF User Requirement (HFUR) Goal Statement

The Capability shall integrate people to achieve the required performance under all conditions of use in accordance with the TAD, ConEmp and ConUse.

HF User Requirement (HFUR) For SSUN

HFUR-1 The Capability shall accommodate the characteristics of human capabilities.

HFUR-2 The Capability shall provide for human habitability.

HFUR-3 The Capability shall protect the Human from adverse effects of system use.

HFUR-4 The Capability shall integrate humans in ways which maximise System Safety.

Generic DEF STAN HF System Requirements

HFSR-1.1 The System shall accommodate the anthropometric and physical characteristics of the specified user population (including the relevant clothing corrections)

HFSR-1.2 The System shall accommodate the sensory characteristics of the specified user population.

HFSR-1.3 The system shall accommodate the communication needs of the specified user population.

HFSR-1.4 The System shall accommodate the cognitive capabilities of the specified user population.

HFSR-1.5 The System shall provide appropriate means for the human to make control inputs to the system.

Technical Guide Requirements

Human Factors within Requirements

- HF requirements that are contractually verifiable/testable can be challenging to write
- Examples of bad HF requirements:
 - The system shall be easy to use.
 - The system shall be usable.
 - The system shall not place excessive workload on the user.
- Examples of better requirements:
 - The system shall allow the user to complete [task] in [time] under [conditions].
 - The system shall accommodate the anthropometric and physical characteristics of the specified User population (including the relevant clothing corrections).

Human Factors Integration – Myths and Excuses

- It's all common sense, I'm a human after all!
- I'll design for the average/me rather than the whole population
- I can just rely on end users opinions.
- HFI is only about the person that uses the system.

- Technology/automation is the answer.
- I can use training to overcome design faults.
- It's just a technology project.

- It can wait until after user trials
- HF is just costly gold-plating and therefore optional.
- I have tight deadlines, I don't have time to do HFI.
- It's COTS/MOTS, I don't need to/can't do HFI.
- I haven't been trained.

Final Thoughts

- Who is the target audience?
- What are we trying to get them to do?
- Where are the boundaries?
- What language should we use?
- Is HSI/HFI the best/right term?
- How do we communicate the value?

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