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**Draft**  
**HFI CMM Study**  
**Recommendations on data management**

**HFI CMM Study - Work Package 5**

**July 2001**

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## 1 Summary

This document presents findings and observations from the HFICMM project related to the design, performance and management of HFI process risk assessments. Most of the observations conclude with recommendations for process assessment in general and HFI process assessment in particular. These include the use of graphical representations to facilitate communication between assessor and assessee, the selection of the most suitable approach for an assessment and the impact of human-system process models on industry and HF research.

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## **2 Need for data management in HFIPRA**

- 2.1.1 The plan for the HFICMM project included a work package on data management for HFIPRA. The inclusion of a work package in this area was based on two assumptions and one risk. The first assumption was that the process assessment group in DERA Malvern (SCE, now QinetiQ KIS) would use formal computer-based tools and the HFI process model would need to be installed in this model. The second assumption was that the HFI process model would be a small variation on ISO 18529. The risk was that DERA SCE would not collaborate in the definition and use of the model and a new framework for full assessment would be required. Neither of these assumptions were correct and fortunately the risk did not materialise, therefore the deliverables from this work package were not required.
- 2.1.2 The emergent (and main) project risk was that we unexpectedly had to develop an almost completely new process model. This placed considerable demands on project resources and the lack of need for the data management outputs meant that this workpackage became largely obsolete. However, a number of interesting issues relating to the handling of information during process assessment from the human factors point of view were identified and developed in the HFICMM project. These are recorded in this document.

## **2.2 Structure of this note**

- 2.2.1 This note contains a number of sections that present issues associated with process assessment from the point of view of its human factors, the management of information and the organisational ergonomics of process improvement. Annex A presents a summary of alternative approaches to process assessment including DERA SCE's model-independent approach to process risk assessment. The need for further work on the human factors of process assessment is discussed.

## **3 Process Assessment - an HF point of view**

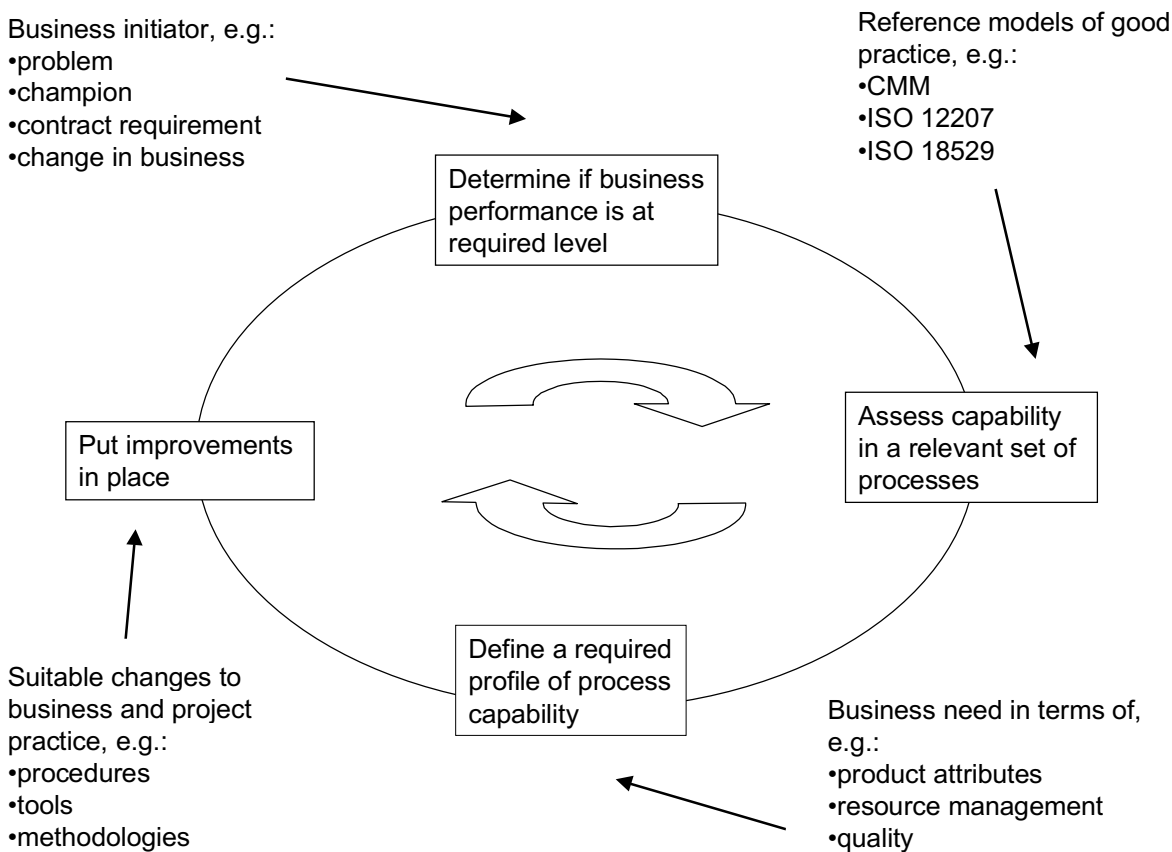
### **3.1 Use and presentation of models and assessment tools**

- 3.1.1 Assessor needs to take control and run the assessment. If this does not happen there will be a problem with authority of the conclusion and the final presentation. The lead assessor needs to have a slick potted introduction with a description of the benefits. Just because the sponsors know the reason the assessor is present this does not mean that the assesses do. Cover and contextualise assessment and purpose of assessment using a standard script (will be needed several times). A strong distinction should be made between the assessment and training in process assessment & improvement.
- 3.1.2 Tools and models should be presented in a positive manner even if they are in a draft form. On the EC TRUMP project a useful ground rule was established "don't question the model". Debriefings should use a questionnaire in order to guide the review and achieve uniformity. There is a risk that assesses will come up with 1001 things wrong with the process model, especially if they are unfamiliar with the full scope or purpose of the model.

### 3.2 The process assessment process

- 3.2.1 Annex E of the HSL model contains a range of advice to assessors and should be studied in conjunction with this document.
- 3.2.2 Process improvement is an iterative activity. Figure 1 summarises the processes implemented in the examples in Annex A and presents them as a cycle comprising the following stages: review of business need, selection of relevant reference processes, assessment of current capability, definition of required performance, deciding how to make up any shortfall (and how to preserve good practice), and organisational change. Assessment of current capability is made by examining one or more projects, ideally covering a range of lifecycle stages (from initiation to completion).

Figure 1. The process improvement process



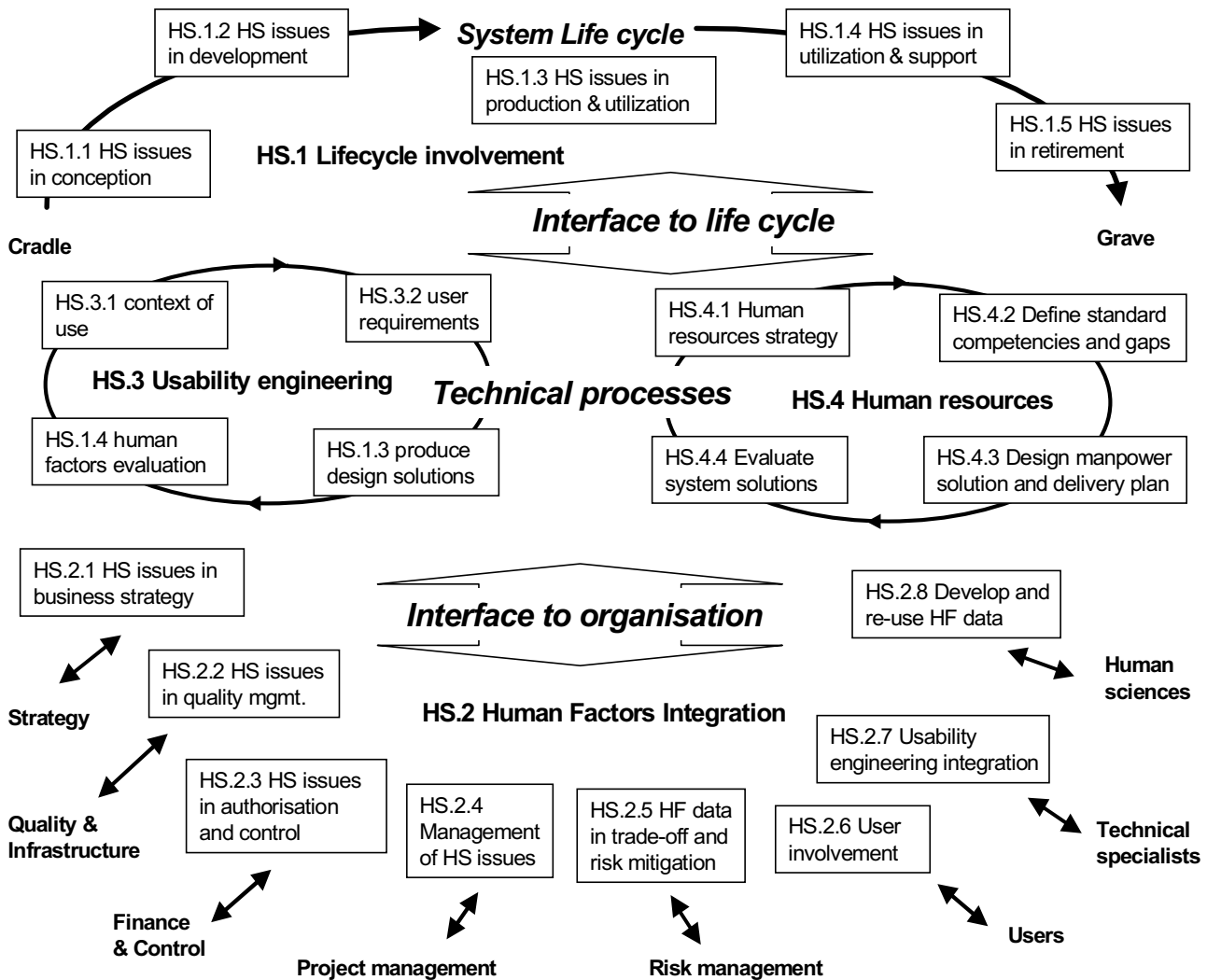
- 3.2.3 The barriers to process improvement are very largely the same as the barriers to the uptake of any new system. During the closing plenary of SPI'96 Giannetti coined the slogan "People do Processes" to encapsulate this issue. Sociotechnical approaches should be applicable to the introduction of new processes.

### 3.3 Ergonomics of site visits

- 3.3.1 Large scale, full-model process assessments follow a similar agenda to audits. A preliminary report of findings is usually presented on the last day of the assessment. The requirement to have a conclusion within the visit and the need to synthesise and capture a clear understanding of the issues emerging during the assessment place great strain on the lead assessor. One effective means of managing this stress is a

- daily schedule that includes sufficient time for collating all findings made during the day and a morning briefing session that allows adaptation to the availability of assessors and assessees and to the emergence of new information.
- 3.3.2 The assessment team should all stay in the same hotel and arrive the day before the commencement of the assessment. Transport to the assessee's site should be easy and reliable. The assessment team require a room for use as a "base" at the assessee's site. Meals take a long time and should be included in the agenda. It is convenient to use one meal as an opportunity for the team to interact socially. Work should therefore not be planned during meals, but if useful points emerge a clear record should be made at the time.
- 3.3.3 A local organiser is essential and should be selected early and involved in all planning meetings. The local organiser and the process owners for the assessee organisation should organise a briefing session for the assessors covering the status of the projects to be assessed and the processes methods and techniques in use. Documentation describing all projects, methods and techniques should be provided to the assessor well in advance of this first site visit.
- 3.3.4 The use of specialist terms and "jargon" by both the assessee and assessors is very likely. A lexicon of common terminology should be established, distributed and used by the assessors. A structure allowing "time out" to be called by assessors or assessee when a term is not understood should be established. A briefing session should be given by the assessor to the assessee at least two weeks prior to the assessment at which the purpose of the assessment, the method and model to be used and the lexicon of common terms are presented.
- 3.4 Presentation of results**
- 3.4.1 The clear presentation of results is a key factor in the success of process assessment. A common problem for those being assessed is a common understanding of the structure and relevance of the assessed processes to their own project or organisational unit. The traditional form of presentation is as a series of textual descriptions of non-compliances or risks or areas for improvement. Nokia have developed a series of charts that summarise the performance of processes in the ISO/IEC 15504-5 exemplar model.
- 3.4.2 The authors and the KESSU project independently concluded that a graphical presentation of the process model (a **process figure**) would be easier to grasp and, if this presentation were used for both the briefing and presentation of results, the continuity would aid an overall understanding of the goals and findings of the assessment. The authors propose that tailoring would be more simple with a graphical presentation of the model. The authors also propose that the presentation of the results would be greatly aided by colouring of the process boxes in the figure to correspond with the required and/or assessed levels of maturity for each process, and annotation of the process figure to indicate specific issues related to the assessment.

**Figure 2 — Human-system life cycle process figure**



3.4.3 Timo Jokela working with the KESSU project in Finland has taken the use of process figures much further. The process figure is used as the mediating representation between the assessor and the assessee. Assessments are largely group activities. The process figure is used to focus and record the discussion. It is annotated and elaborated with the organisation's taxonomy and work products, and with small graphics that indicate the level of performance.

3.4.4 Another use of the process figure would be as the main screen in a hypertext presentation of the HSL model. The existing structure could be "buried" under the figure and the main components of the process model (process description, outcomes, practices and work products presented as popups, drop-downs and tear-off sheets. The Annex A assessment detail and elaboration of work products or cross-references could be provided on larger overlays or separate pages. This version would be more accessible to undirected browsing and visual search. It could also be used in training and the KESSU-style large group assessment as described above. Additional fill-in forms could be used to record the results of an assessment and the conclusions could be automatically presented as colouring of the process boxes in the figure.

**3.5 Format of the report**



- 3.5.1 Reports that present both the results of an assessment and suggestions or recommendations for the improvement of either projects or organisational units should clearly separate the data, the analysis and ratings, the discussion and observations and any recommendations arising directly from the assessment. In the case of assessment for process improvement additional input from the assessors may also be requested. In this case opinion should be clearly separated from the other material in the report and this should include an explanation of the terms under which this is provided.

## **4 Organisational ergonomics of process assessment**

### **4.1 Impact of HSL process assessment**

- 4.1.1 The HSL is a clear, succinct model of internationally-endorsed best practice. The implications of the introduction of ISO 13407, ISO TR 18529 and the HSL model are profound, and potentially include liability issues. Designers who cannot trace their design processes to ISO 13407 are potentially at risk since a legal defence for using an approach other than the one that has been internationally discussed, agreed, unanimously voted and published world wide is difficult at best. The status of ISO 13407 as an EN (European standard) also has implications in Europe. The European Display Screen Equipment Directive requires that the “principles of software ergonomics” are applied in the development of software. When seeking a definition of principles it is hard to argue against an international standard.
- 4.1.2 The ability to measure the extent to which good practice is being followed (using ISO TR 18529 or the HSL model) has further implications:
- it is likely to promote uptake of user-centred design, on the principle of "what gets measured gets done"
  - it raises the competitive stakes by enabling suppliers in competitive markets to provide validated product endorsement based on process metrics.
- 4.1.3 The curricula for courses in Design, Systems and Software Engineering, Human Factors and HCI need to take account of the existence of an authoritative standard for human-centred design. However, HCI training material that gives due recognition to the European Display Screen Equipment Directive is the exception rather than the rule. Indeed, a recent CCTA publication on 'best practice' in user-centred design, which ignores both the Directive and resulting legislation, and the standards under discussion here.
- 4.1.4 Software and System Engineering have made a similar move from method to process, e.g. from SSADM and Information Engineering to the development of standards such as ISO/IEC 15504, the Software Engineering Institute's Capability Maturity Model (CMM), ISO 12207 and ISO/IEC 15288. The development of a process model for user-centred design that is compatible with engineering models and quality standards enables usability professionals to form new alliances (with quality managers, process architects and Software Process Improvement initiatives), and to take advantage of accepted initiatives for process improvement. For example, ISO 9001:2000 includes a requirement for continuous improvement of selected processes. The availability of a process model for human-centred design eases its inclusion in the scope of continuous improvement. Similar benefits can be obtained from a process model compatible with CMM and ISO/IEC 15504.

4.1.5 It is also important to note that globalisation and international collaboration are forcing convergence on single standards, in contrast to the profusion of methodology guides and standards promoted in the 1980's. ISO 13407 fits into this new class of standards. As the new version of ISO/IEC 12207 (incorporating a usability process based on ISO TR 18529) and ISO/IEC 15288 (incorporating Human Factors issues) emerge, there will be further benefits to be obtained.

**4.2 Range of types of assessment**

4.2.1 The guiding objective in process improvement is benefit to business. A quality function deployment approaches to planned process improvement is proposed and the selection of the processes should be based on a suitable combination of product attributes and business goals. The examples of the implications of ISO12207 and ISO 15288 given in section 4.1 illustrate the range of possible business drivers for process improvement. Whatever approach is used, cost-benefit depends on fitting the approach used to the organisation's process needs, and some form of assessment of current practice is always necessary in order to identify strengths and weaknesses. This assessment need not be very rigorous or cover a wide range of processes. Table 1 describes approaches to assessment and the benefits given to particular types of organisation.

**Table 1. Uses of process assessment**

		Type of organisation				Description of the approach in use by organisations
		Contract orientation	Service orientation	Quality orientation	Enterprise/ Partnership	
<b>Approach used</b>	<b>Certificate</b>	Preferred	Used		Used	Achievement of a target level of organisational capability for a generic set of processes. (The most traditional approach, e.g. CMM)
	<b>Risk assessment</b>	Used			Preferred	Capability in a set of processes relevant to risks of a particular mission or project.
	<b>Profile</b>		Preferred	Used		Capability rating in a wide range of processes. Give general picture against which to improve.
	<b>Workshop</b>			Preferred		Informal examination of a project or organisational unit against the requirements of a process model.
<b>Rationale For organisations to use this approach</b>		Certificates provide a testimonial of capability. Risk assessments are used by clients. Contracts are placed subject to specified improvements	The most common use is for benchmarking against other organisations. Certificates have a built-in reference. Profiles are more diagnostic and derived from business goals.	An organisational focus on process improvement is commonly found in generic product development, especially in Japan. Capability may be assessed informally.	Organisations combining to develop or operate a system need a clear understanding of weakness in key areas. This includes the customer and user organisation.	

- 4.2.2 Whichever approach to assessment is to be used, it needs to be tailored and focused for efficiency. In practice, the efficiency of any approach to process assessment depends on designing the assessment to examine only the processes which are related to the selected drivers for process improvement. Examples of drivers are risks related to a particular contract, competitor capability and defects which occur across versions or lines of products. With more formal assessments this tailoring takes place prior to assessment. Workshop-style assessment can be more flexible and tailoring may take place within the workshop itself.
- 4.2.3 There is an important issue related to process assessment, which has been neglected by the software assessment community. There is a big difference between formative evaluation for process improvement and summative evaluation for capability determination. Flanagan's very simple scale was aimed at process improvement, he cared much more about culture and attitude than process. The Philips HumanWare work appears to try to deal with both. The literature around process improvement is very simplistic in terms of organisational change or evaluation, the evaluation research literature might help. The importance of management aspects will depend on the culture and structure of the organisation, on who you are talking to, and on your intervention strategy. how important are company procedures to the people you are talking to, and who writes them? For example if people have a look at the CMM Level 2 KPA's over coffee (e.g. requirements management, configuration management) - is management important there? There are some companies where if it isn't in the book it won't happen and some companies where they can't find the book. The people who write about Process Improvement are often away from the production line and live in companies that believe the book is everything, and adopt the managerial ethos in full. There are exceptions to this. Mintzberg is very helpful as an aid to thought if seeking a way to characterise the different company structures and cultures.

## **5 Conclusions and further work in this area**

### **5.1 Work to do**

- 5.1.1 The HSL model, ISO 13407 and ISO TR 18529 present a definition of user-centred design expressed in the language of its user - the project manager. This definition can be integrated with definitions of software engineering and system engineering. This represents a quantum step forward for Human Factors and HCI.
- 5.1.2 The immediate implication of these standards is that software engineers, system engineers and usability professionals have a professional responsibility to adopt this definition of good practice as their baseline. This has cultural implications both for the technical focus of engineers and for the research focus of usability professionals. It also demands that earlier definitions of HCI (in terms of methods such as formal analysis, user interface design, usability testing or as specialist consultancy) are recognised as 'steps on the way' and consigned to history. The implications for teaching and training are similar; software engineers and human factors students need to be taught about these standards, why they are useful and how to do work which complies with them.
- 5.1.3 Usability is being pushed to centre stage in the marketplace. For example, the usability of web applications and generic IT products has become the subject of commercial importance. User-centred design has now reached a level of definition that allows Human Factors and HCI to meet these challenges, i.e. there is an engineering

statement of best practice against which its capability can be assessed. It is a powerful tool to introduce and train user centred design in organisations (through assessments).

5.1.4 The working group developing ISO 15504 co-ordinate an ongoing collection and analysis of the results of process assessments. These are called the "SPICE" trials. There would be good sense in collaborating to include the results of HSL and ISO TR 18529 assessments into this database and to start using the analysis of assessment type and metric in the development of HSL assessment tools and methods.

5.1.5 The roll out of HFI/HFI PRA can be seen as a process improvement exercise on the HFI community (rather than a project or an organisation); the combination of the various standards and guidance activities is to develop an agreed set of processes to work to and to start to get people up the maturity scale. It might be interesting to see how this would look using the SEI CMM IDEAL PI framework. UK differs from the USA in that they used 46855 as a single description of processes for ages and then had various MANPRINT directives and now have perhaps not much but the prospect of integration with software engineering, which the old standards didn't do.

5.1.6 The original software CMM contains some assessment of staff expertise and training; without trying to promote a closed shop, where would HFI PRA get the equivalent from?

## **5.2 The place of standards in HF process assessment**

5.2.1 There is an issue of how large is the body of endeavour we are trying to explore and describe? The scale and place of entities such as improvement, assessment, cultural effects, formality are as yet unclear. Observations from HFICMM and the KESSU project in Finland provide some input. These can be distilled into two observations on the current discussion:

- The HF community is expected to have the most to say regarding cultural aspects of process improvement. Any work we do in this area will be of interest. Process assessors and process improvement consultants seem pretty bad at addressing the social and human practicalities. As far as the HFICMM project is concerned our findings (limited as they are) are reported in this report. As far as the recent EC "TRUMP" project was concerned the majority of the report to the Inland Revenue was concerned with taking the findings back into the client in a sympathetic manner. The structure of that particular client was such that they needed reports rather than hands-on coaching.
- From a formality point of view there is a need to follow the emerging nomenclature of process assessment in any description. Most of ISO/IEC 15504 is concerned with how to do assessments so that they are valid, reproducible and comparable. This is because many assessments are used as part of contract where the liability issues are horrendous. This also applies to a lesser degree to process improvement. If you assess and recommend and the product ends up less usable at best your reputation will be lost. At worst a US company is likely to take legal action for damages (and for a high integrity system the estate of the deceased may have an interest as well). Formality gives protection, and also allows transfer of general expertise about assessment in a structured manner. The conformance requirements of ISO/IEC 15504 are a realisation of this formality. To paraphrase these requirements in English "The model in the standard is internationally agreed as good practice (i.e. safe to use as a basis for assessment of a particular project or organisation). If you want your assessment to be safe, valid, reproducible and comparable then you should use an assessment model that is directly derived from the reference model. You shall state

where your assessment model is the same as the reference (12207, 18529, TR 15504 etc.) and where it is not." In the area of assessment ISO/IEC 15504 says that you need to follow a set of steps to process improvement. These steps give you a safe, valid, reproducible and comparable baseline for improvement.

5.2.2 Assessments that are more informal in terms of the model used or the process followed tend towards consultancy or training. And there are a large number of process improvement consultants working in this area, in fact the whole of TQM is in this area (Richard Zultner is a good example). There is absolutely nothing wrong with this, and the KESSU project has found that at the current average level of maturity regarding usability such an approach is likely to be more widely used and beneficial. However, the progressive loss of safety, validity, reproducibility and comparability as one moves towards project-specific training and consultancy needs to be taken into account.

### 5.3 General (HF/HFI)

5.3.1 The human sciences can make contributions to the development of HFI and HFIPRA at both the cognitive and organisational levels:

- The usability of Process Improvement in general: the HCI community has much to contribute to understanding Process Improvement for processes beyond those that deliver usability,
- The social and human science aspects of organisational change have yet to be investigated fully in the context of process maturity,
- The context of application of process models: the limits to existing process models need to be understood, for example how variables in users, tasks, technology affect the ease of achievement of process outcomes.

5.3.2 Timo Jokela and the KESSU project at the University of Oulu has started to investigate the basis for conducting assessment and Process Improvement, with consideration given to non-process perspectives.

5.3.3 The implication for applied research is a need for re-definition of focus and direction to support effective practice in a new framework:

- Standards clarify what is known and what is still to be developed. Standardisation brings research into user-centred design under version control. ISO 13407 and ISO TR 18529 provide the framework for how user-centred design is to be practised. Methodologies and lifecycles should be defined in terms of their relationship to these international standards. Successive versions of standards incorporate changes in practice emerging from their application. In the case of user-centred design this is likely to be in areas such as improved efficiency or issues relating to scope of application. Standardisation should not be taken to imply the end of research in user-centred design. For example, Malcolm Mills speaking at the 1999 Human Factors Integration Symposium highlighted the relative lack of predictive capability in HCI and a need to lessen its dependence on an iterative lifecycle.
- The development of process metrics. Process assessment in general is in its infancy regarding the value and meaning of the results of a process assessment. Research is required into the type and interpretation of the measures that can be made of a process, the establishment of benchmarks and, in the longer term, normalised assessment tools. The Human Sciences are much more firmly rooted in statistics and

therefore have a lot to offer in this area.

- The context of use of HCI. Usability engineering is not just about the user interface and does not work in isolation. Research is required into the most effective means of integrating user-centred design processes and techniques with other systems disciplines. Sociologically, research is required into barriers to the uptake of user-centred approaches within technically-driven engineering disciplines.

## **6 Annex A Typical approaches to process assessment**

### **6.1 Nokia/Process Professional/EC TRUMP (SPICE)**

- 6.1.1 The intended assessment process is that defined in ISO/IEC 15504 *Process assessment*. The reader is referred to ISO/IEC 15504-2 *Performing an assessment* for details of the qualification of assessors, quality processes associated and other groups associated with assessments.
- 6.1.2 The first step is the tailoring of the model for the assessment. This consists of selection of relevant processes and definition of the maximum capability which is likely to be observed. The processes selected are to be representative of the activities carried out by the organisation. The model is not sacrosanct and may be tailored as much as necessary. The purpose of assessment is usually to gain a clear picture of the processes in a particular organisation for the purpose of process risk assessment or process improvement. The benefit to the organisation is only realised if the model is tailored to suit the purposes of the assessee. Processes and practices are selected for assessment if the organisation wishes to know how well that particular activity is carried out. If it is not important to the business that a particular process is performed well then there is no need to assess it.
- 6.1.3 In a third party assessment for the purposes of accreditation the situation is different. A purchaser or other client is looking for evidence that the processes which it considers necessary are performed to the level it requires. In this case the processes to be covered are defined by the client.
- 6.1.4 The next step is to select typical projects for assessment. For a thorough assessment the range of projects are selected to be representative of the spread of work, size of project and diligence of the organisation.
- 6.1.5 The assessment itself is achieved by interviewing selected staff. Firstly, to ascertain how many of the practices are performed for each process. Secondly, to ascertain how well these processes are implemented in terms of, for example, the performance of the management practices in ISO/IEC 15504 *Process assessment*. Part 5 of ISO/IEC 15504 *Exemplar model* provides details of base practices, management practices and work products.
- 6.1.6 It is beneficial if the interviewees prepare for the assessment. They need to understand the model and why the assessment is being carried out. Some familiarity with process thinking is required. Evidence of the performance of practices is provided by the interviewees, probably in the form of the work products.
- 6.1.7 The organisation being assessed needs to understand and prepare for the assessment. In an ideal case the relevant staff will have studied the model and prepared a description of how the organisation's processes and practices map onto the integration of human factors in the life cycle.
- 6.1.8 In general, interviews with a project manager and two or three members of project staff (the staff may be interviewed together) will be sufficient to give a reasonable impression of the level of maturity of each project.
- 6.1.9 In order to encourage openness and co-operation the assessment of whether practices

are performed or not is reasonably informal. It is best to ask the interviewee to describe how the process is carried out and to only ask specific questions about particular practices or deliverables if the description is unclear. At the end of the discussion summarise the findings back to the interviewee in terms of what is and is not done and/or delivered. During an assessment of Capability it is advisable to start by getting the interviewee to describe how the process is managed, move on to asking specific questions about the lowest levels of maturity and move up the scale until it is obvious that the practices are not being achieved. It is not beneficial to go beyond this level. If interviewees are not well prepared or if time is short the assessor may resort to asking direct questions.

- 6.1.10 The assessment progress is monitored against the assessment schedule. The assessment includes the following activities:
- 6.1.11 Prepare the participants; explain the assessment structure and the process model
- 6.1.12 Assess the adequacy of the process instance against base practice(s); interpret the base practice(s) in the current context, gather information on and determine/agree adequacy ratings for each base practice
- 6.1.13 Assess the process instance against the process attributes; gather information regarding the achievement of the process attribute goals and determine/agree the achievement rating for each attribute
- 6.1.14 Elicit any additional information required
- 6.1.15 Determine the confidence level ratings; gather information relating to confidence in the accuracy and typicality of the ratings assigned and assess how likely is it that a similar assessment on a new process instance would allocate the same rating. Reasons for a lack of confidence may include a limited sample size, opinion replacing fact etc. Only applicable if predictive ratings are required.
- 6.1.16 Assess the process capability; the qualified assessor reviews the results of the assessments carried out, in particular the ratings for process instances, the justifications given to substantiate the ratings and the associated confidence level ratings if applicable.
- 6.1.17 Rate each practice for each interviewee on a scale of N to F where:
- N Not achieved: There is no evidence of achievement of the defined practice.
  - P Partially achieved: There is some achievement of the defined practice.
  - L Largely achieved: There is significant achievement of the defined practice.
  - F Fully achieved: There is full achievement of the defined practice.
- 6.1.18 It is advisable to use a pre-prepared paper form or a computer-based tool to calculate the rating of each process in the organisation with regard to performance of HS activities. The result of the assessment will form the basis of plans to review and/or improve HS lifecycle processes within the organisation. There are no good or bad results from an assessment. The level of capability only needs to be good enough to allow the business to fulfil its objectives. The required profile of maturity (capability against process) will be defined by the client as part of process improvement.



## **6.2 DERA SCE (CMM for risk assessment)**

### **1.1.1 Background**

- 6.2.1 Interested in how to do legally-defensible assessment without a breakdown in the assessment team.
- 6.2.2 Projects are generally above £20M in value. The process risk assessment accounts for 25% of the decision. An assessment runs for a minimum of 10 weeks with 4-6 people in the team. The absolute minimum team size at any one time is 3 (must have 4 available).
- 6.2.3 Software CMM and EIA 731 are the most common models 15504-5, SECAM and CMM-I have been experimented with. The SCE version 3 method is applied (this is available on the SEI web site). The steps are as follows:

### **1.1.2 Training**

- 6.2.4 Team in model: 3 days.
- 6.2.5 Team in method: 3 days (a public domain course 50/50 lecture and exercise).
- 6.2.6 Classification of team members: OK, re-train, untrainable.
- 6.2.7 Model workshop: Presentation of each process in a model, Processes allocated to all attendees.

### **1.1.3 Preparation week**

- 6.2.8 Team dynamics (team building), Agree processes for team (timekeeper, conflict resolution, consensus building), Team refresher training, May use SEI maturity questionnaire, Planning template, Summary sheets (one page per process, one page per focus area, one page per practice area).
- 6.2.9 Scripted interviews: 20 minutes per interview, Record using uSoft Access-based tool with scripts developed by the team. Questions against the role and topic (KPA and common feature) in the script database.
- 6.2.10 Questions: Four areas of consideration, Areas/topics to cover (covering risk and known problems with project), One question per process for each, Written by teams during preparation week, Designed to uncover the truth without leading.
- 6.2.11 Project selection: Past project profiles on questionnaires, Get profile for project then pick three most similar and also mismatches to inform topic selection (e.g. difference in scale).
- 6.2.12 Topic selection is tricky. There may be a bias towards state of the art to pick up lower risks from very good companies.

### **1.1.4 On site**

- 6.2.13 First two days: Design of the assessment room (inversion test - try one thing at a time to make the room unacceptable), Review of documents, Prepare an interview list of 12-15 people per day.

6.2.14 Day three: am Intermediate assessment, pm More interviews. Interviews involve the whole team interviewing one person. There is a lead interrogator who questions for 10 minutes then other members of the team signal if they want to ask ancillary questions. Leader does not take notes in order to keep concentration. There are two or more note takers and a timekeeper. Interviews are per key process. There are ideally only ten questions per person. Junior people are interviewed about organisational competence. Interviews are arranged to order staff from projects from junior to senior. With CMM questions about maturity are taken from highest capability down.

6.2.15 Day four: presentation of findings by assessor

6.2.16 Day five: presentations of refutations by assessee

6.2.17 Next site (no more than two consecutive assessments)

6.2.18 Write up

6.2.19 Two more sites

### **1.1.5 Report**

6.2.20 Purpose, risk, identified process risks and area, how to stimulate process improvement

6.2.21 For SE-CMM just report the risks and weaknesses

6.2.22 Process Improvement: Weaknesses, Risk, Business benefit of fix (low/medium/high rate as 3/7/10), Affordability of the fix (low/medium/high rate as 3/7/10), Quick hits (sum of benefits and affordability). Strengths (ask how to preserve them during assessment), Company invites undertaking to do this, SCE reviews.

### **6.3 UK SPIN comments (CMM for process improvement)**

6.3.1 Although everyone talks levels and KPAs, in fact each company there has built a profile of KPAs that it wants, and finds the CMM levels confusing, i.e. there ought to be things from level 3 in level 2 etc. For example BAe Edinburgh has a combined level 2/3 external assessment (unusual) and their current work includes patches to level 2 and cherry picking level 4.

6.3.2 For introducing CMM into an organisation you need lots of effort on communications and sales. For example, for their next phase SAIC have a separate communications plan from the SPI plan. This will take 1/3 of the effort. The emphasis on this aspect in last year's report seemed justified from the discussion.

6.3.3 BAe systems approach to full CMM assessments:

- The main recording format they used were flip charts - one per KPA – with a big table of activities (down the way) and strengths/weaknesses/further info needed across (Denis O'Brien would have been proud of them). Postits (postcard size) went into each cell with the details on. If a strength or weakness got confirmed, then it got a red blob on it. when the team decided it was consolidated, it got a green blob as well. The further info column was to direct further interviews. No database/tool/spreadsheet.
- Interviews took 1 - 1.5 hrs, and an hour or so to consolidate after each, so 3 interviews

per day. At the end of the day it took a while (sometimes to 23:00) to consolidate for the day. Both of these consolidations essential at the time.

- The draft findings presented back were the strengths/weaknesses. The project could challenge these and produce more evidence if necessary. The final findings were these strengths etc. mapped onto the model and non-negotiable.
- The assessment team flip charts were kept in a consolidation room i.e. a conference room that could not be used for interviews. So three rooms required; an interview room, the consolidation room and a small room for KPA mini-teams. A decent (simple) tool (maybe plus projector screen) would save a room.