



An Update on INCOSE UK's Human Centric Systems Engineering (HCSE) Working Group

Mark Anthony / Michael Boardman

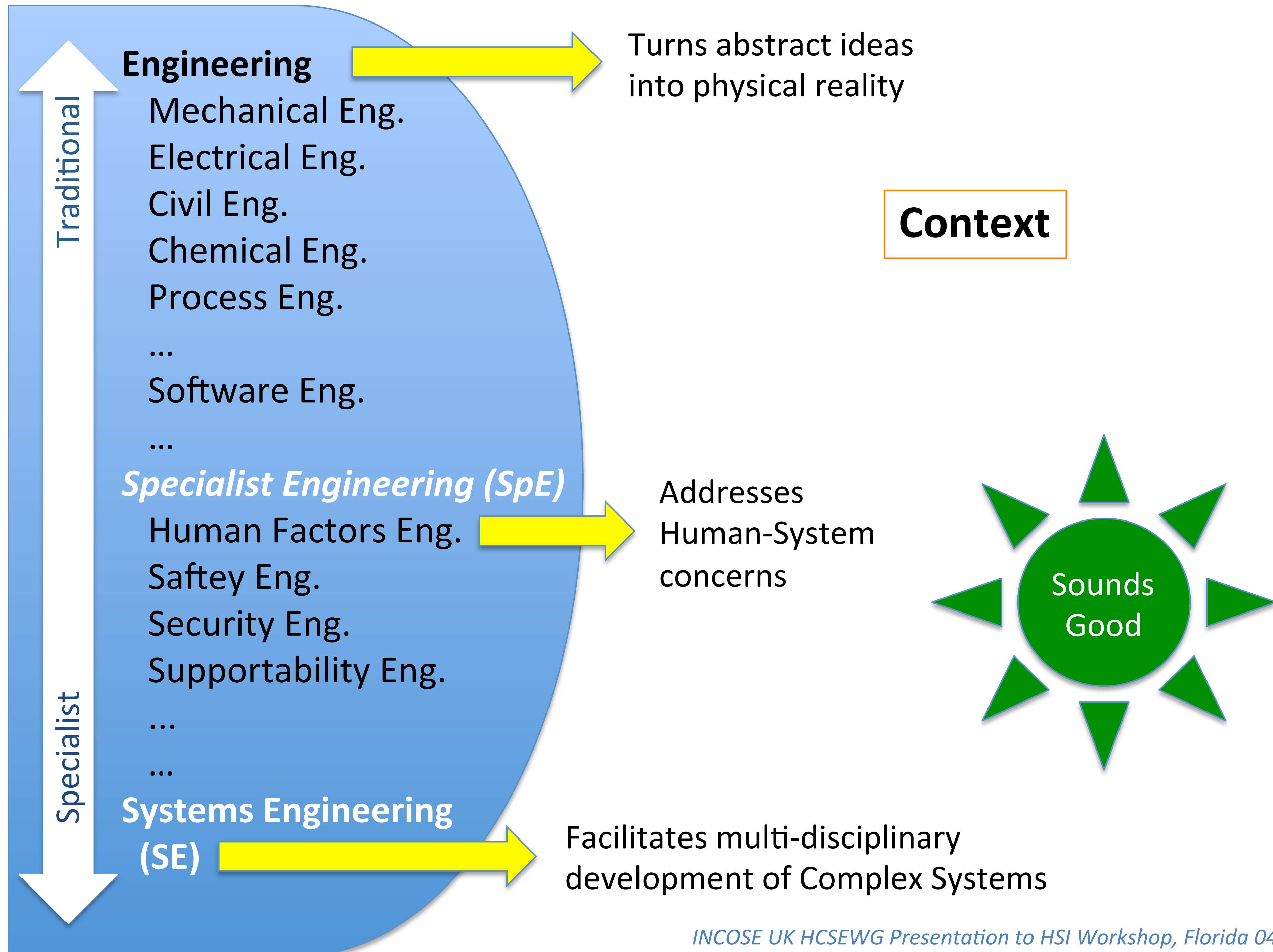
Presentation to HSI Workshop, Florida, 04OCT 2016, on behalf of:
INCOSE UK: Human Centric Systems Engineering Working Group
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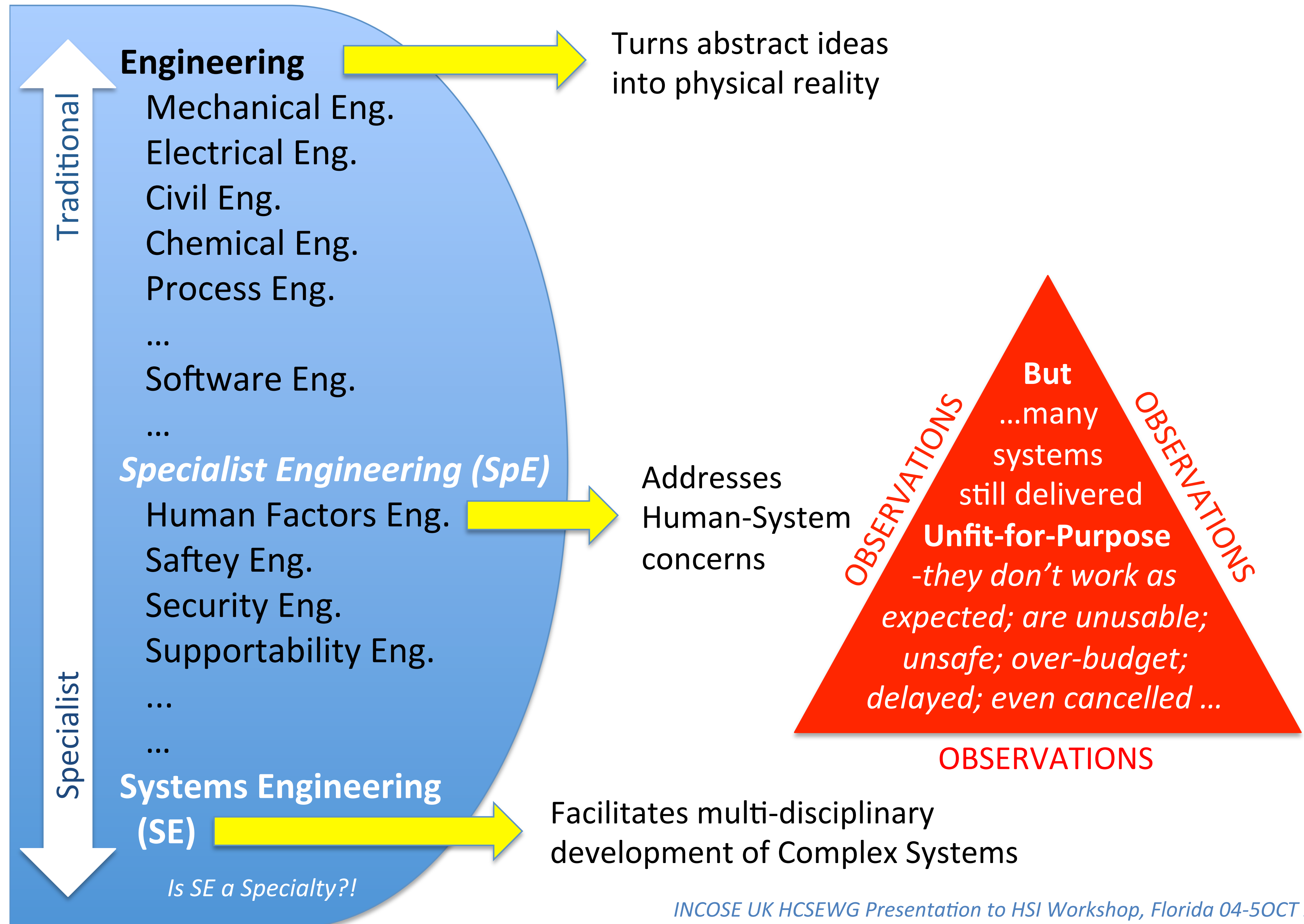
Coming Up

- Context
- Current SE Practices, Concerns and Opportunities
- HCSEWG Strategic Ambitions
- Key Objectives
- History
- Activities & Progress

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Current Practices, Concerns & Opportunities



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Current Practices, Concerns & Opportunities

Real World SE Practices Varied and Inconsistent

- Every nation, culture and business is unique, so every instantiation of SE is different
- All subject to business dynamics
- Some do SE better than others;
All can do better!

Differences also apply to related
Specialist Engineering (SpE)
processes, e.g.: *US Human Systems*
Integration (HSI) & UK Human
Factors Integration (HFI)

Concern

Systems
Engineering
Observations

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Concern

Systems Engineering Observations

Maturity / Immaturity of SE Best Practice

Concern

- SE consensus *still* developing (*ask what constitutes SE Research and diversity of views evident...*)
- **Incomplete Guidance / Standards** (*Some 'Whats' but little How, Who, Why, etc.*)
- Inconsistent use of terms (e.g. Architecture: Views & Viewpoints)
- Much 'standardised' SpE Best Practice available (*HFI over 20yrs old*)
- Most poorly integrated into SE, so under-utilised
- Lack of parity between PM and SE Lead

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Concern

Relationship of SE to SpE

- Late entry in INCOSE SE Handbook demotes perceived value of SpE
- SpE seen as less important than SE
- SpE inclusion in SE often to chance
- SpE equated to extra cost & delay

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Concern

Poor Awareness and Understanding of SpE Value Mitigating / Managing Risk

- Risks mitigated by SpE poorly understood by SE Leads, SE Practitioners and Programme Managers (PM)
- Risks recognised too late

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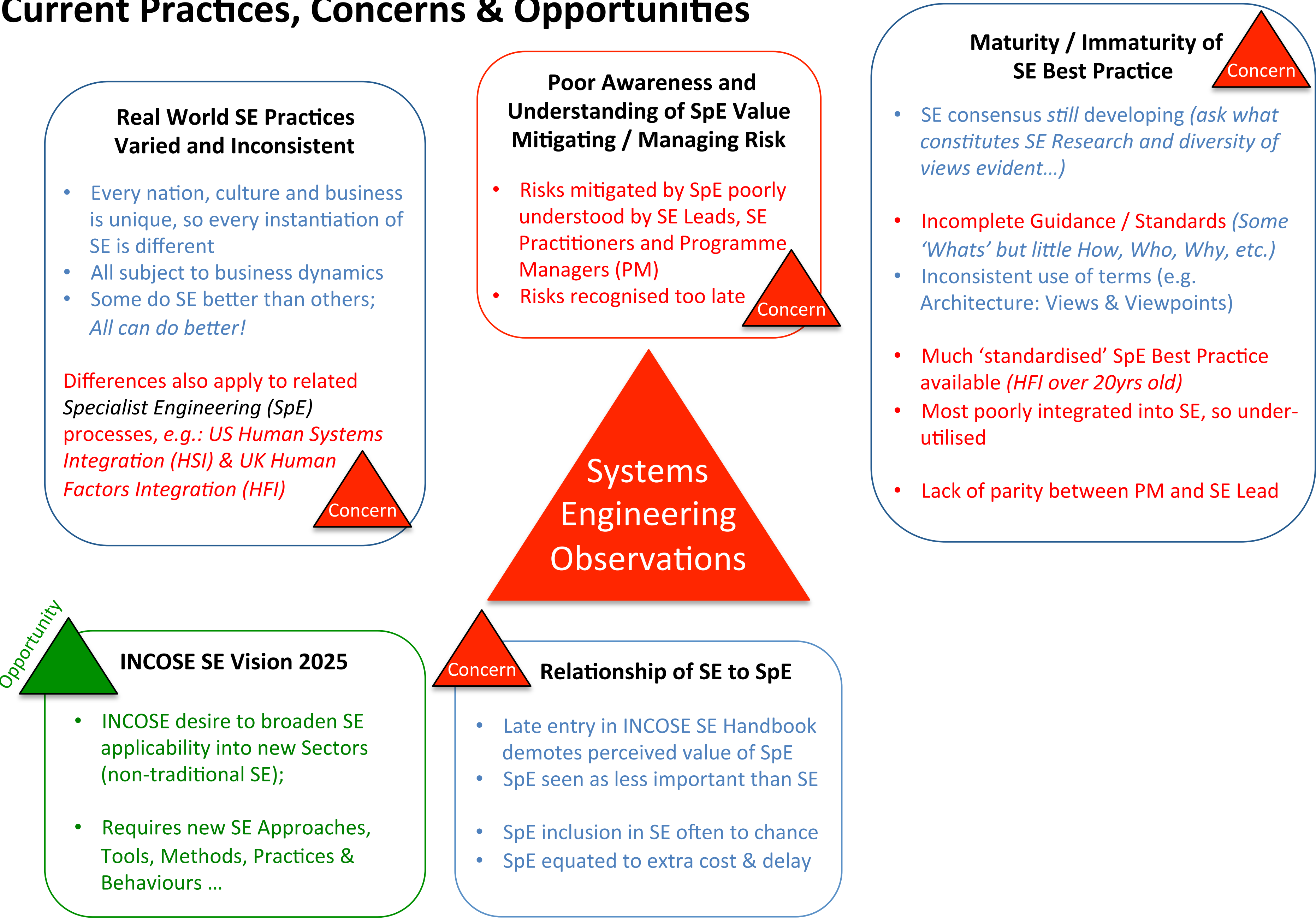
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Systems Engineering Observations

INCOSE SE Vision 2025

- INCOSE desire to broaden SE applicability into new Sectors (non-traditional SE);
- Requires new SE Approaches, Tools, Methods, Practices & Behaviours ...

Opportunity

Concern

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Conclusion:

Need easier way to ensure human issues accommodated;

Need HF / SpE addressed in SE by default





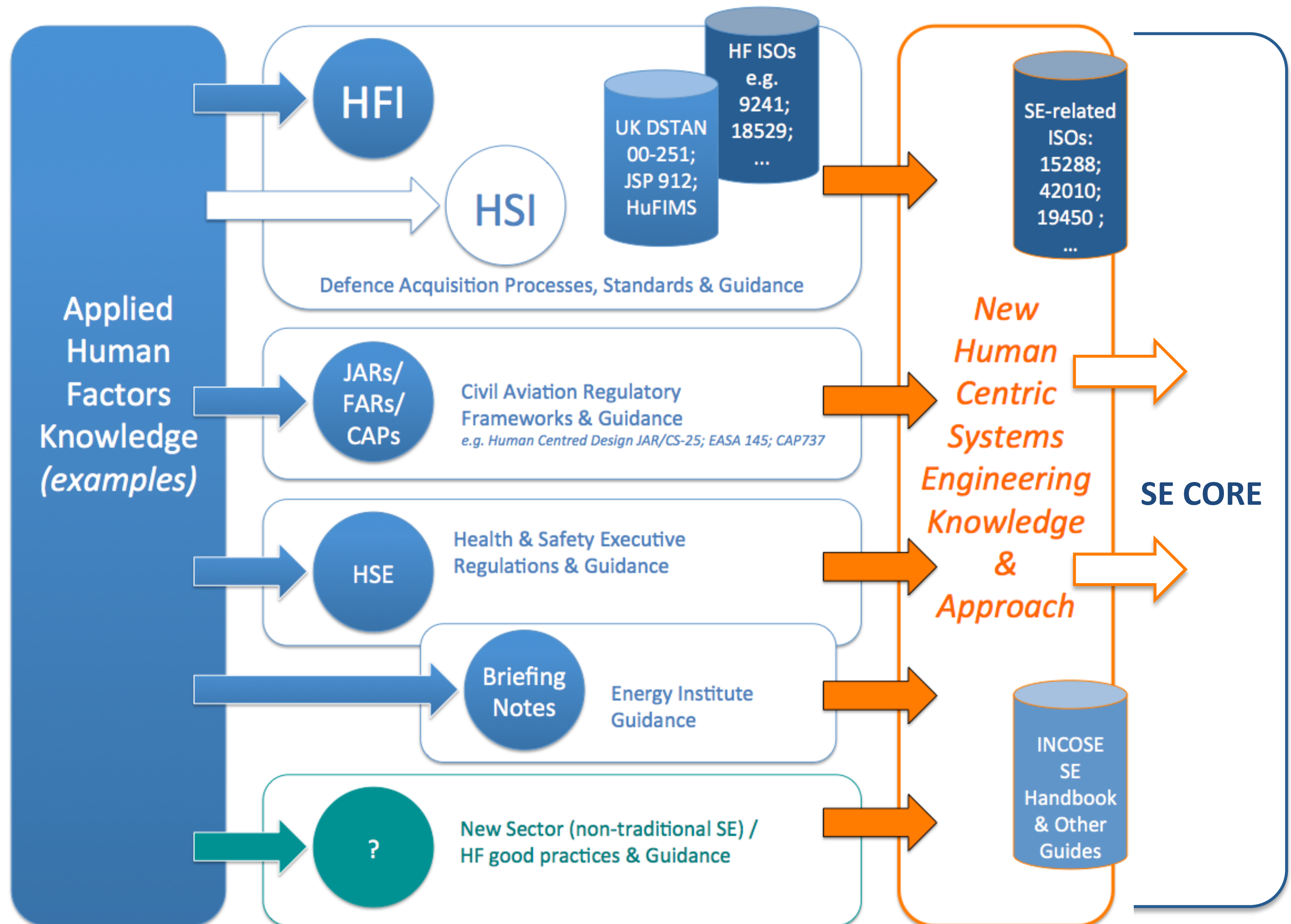
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Strategic Ambitions

- Develop **Comprehensive Coherent HCSE Framework** to ensure human concerns are addressed across the SE lifecycle (from system conceptualisation to end-of-life)
Build on extant HF Applied Knowledge & processes; Incorporate essential SpE influences into mainstream SE activity (i.e. the SE 'Core') to reduce risk from accidental or 'intentional' SpE exclusion: Practice HCSE by default
- Develop **additional mechanisms** to facilitate greater SpE inclusion
Early Systems Architecting and Model-Based Systems Engineering are 2 such avenues; Find and develop others
- Identify **New Best Practice** in non-traditional SE sectors (e.g. health, energy)
Determine which to include in our new universal SE Core and which might constitute more sector-specific 'flavours' to complement it
- **Raise Awareness**, Promote and Guide advocated HCSE Best Practices
Develop INCOSE information / technical guidance products, How-To workshops, etc.

HCSE is a **Pathfinder** we hope may help other SpEs to integrate better with SE, driving the development of a more comprehensive SE Core.

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Key Objectives

- Identify organisations across diverse sectors practicing Human Factors
- Review where possible what approaches, standards, guidance they follow
- Determine what constitutes best practice (develop criteria)
- Consolidate Best Practice findings into core elements of HCSE and sector-specific or sector-cluster 'flavours' of HCSE
- Seek opportunities to formalise HCSE and its Best Practice in relation to a 'universal' lifecycle approach and flavours of enterprise-based development processes
- Raise awareness of the HCSEWG and its HCSE developments:
 - *Information products; workshops; WG website; other outputs and activities*
- Develop cross-linkages with other INCOSE WGs and other Professional Bodies



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History

Q3 2014: Proposal for new **INCOSE Human Factors Integration WG** put to INCOSE UK Council (supported by *UK MoD-Industry HFI WG*). Case highlighted need to address failings in SE to adequately accommodate Human Factors
Extant HSIWG supported US DoD acquisition processes but nothing similar supporting UK MoD's (different HFI) approach. 1st Step: Formalise HFI by bringing it into the INCOSE SE fold. WG Approved.

Q1 2015: 1st Meeting of **INCOSE HFIWG**. Members felt focus should be broader than HFI: *humans as integral parts of Systems* rather than add-ons to be integrated later.
WG Renamed: **HCSEWG** Vision for HCSE as overarching comprehensive framework addressing human issues in SE takes root.

Q3 2016: 6th Meeting: Workshop on HF & System Architectures.
Current membership of HCSEWG: 60+



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Activities & Progress

- Building understanding between 2 core participating member communities:
 - *SE*
 - *SpE (predominantly HF & Safety so far)*
- Identifying key areas of concern, including:
 - *Workshop 2015: New Sectors of interest and anticipated Types of BP*
 - *Workshop 2016: HF and Systems Architecting*
- Information Products in development:
 - *Introduction to Human Factors (INCOSE UK Z-Guide)*
 - *Human Factors Integration (INCOSE UK Z- or Omega Guide)*
 - *INCOSE Preview Article / INCOSE UK ASEC2015 and 2016 Posters*
- Formal / reciprocal links established with external entities:
 - *UK Ministry of Defence-Industry HFI WG*
 - *Energy Institute's Human and Organisational Factors Committee (HOFCOM)*
- INCOSE WG Links:
 - *Architecture, MBSE, Organisational Capability WGs*

We hope to establish stronger links with our colleagues in the HSI WG too!