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D3.1.5_3: KNOWLEDGE ENABLED ENGINEERING GUIDELINES

by

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Abstract:

This document contains the Knowledge Enabled Engineering (KEE) Guidelines. The KEE Guidelines are good practice aids, allowing adaptation of processes, behaviours and the approach organisations take to better facilitate Knowledge Engineering.

The guidelines focus on four aspects:

- How to collaborate and the role of collaborative knowledge sharing platforms.
- How to learn lessons across the supply chain boundaries.
- How to assess, review and improve supply chain relationships to support effective working.
- How to assess the maturity of information through a gated process.

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Revision table

Issue	Issue date	Modifications
0.1	2007-03-06	Draft version of KEE Guidelines – guidance on structure
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0.93	2007-10-01	Draft version release for internal review, after AVIO comments
1.0	2007-10-09	Final version, reviewed.

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Internal ref	

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1. EXECUTIVE SUMMARY

This document brings together guidelines which contribute to successful knowledge engineering across the supply chain by indicating good practice. Effective knowledge engineering is addressed via both IT and infrastructure solutions, and understanding the nature of collaboration and why it is often difficult to achieve it by technology alone. The topics raised in this report were generated as a result of interviews with team members in both prime and supply chain organisations, literature reviews, and practical experience.

This deliverable gives background context to the reason WP3.1 developed guidelines, what these guidelines encompass, and why they are beneficial. The four guidelines themselves were developed by work packages 3.1, 1.2 and 2.1 in cooperation and are located in the appendix. These are:

- How to collaborate and the role of collaborative knowledge sharing platforms.
- How to learn lessons across the supply chain boundaries.
- How to assess, review and improve supply chain relationships to support effective working.
- How to assess the maturity of information through a gated process.

2. TERMINOLOGY AND ACRONYMS

Dissemination Portal	A web based portal, publicly accessible, to provide a resource for Knowledge Enabled Engineering within Aerospace, based on the results from the VIVACE project.
Guideline	Guidelines are good practice techniques, aiming to provide benefit by solving some of the methodological and behavioural knowledge challenges.
K	Knowledge
KEE	Knowledge Enabled Engineering
KESP	Knowledge Enabled Solution Platform – A context-based search and retrieval system, developed by Work Package 3.1 within VIVACE.
KEWE	Knowledge Enabled Wing Engineer – a use case within Work Package 1.2.
LL	Lessons Learned
RET	Relationship Evaluation Tool
SCRIA	Supply Chain Relationships In Action

3. INTRODUCTION

3.1. INTENDED AUDIENCE

The intended audience for the Knowledge Enabled Engineering Guidelines are those VIVACE partners who wish to learn more about techniques and good practice, and how to facilitate effective adoption within their respective organisations.

The guidelines themselves, held within the appendix, may be only of interest individually and so can be treated as a standalone knowledge asset.

4. BACKGROUND

4.1. VIVACE

VIVACE is an EC funded Framework 6 programme involving around 60 partners from various aerospace companies and universities. The programme's overall goals are to develop a collaborative design environment that facilitates efficient aircraft and engine design. It is hoped that the introduction of an advanced concurrent engineering environment will lead to significant reductions in the design and development phases. VIVACE consists of three technical subprojects:

Virtual Aircraft (SP1) – develops the different elements of the aircraft, and works around the products for design, modelling, interfacing and testing.

Virtual Engine (SP2) – develops the different engine modules of the aircraft propulsion system and key areas of multidisciplinary optimization, knowledge management and collaborative enterprises.

Advanced Capabilities (SP3) – a key integrating work area developing common tools, methodologies and guidelines to be shared in the previous two work areas and provides for further integration of these two. The KM program is part of this.

4.2. WP3.1: KNOWLEDGE ENABLED ENGINEERING

The Knowledge Enabled Engineering work package is one of six integrated technical packages that collectively form the Advanced Capabilities sub-project (SP3). It focuses on knowledge concerns within the context of the extended enterprise and has adopted a bold vision with far reaching implications if successful.

The work package aims to identify, define, validate and exploit preferred knowledge-centric methods that help to identify, model, store, retrieve, reuse and share, knowledge. Of interest is knowledge related to people, processes, and products, spanning long product life cycles, within multi-disciplinary, multi-organizational and multi-cultural environments. This includes the way organizations are structured, the way people work, and the way knowledge is created and exchanged informally, and formally, on a day-to-day basis. This involves not just applications, but people, processes, technologies, methods and procedures.

WP3.1 has been decomposed into a set of integrated iterative tasks that define how work is to be progressed:

T3.1.1: Use Case Analysis – examine selected use cases proposed by WP3.1 partners (or by other work packages) in order to identify issues related to engineering knowledge management.

T3.1.2: Knowledge Enabled Solution Components – identify and qualify components available that will help address issues highlighted by analysis of the use cases.

T3.1.3: Knowledge Management Solutions – select KES components according to functionality, characteristics, and relevance to use cases and k-issues.

T3.1.4: Pilots Specification and Metrics – identify scenarios and needs suitable for implementing pilot studies, ascertain implementation constraints, and appropriate metrics for measuring benefits.

T3.1.5: Pilots Implementation and Validation – run pilots to test solution prototypes and validate using metrics identified in the previous task.

T3.1.6: Training – development of training programs and associated material.

The WP began by focusing on a number of use cases and performing an As-Is analysis to identify important issues (derived from business and service requirements) and knowledge challenges related to Knowledge Enabled Engineering (T3.1.1). This was achieved in collaboration with the use case subprojects in the Aircraft (SP1) and Engine (SP2) themes.

The following pilot projects were specified in close cooperation with their respective Use Case domains:

- Multidisciplinary Data Model (from Task 1.2.4).
- Knowledge Enabled Wing Engineering (from Task 1.2.6).
- Produce customised proposal in 7 day lead time in a virtual company (from Task 2.1.3).
- Robust multidisciplinary design of components (from Task 2.3.5).

These Use Case domains have produced a large set of common functional requirements, thus leading the work package to an integrated approach, based on analysis and development of a common "Knowledge Enabled Solutions Platform" (KESP). This platform will provide the basic common functionalities, which can be applied to the above domains to demonstrate different Use Case scenarios. Based on this approach, a Pilot Project can be defined as an "application of a common KES Platform within a specific Use Case scenario". Nevertheless, specific use case needs will be investigated in order to provide organizational, methodological and innovative technological solutions, which might be also added as dedicated modules to the KESP. The training activities of the whole work package are carried out by a dedicated task (T3.1.6), which started with the development of the training and dissemination strategy and will deploy the training both internally and externally.

4.3. OBJECTIVES OF TASK T3.1.5

As described in the previous chapter, WP3.1 has adopted an integrated approach, and decided to develop a "Knowledge Enabled Solution Platform" (KESP). This KESP answers most of the common requirements that arose from the analysis of business use cases.

The overall objectives of T3.1.5 are to:

- Design the KESP (Specification & Detailed design)
- Implement a prototype for the KESP
- Experiment the KESP prototype through at most 4 pilots.
- Assess pilots through metrics quantification

To achieve this, T3.1.5 relies on outputs coming from previous WP3.1 tasks such as initial proposals for KESP architecture and solution candidates for KESP coming from T3.1.3 and guidelines for pilot implementations and metrics coming from T3.1.4.

The inputs and outputs of the T3.1.5 task can be summarized as follows:

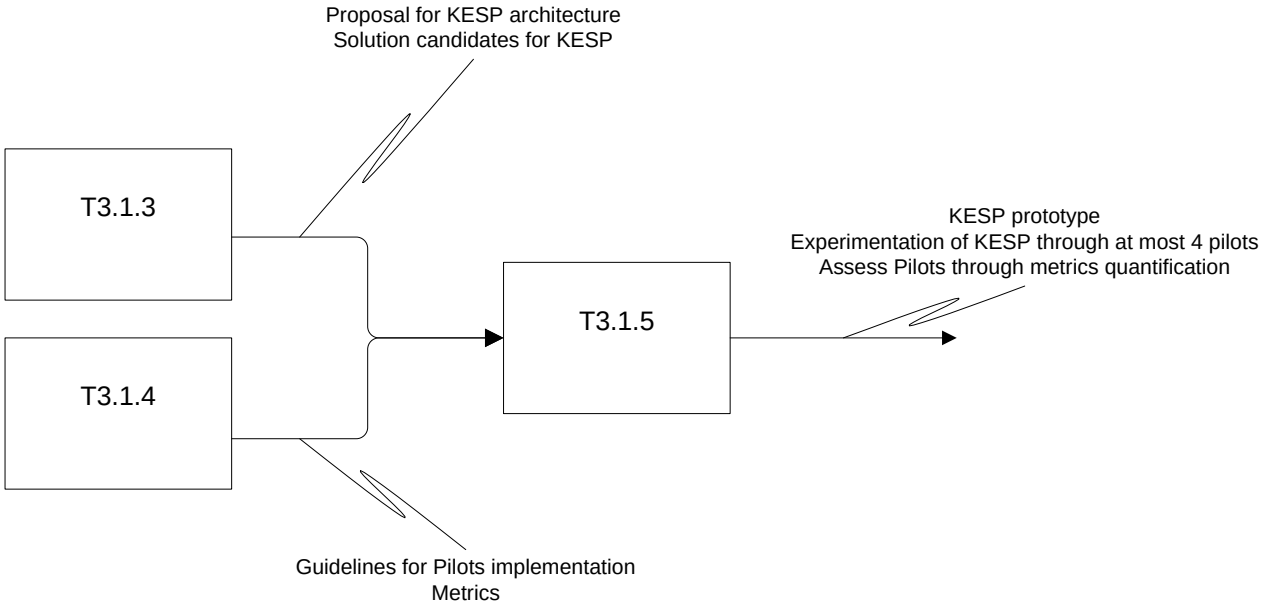

Figure 1: *T3.1.5 output coming from previous tasks*

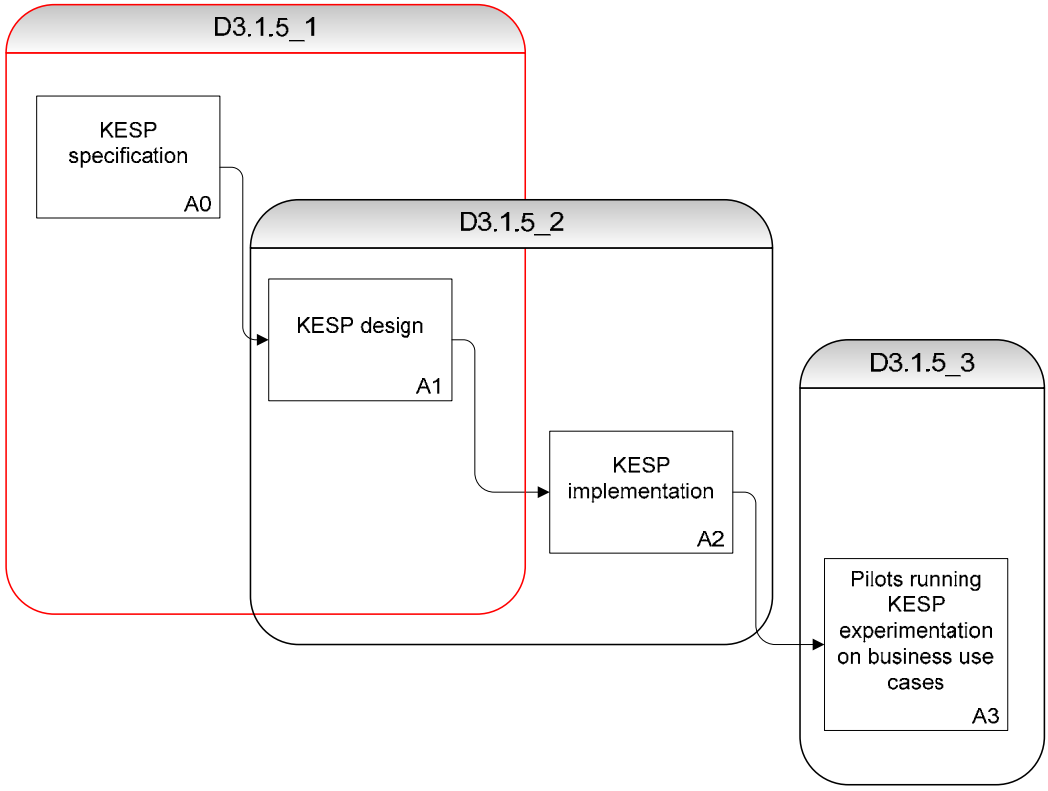

Figure 2: *T3.1.5 deliverables scope*

This deliverable, D3.1.5_3, is concerned with guidelines produced as a result of interviews with members of both the prime contractor and supply organisations and key areas that offer real business improvement.

5. KEE GUIDELINES DEFINITION

5.1. GUIDELINE DEFINITION

Guidelines are good practice techniques, aiming to provide benefit by solving some of the methodological and behavioural knowledge challenges.

5.2. RATIONALE

Within work package 3.1, use cases from other VIVACE work packages have been analysed and a list of KEE challenges were defined. These challenges are real problems that the respective aerospace companies are facing within the knowledge domain. A common view, put forward by contributors working in this field, is that such problems cannot be solved by technology alone — technology is merely an enabler — and that consideration must also be given to the people and processes involved. This was summarized in the VIVACE deliverable, "Knowledge Enabled Solution Components state of the Art – Version 2", D3.1.2_2, VIVACE-3.1.2-BAES-T-05031-1.0.doc, and outlined in the following figure.

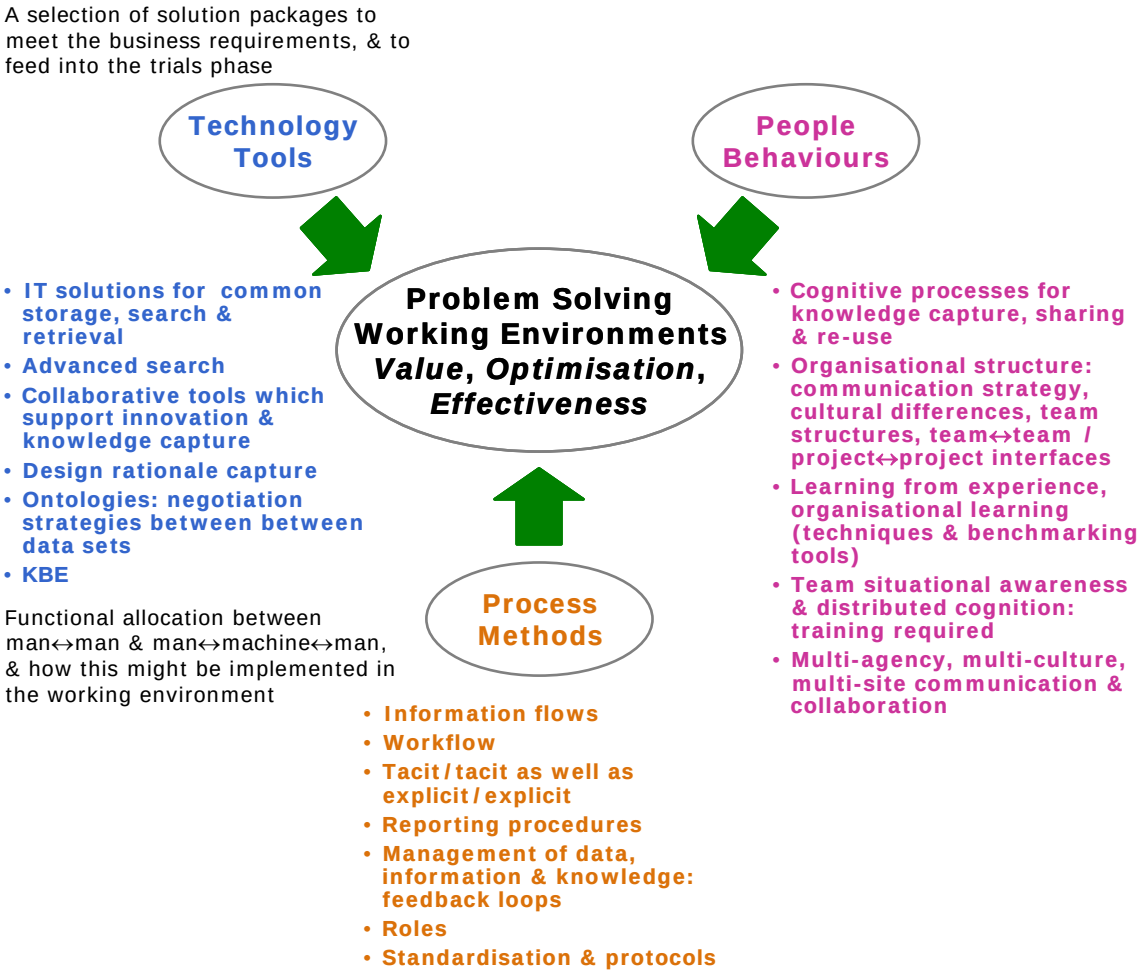

Figure 3: *Outline of the integrated approach taken by T3.1.2.*

WP3.1 has proceeded to work on this multi-aspect approach by defining two levels of the Knowledge Enabled Solution. The first one is predominantly concerned with the development

of a common KES software platform, which primarily provides advanced context search capabilities. The second level has two requirements:

- To address those challenges that cannot be addressed by the KES Platform in the first level.
- To address the behavioural and methodological issues that arise from the necessary change in working practices as a result of implementing the KES Platform within an organization.

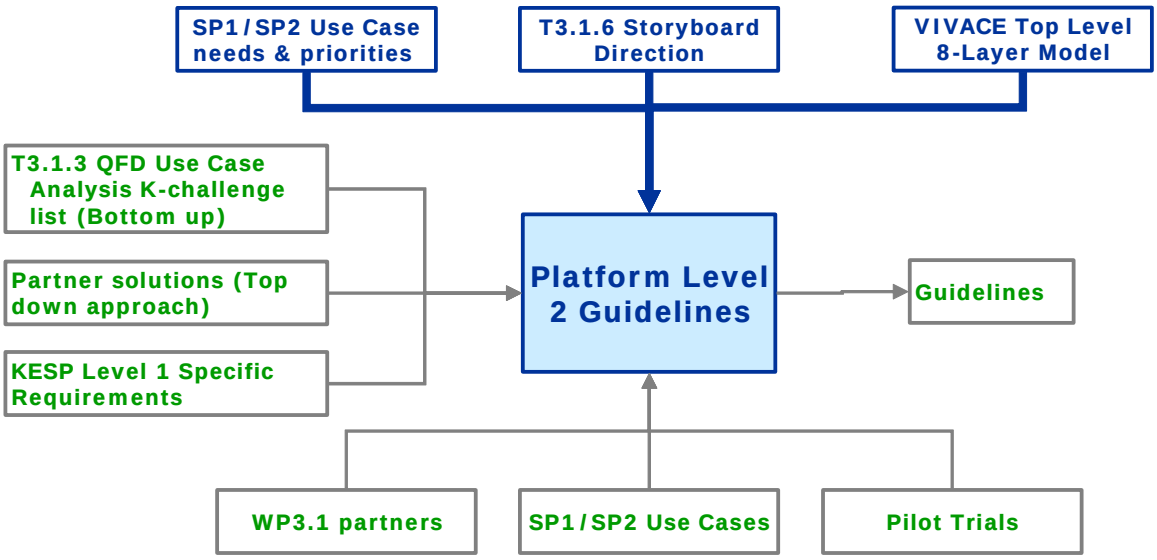

Figure 4: ***IDEF0 Diagram for KES Platform Level 2.***

The outputs of this second level, as shown in the Figure 4 are solutions, such as new working procedures and changes to behaviours, and recommended ways of working in the form of guidelines. Some of these solutions will be output from pilot trials, intended to be carried out by WP3.1 and so will be validated in an organisational context. Other solutions may be brokered from elsewhere and, although these will not be validated via pilot trials within an aerospace setting, should be generic enough to be used across industrial boundaries.

The guidelines outlined in the remainder of this document will form part of the VIVACE Capability Structure within the VIVACE 8-layer model, seen in Figure 5. The work detailed in this version of the deliverable represents the initial contribution, outlining our strategy, where subsequent versions will focus on the development and integration of these guidelines.

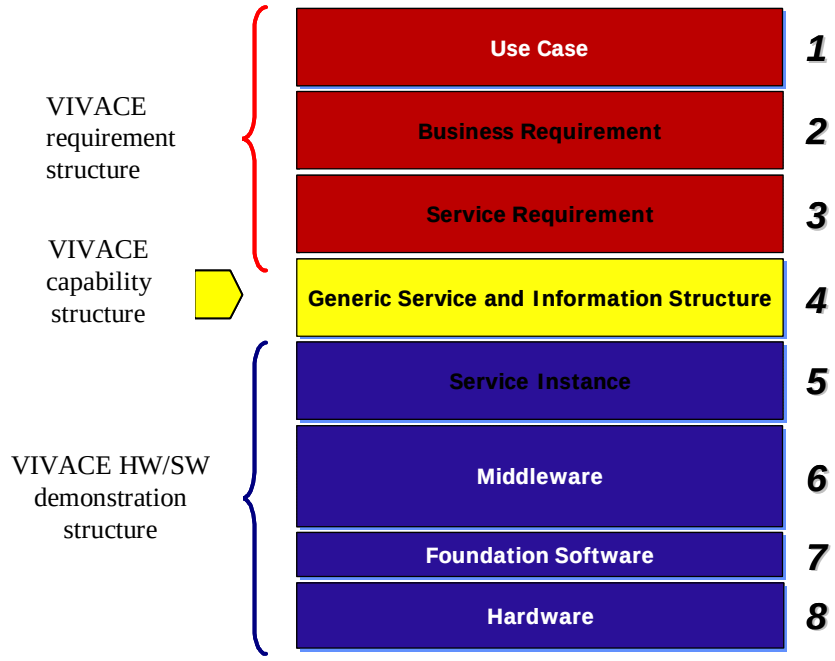

Figure 5: The VIVACE structures and VIVACE 8-Layer Model

Figure 6 shows how this level can be split into behavioural, process and organisational guidelines. However, they are not necessarily mutually exclusive. For example, a solution to a KEE challenge could encompass changes in culture at an organisational level and at an individual level due to the requirement to follow a more efficient process. The following figure also shows that some of the guidelines will be specific to the KES Platform whilst others will be generic, relating to challenges posed by the use case.

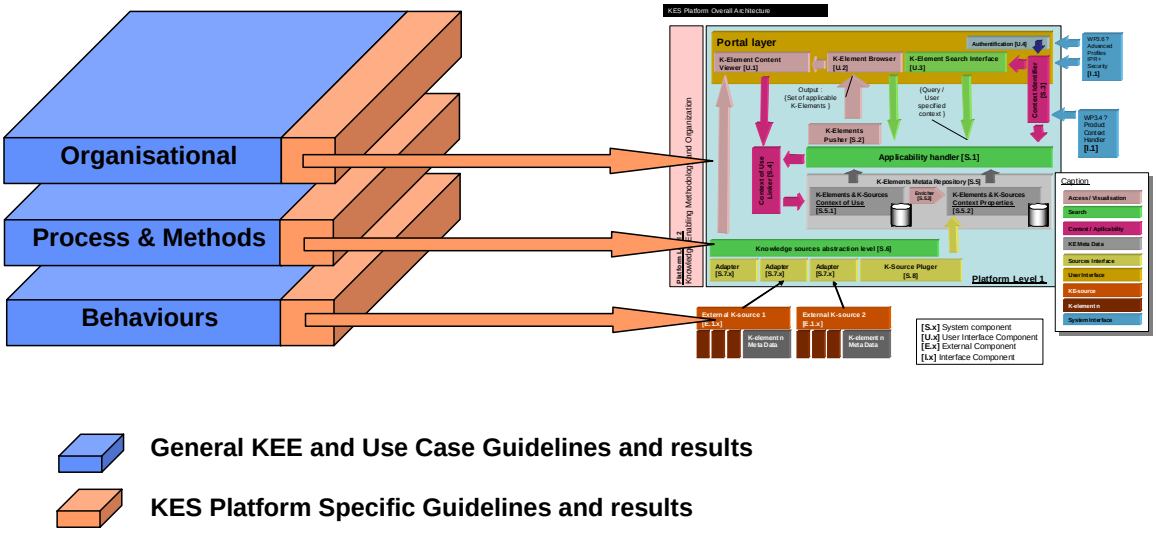

Figure 6: Guidelines and KESP

5.3. BENEFITS

The guidelines will address knowledge engineering within a supply chain setting, and the following benefits should be observed when encouraging good practice:

- Sharing information and knowledge across the extended enterprise, projects, and bid teams.
- Methods for sharing information which promote a more transparent, proactive sharing culture.
- Reduction of the reliance upon email.
- Raise awareness of the need to validate and update information.
- Encourage early sharing of partially completed work with within the extended enterprise.
- Enable access to information within the team as required.
- To enable teams to set up spaces to share work and to initiate computer supported methods to replicate the sort of interactions that they may enjoy in collocated teams.
- To support virtual teams within an extended enterprise to set up working groups, carry out specific activities and then to disband those groups when they no longer have a function to fulfil.
- To endeavour to achieve the same and greater levels of innovation across supply chain boundaries to bring the product to market more quickly, to achieve better products and services and to support business for the future.
- To mitigate the risks of working in a dispersed way within multi-disciplinary, multi-culture, multi-language, multi-organisation working groups.

5.4. STRUCTURE

- What does a guideline look like?
  - A manual or guide that a company can follow to overcome knowledge related problems within in their company.
  - It is a good practice document that enables another company to follow pre-defined procedures or review problem areas.
  - A guide to train or develop an individual by teaching them how to use a given process or tool.
- A guideline may be made up of:
  - A process,
  - Lessons learned,
  - Templates for use,
  - An enabling technology (if appropriate),
  - Validation of evidence of case studies from other organisations

5.5. METHODOLOGY TO OBTAIN GUIDELINES

There are two main approaches to defining the guidelines within the work package:

- The first is to take a bottom-up approach, analysing the KEE challenges from each of the use cases, and focusing on those challenges that require a method, and/or an organisational or behavioural point of view.
- The second approach is a top down approach, identifying what each of the partners can input that integrates well with the use cases and intended storyboard.

Both these approaches are explained in further detail in the following sections.

A final approach is to define guidelines based on arising problems from the KES Platform — some of which could be investigated prior to the development of the platform, others will become apparent after implementation and during trials of the platform.

5.5.1. Bottom-Up Approach

Work conducted in the Knowledge Enabled Solution task (T3.1.3) focused on providing solutions (in the form of functional and service requirements) that answered the challenges found in the use cases. Further analysis of this work, focused on the question *"(How well) Does the platform functional requirement X cover the knowledge challenge Y?"*.

For example, the answer was:

> "*PFR2.1 Capture context properties of k-elements* answers the knowledge challenge *KEWE8.1. How can we provide better knowledge about knowledge* appropriately (I.e. scores 5)."

Matrix1 K-challenges vs. Platform Functional Requirements		Importance	Platform Functional Requirements														
			PFR 1.1 Identify the User's Context	PFR 1.2 Identify applicable K-Sources for a Context	PFR 1.3 Identify applicable k-Elements for a Context	PFR 2.1 Capture context properties of K-Elements	PFR 2.2 Capture Context of Use of K-Elements	PFR 2.3 Capture updates of K-Elements	PFR 3.1 Browse K-Elements	PFR 3.2 Search for K-Elements	PFR 3.3 Retrieve K-Elements	PFR 4.1 Provide mechanisms for sharing K-Elements and K-Sources	PFR 4.2 Allow early sharing of knowledge	PFR 5.1 Store K-Elements	PFR 5.2 Store K-Element and system properties	PFR X Unexpressed Platform Functional Requirements
KEWE1.1	How can we ensure that knowledge is up to date and consistent?	5	0	0	0	0	0	5	0	0	0	0	0	0	0	0
KEWE1.2	How can we provide visibility of context and provenance of information?	5	0	0	0	5	5	0	0	0	0	0	0	0	0	0
KEWE2.1	How can we validate knowledge against process.	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KEWE3.1	How can we share knowledge and information across the extended enterprise with confidence ?	5	0	0	0	0	0	0	0	0	0	5	5	0	0	0
KEWE4.1	How can we find Knowledge through people within the extended enterprise across cultural boundaries?	5	0	0	0	0	0	0	3	3	3	0	0	0	0	0
KEWE5.1	How can we ensure IPR issues when sharing knowledge within an extended enterprise?	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0
KEWE6.1	How can we push knowledge from individuals?	3	3	3	3	0	0	0	0	0	3	0	0	0	0	0
KEWE7.1	How can we push knowledge to individuals?	3	3	3	3	0	0	0	0	0	3	0	0	0	0	0
KEWE8.1	How can we provide better knowledge about knowledge?	3	0	0	0	5	5	0	0	0	0	0	0	0	0	0
KEWE9.1	How can we access knowledge through a single interface?	3	0	0	0	0	0	0	5	5	5	0	0	0	0	0

Figure 7: Matrix 1 KEWE k-challenges vs. platform functional requirements.

However, it does not say what else can be done to provide a solution to the knowledge challenge, or whether the knowledge challenge is fully answered by the functional

requirement. The following figure shows this example in Matrix 1 of the QFD processes conducted in D3.1.3_2.

Further requirements, other than those answered by the technical platform proposed, are necessary for a complete solution to each of the use cases. In the case of the KEWE use case, Figure 8shows examples of which challenges still have areas within the behaviour and process angles still to be answered. As can be seen, for KEWE this could be said to be all of the k-challenges. Examples of underlying problems–solutions, (this is a non-exhaustive list) could be:

- KEWE1.1: processes to ensure users validate and update information through its lifecycle. *E.g. Incorporate knowledge creation, sharing and reuse measurements into performance metrics*
- KEWE1.2: we can provide visibility of context, but what about provenance — for example the source and its trustworthiness. *E.g. provide details of author(s), link into contact details. Update for successive versions.*
- KEWE2.1: processes to ensure validation of knowledge. *E.g. implement processes to have a gated validation process on the creation and maintenance of knowledge assets.*
- KEWE3.1: technological solution to allow sharing, but what about the issues of whether it is right to share, sharing incomplete information, sharing across the supply-chain, intellectual property right issues and so on. *E.g. Virtual Team Guidelines (access to questionnaires to assess team performance)*

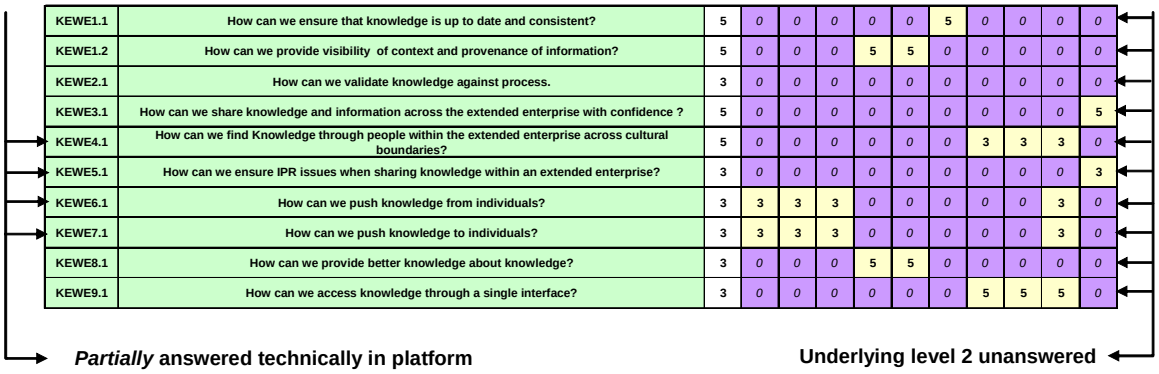

Figure 8: *Example of further KEWE requirements.*

5.5.2. Top-Down Approach

In addition to the bottom-up approach outlined in the previous section, a top-down route has been taken to identify solutions which would satisfy the Use Case requirements, and therefore be suitable for inclusion in Platform Level 2.

The basis for this top-down approach was the VIVACE knowledge lifecycle developed in T3.1.2. The lifecycle proposed by WP3.1 (Figure 9) provides a generic view to describe important knowledge activities and associated processes.

Using this model has enabled T3.1.5 to match the requirements defined in the use cases to knowledge activities and processes, e.g. document assessors, post-project reviews, and SCRIA.

The mind map in Figure 10 provides an overview of such solutions mapped onto the VIVACE knowledge lifecycle. For completeness, both process and tools have been included, along with a number of guidelines which help to address the behavioural (people) aspects of our holistic approach to knowledge management (see Figure61). Technological solutions are absent from this map, as they are address in more detail elsewhere in T3.1.5.

This map is by no means complete; however, solutions have been identified for the key aspects of the knowledge lifecycle (i.e. share, use, capture, store, etc.), and a number of the entries would be of use at a various different stages. For example, Lessons Learned can be applied during knowledge capture, but also has a focused on the storage of the knowledge assets produced, requirements on sharing, and importantly, how they are subsequently used.

For the purposes of this deliverable, it is not intended that all of these solutions are incorporated into Level 2 due to resource and time constraints. In order to define the pilot trials and give focus, direction for which items should be trialled will be taken from the KEWE use case.

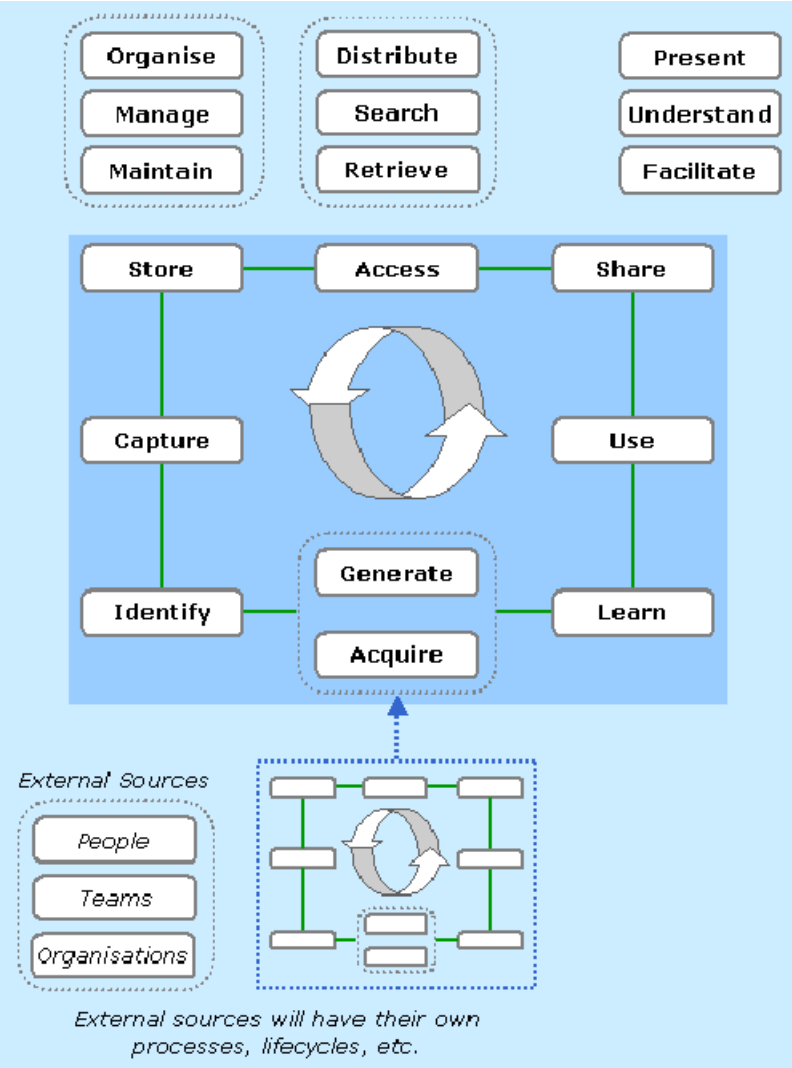

Figure 9: *Knowledge lifecycle proposed by WP3.1.*
[Taken from VIVACE-3.1.2-BAES-T-05031-1.0.doc.]

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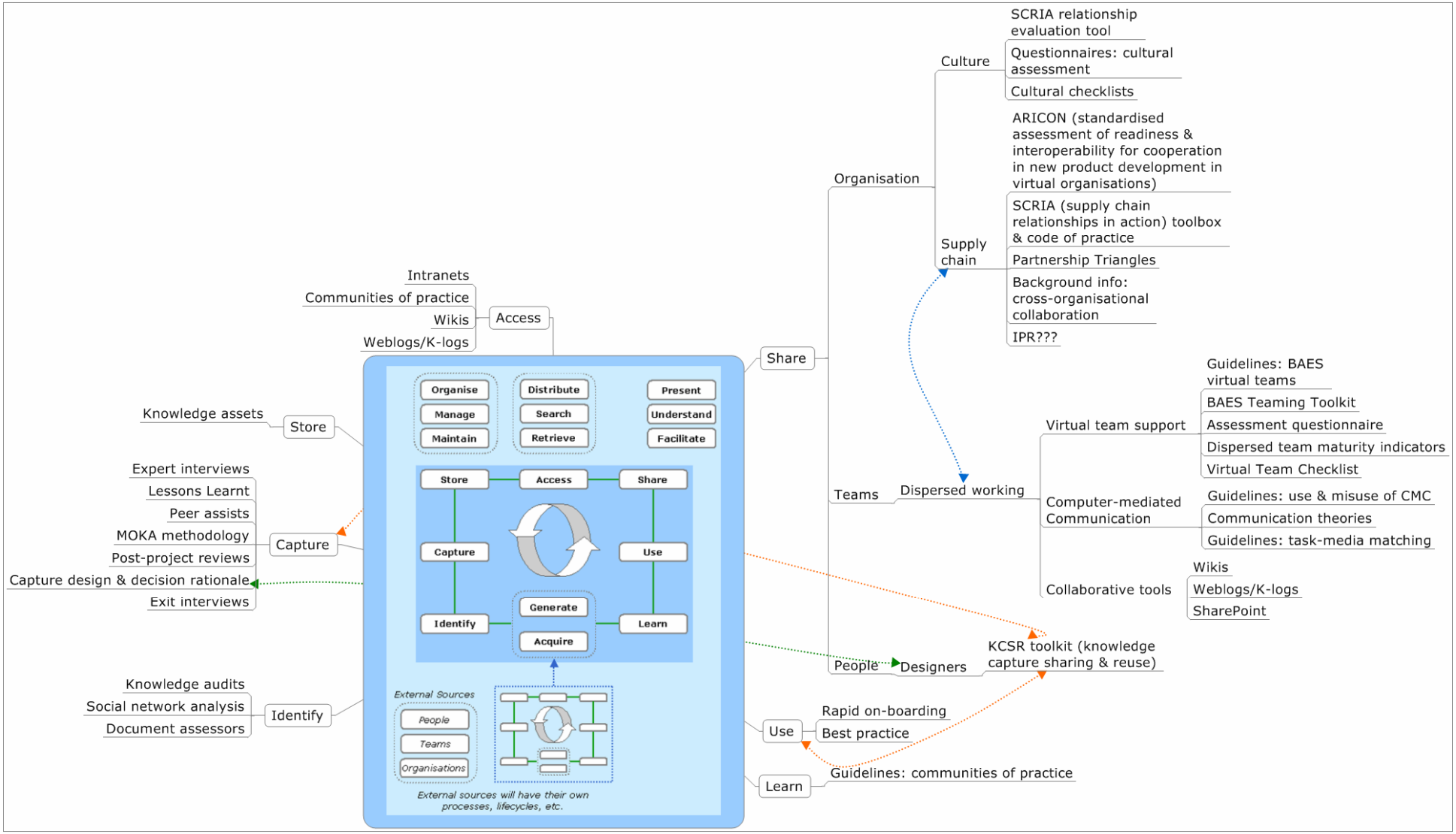
SCRIA relationship evaluation tool
Culture
Questionnaires: cultural assessment
Cultural checklists
ARICON (standardised assessment of readiness & interoperability for cooperation in new product development in virtual organisations)
Organisation
SCRIA (supply chain relationships in action) toolbox & code of practice
Supply chain
Partnership Triangles
Background info: cross-organisational collaboration
IPR???
Intranets
Communities of practice
Wikis
Access
Weblogs/K-logs
Share
Guidelines: BAES virtual teams
BAES Teaming Toolkit
Virtual team support
Assessment questionnaire
Dispersed team maturity indicators
Virtual Team Checklist
Knowledge assets
Store
Organise
Manage
Maintain
Distribute
Search
Retrieve
Present
Understand
Facilitate
Teams
Dispersed working
Computer-mediated Communication
Guidelines: use & misuse of CMC
Communication theories
Guidelines: task-media matching
Expert interviews
Lessons Learnt
Peer assists
MOKA methodology
Capture
Post-project reviews
Capture design & decision rationale
Exit interviews
Store
Access
Share
Capture
Use
Identify
Generate
Acquire
Learn
Collaborative tools
Wikis
Weblogs/K-logs
SharePoint
People
Designers
KCSR toolkit (knowledge capture sharing & reuse)
Knowledge audits
Social network analysis
Document assessors
Identify
External Sources
People
Teams
Organisations
External sources will have their own processes, lifecycles, etc.
Rapid on-boarding
Use
Best practice
Learn
Guidelines: communities of practice

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5.5.3. KEE Platform Specific

There are many behavioural and methodological issues associated with any technological implementation, which need to be defined and guidelines sought. Among others, these are:

- Who are the actors, who will be using the system?
- How to control the use.
- How to manage the change.
- How does it impact on the culture and individual behaviours?
- What current working practices change, how are these affected?
- What are the expected risks, failures and mitigation routes?

More specifically, in relation to the use of a context-based system, the following questions may also need to be answered:

- How can it be used in the supply chain setting? Can context be shared across the supply-chain, what are the extended IPR issues?
- What can be done to minimize user-input?
- What processes need to be in place if user-input is required, e.g. user information entry, manual metadata tagging, etc.
- The black box effect — how a will a user trust the information given to them? Do they know how it has been produced?

5.6. DISSEMINATION

The approach taken by the work package is to present the results and progress made in a web-based Dissemination Portal. For more information the reader is directed towards the final reports from Task 3.1.6.

6. CONCLUSION

This document describes the nature of Knowledge Enabled Engineering Guidelines and why they have been developed within VIVACE, based on the needs of the aerospace industry. Four guidelines have been developed, a brief summary of which given, along with the guideline documents themselves, in the Appendix. These are:

- How to collaborate and the role of collaborative knowledge sharing platforms.
- How to learn lessons across the supply chain boundaries.
- How to assess, review and improve supply chain relationships to support effective working.
- How to assess the maturity of information through a gated process.

Each guideline has been produced by VIVACE partners through a basis of experience and real world use. The guidelines should greatly help other organisations achieve similar goals, giving them a “head start” in knowledge enabled engineering techniques. There are many topics within Knowledge Enabled Engineering, as discussed in this deliverable, which potentially could be packaged as guidelines. Future work could help to carry forward this aim of sharing our collective techniques with other organistions, a kind of KEE community of practice if you will, and the KEE Dissemination portal is seen as a good route to do so.

7. REFERENCES

Nuzzo, P & Lockwood, F – *Knowledge Enabled Solutions*, VIVACE-3.1.2-BAES-T-05031-1.0.doc

Cloonan, J – *KEWE Applications & Results: Knowledge Sharing Guidelines,* VIVACE 1.2/6/AIUK/T/07020

Bovik, C - *7 Day Proposal Updated Process and System Requirements*, VIVACE 2.1/VAC/T/06002.1.0

8. APPENDICES

8.1. KNOWLEDGE SHARING GUIDELINE

8.1.1. Overview

Collaboration across a supply chain represents a scenario where many dispersed and co-located teams are required to work together, share data and knowledge, and coordinate their efforts both within and across partner organisations. To this end this deliverable will cover the most salient issues with regard to collaboration and knowledge sharing, and indicate how this may differ when occurring within the context of an extended enterprise. The importance of collaboration across a supply chain should never be underestimated. From the sourcing of materials to the delivery of items to the customer, the need for effective collaboration and knowledge sharing is paramount.

The aims of the guidelines are to encourage best practice in the following areas:

- Sharing across the extended enterprise, projects, and bid teams.
- Methods for sharing information.
- Reduce the reliance upon email.
- Raise awareness of the need to validate and update information.
- Promote a more transparent, proactive sharing culture.
- Encourage early sharing of partially completed work with within the extended enterprise.

It is anticipated that the introduction of such guidelines will result in improved access to essential information, knowledge, resources, and expertise. In turn, creating better informed teams, and savings to the supply chain as a whole due to improved retrieval and reuse of knowledge.

8.1.2. Guideline Document

VIVACE WP3.1
Supply Chain Collabor

8.2. MATURITY GATE TECHNIQUE GUIDELINE

8.2.1. Overview

The gated maturity assessment guideline has been developed as a support tool to the 7 Day Proposal use case within WP2.1. The maturity technique has been reported in D3.1.5_4. In this version, the methodology has been formatted into a guideline and the overall results from validation workshops are reported.

During the final year of VIVACE a series of workshops have been conducted in collaboration with WP2.1 (7 Day Proposal). The participants in the workshops were representatives from Volvo Aero, active in business development on civil engines, military engines and space engines business.

The objective of the validation work has been to explore the feasibility of using the maturity concept in a business process in Volvo Aero in a similar context as the 7 Day Proposal use

case. Another objective of the work is to find a "generic" maturity scale that can be used in a cost calculation activity.

The guideline has been developed, which has been used at a workshop in May 2007 at Volvo Aero in Trollhättan, Sweden. Participants represented the 7 day proposal team where the dimensions and grades of the maturity scale was defined and a first gate assessment was conducted. On a follow up workshop, in August 2007, the same participants and the business process manager at the Company participated. The objective was to revisit the results and assess the maturity methodology. The result of the second workshop resulted in:

1. Feedback on the methodology, user refinement
2. A plan to continue validation within the Company due to the interest gained.
3. Comment that the gated maturity works fine for the 7D proposal, whereas generality needs further cases (see 2).

8.2.2. Guideline Document

VIVACE WP2.1
Gated Maturity Asses

8.3. LESSONS LEARNT GUIDELINE

This guideline explores the generation and application of lessons learned processes aimed at the Knowledge Enabled Wing Engineering function and processes, but in reality applicable to other aerospace function. The guidelines are presented in relation to the process, capture and management of data, reuse of lessons learned, and the issues associated with deployment of lessons learned as a business change.

The aim is too ensure that:

- The lessons learnt process is followed.
- Good quality lessons are identified.
- Learning points get to the right place to make a difference next time.
- Develop best practice guidelines on how much detail is required, (e.g. context, confidence limits, etc.) to allow re-use by another person/another project.
- Lessons learned are built into the project lifecycle and budgeted for accordingly.

Throughout it has to be emphasised that the lessons learned process is a means of supporting the networks of personnel who are employed to deliver the necessary functions. It is an approach for use across the whole organisation, and considerable benefits exist when these can be expanded in to supply chains. It is also important to recognise within a supply chain framework the importance of trust, and the management of Intellectual property, and the use of the contract to the benefit of those parties within the supply chain, in the creation, management and use of lessons learned.

8.3.1. Guideline Document

VIVACE T1.2.6
Lessons learned guide

8.4. RELATIONSHIP EVALUATION TECHNIQUE GUIDELINE

These guidelines provide a framework for raising the awareness of and for discussing relationship topics that enable or inhibit knowledge flow. The objective is to maintain good relationships or to improve poor relationships to enable better information creation, capture and sharing between teams or individuals.

To address the use cases, support tools such as SCRIA (Supply Chain Relationships In Action) which were identified during ENHANCE (EU Framework Programme which investigated working methods drawing particularly on concurrent engineering techniques) were evaluated in the context of the Knowledge Enabled Wing Engineer (Task 1.2.6).

The two main aims are:

- To consider how such tools enhance relationships and raise awareness in supply-chain. This will be achieved through trials in order to evaluate the benefits to the extended enterprise.
- Investigate current IPR and legal practices, with regard to contractual agreements, and to introduce clear commercial guidelines throughout the extended enterprise. This will go some way to improving levels of trust between organisations and contribute to confidence in information sharing.

The SCRIA framework is a sophisticated tool to assess and diagnose problems with relationships between organisations, which are affecting performance. The tool comprehensively covers all aspects of supply chain relationships:

- Communication: formal, personal, quality, business awareness, alignment of strategies
- Design for manufacture: management of costs, value, process capability, investment within partnership
- Continuous improvement: innovation, process development, attitude to change, relationship development
- Working together: ethics, sharing risk and reward, trust, involvement, mutual destiny
- Problems and failures: unprofessional behaviour, incompetence, carelessness, ignorance

For the VIVACE study it was acknowledged that the whole tool was not required since the focus was on knowledge sharing across the enterprise, so a shorter version was developed just concerned with knowledge sharing aspects as well as adding to the element that addressed trust. The key elements of the reduced SCRIA evaluation process are:

- Communication
- Personal relations
- Quality of communication
- Information exchange
- Problem notification and resolution
- Trust

8.4.1. Guideline Document

VIVACE T1.2.6
Relationship Manager