

DRAFT REPORT OF SPIRE ICC REVIEW PANEL

EXECUTIVE SUMMARY

- The panel were very impressed with the dedication, team spirit and work ethic of the ICC development team.
- The team had taken on board the object-oriented approach from scratch in the case of most members of the team but successfully applied it to the SPIRE case and had clearly gained a very clear picture of how they saw the ICC operating. It was unfortunate that an experienced expert in use-case analysis and object-oriented programming had not been brought into the team early on as this may have saved the team some time and effort.
- The panel considered that the use-case document as presented, although a considerable achievement, was confused in places and in need of revision and clarification. In particular there was confusion between actions performed by human actors and the software itself, a cause of which was perhaps an incomplete actor list.
- The panel also felt that the external inputs to the use-cases were not properly identified, nor were the parallels between the SPIRE ICC actions and those of the HCSS.
- Despite these criticisms however the panel felt that it was a relatively simple task to make the necessary corrections and allow the ICC development process to move forward rapidly to definition of workpackages and the start of code-development.
- The panel felt that they not initially been given sufficient information in the documentation to conduct their review fully, and had requested and received, presentations on the workpackage breakdown and development schedule for the ICC.
- The panel felt that this reflected a lack of firm management and direction of the ICC activity as a whole, as well as its role within the overall management of the SPIRE project. Closer relations between the ICC development team and the instrument team were essential in the future if the ICC is to perform the functions required of it.
- As well as a breakdown of workpackages, clear prioritisation was needed, especially in the short-term, in order to ensure that the requirements of the project, especially the instrument-level testing, were met in a timely fashion.
- The panel recommends a review of the ICC management and development schedule in July, once the team have had a chance to make the suggested revisions to the documentation and made detailed plans for their work over the next 12 months, a major task within which must be the development of a detailed schedule and plan for the delivery of the rest of the ICC workpackages over the period to launch and operation.

1: INTRODUCTION

A panel was constituted at the request of the SPIRE PI to review the ICC development plan prior to the definition and allocation of workpackages. The panel was chaired by Prof. W.K. Gear (Cardiff - SPIRE project scientist), with members Prof. M.J. Griffin (Cardiff - SPIRE PI), Dr B.M. Swinyard (RAL- SPIRE Instrument Scientist), Dr, J.-P. Baluteau (Marseilles – SPIRE project scientist), Dr P.Roelfsema (Groningen -HiFi ICC development manager), Dr, L. Vigroux(CEA Saclay, SPIRE Co-PI), Mr K. Galloway (ESTEC – HCSS ???) and Dr C. Tierney (UKATC software engineer).

The panel were sent the following documents for review by the ICC development team:

- 1) “SPIRE ICC SCENARIOS”: SPIRE-RAL-DOC-001195 – author T. Lim
- 2) “Summary level use-case”: SPIRE-SAP-DOC-001241 – author Marc Sauvage

A number of additional documents were provided for information, although the review team noted that no HCSS documentation was provided.

The review was held on May 13-14 2002 at Sussex University. The order of presentations received is shown in Appendix One.

2: AIMS OF REVIEW

2.1: The panel had not received clear guidance from the development team or the PI as to what the review was intended to achieve. The development team did not seem clear on the aims of the review either. The panel regarded its job as to review the readiness of the team to proceed to a detailed design and construction phase for the ICC software, within an overall structure and plan that would deliver the requirements of instrument team during ground-testing, commissioning and PV and those of the user during operation. The panel felt that it had not been given sufficient information in the documents to achieve this, and asked for extra information on work-package breakdown and schedules.

2.2: The PI had requested that the team and the review panel report to the SPIRE ICC steering group meeting that will take place at the consortium meeting in Rome July 16/17 and that at that point work-package allocation to groups would be agreed. However it was clear from the very beginning of the review that this was an unrealistic goal. See recommendations regarding what the panel felt *could* be achieved by that time.

3: OVERVIEW OF ICC AND INPUT TO DEVELOPMENT PROCESS

3.1: In the overview of the ICC documentation and the design process presented to it, the panel felt that all the essential inputs had not been clearly defined. In particular the HCSS definition process had already taken place (in fact some members of the SPIRE ICC development team had taken part in it) and implicit in this were many of the requirements on the SPIRE ICC, and yet this document had not been mentioned as an input, many tasks identified for SPIRE ICC could also have been referred to HCSS. The panel recommends that the SPIRE ICC team make explicit in its documentation the input of the

HCSS use-case analysis, and re-examine the actor list created in that document, as it felt that there were some missing actors in the SPIRE analysis (see also below).

3.2: It was clear that most of the team had had to learn the use-case analysis technique from scratch during the design process, and that this had led to some confusion in the process. In particular the fact that a user-requirements document existed as well as a use-case description of the system. The requirements document was recorded as defunct, and yet it transpired that in the case of QLA, the only subsystem where serious design work was already underway, the design was based on a requirements list rather than a use-case analysis (see also later). The panel felt that the team would have benefited from bringing an experienced use-case expert into their activity early on. However it did not feel it would serve any purpose to do so now.

3.3: Some members of the panel had found the external requirements document very illuminating but noted that it had not been presented for review. It recommends that this document also be reviewed and updated.

4: SCENARIOS DOCUMENT

4.1: The panel noted that the scenarios document was a late addition to the ICC document tree and had not formed a significant part of the analysis process, which it felt it should have done. The document relied very heavily on higher-level Herschel ICC documents, which were not referenced, and in fact added very little that was new to those documents. It was not clear if any additional requirements on SPIRE from the ESA Herschel ICC were identified.

4.2: Some members of the panel felt that the scenarios document would benefit from more detail about the (external) context of the SPIRE ICC software system, as the document already describes the operational and procedural context in good detail. In particular, a number of different software interfaces are presented in the document, but not discussed in any detail. Such information could be included in the document, or referenced from existing documentation.

4.3: The panel felt that the ICC team should take care not to confuse this "scenarios" document, which describes the external constraints within which the ICC and ICC software must operate, with a further "software scenarios" document that they may need to generate during the forthcoming software design process. This latter document will describe how the proposed ICC software design meets key (or all) top-level use cases, tracing software execution by means of sequence diagrams, state charts and the like. The team may want to consider how to name these two documents to help maintain a clear distinction.

5: USE-CASE DOCUMENT

5.1: This document is the key one for the review process. The panel was impressed by the work that had clearly gone into it, and congratulated the team on their achievement. However the panel felt there were some key weaknesses which need to be addressed before the document could be regarded as entirely satisfactory.

5.2: The use-case document should be a tool for the user as well as the software engineer, as constituted the document was very hard to usefully read by a non-software expert. This possibly reflected the fact that the user requirements document had been created first and so the user interests were reflected there rather than in the use-case document. The document could have an appendix or “supplementary requirements document” where detailed specifications were listed.

5.3: It is essential that the document is read and commented on by the Instrument Team once it is made more accessible to them.

5.4: The overall structure should be changed so that the summary level use-cases reflect the real task structure, more along the lines of the presentations made on the second day of the review than as currently presented in the document, followed by the appropriate user-level cases.

5.5: The current document fails to make proper distinction between the ICC as an organisation that has certain tasks to fulfill, and the software system that this organisation creates and uses. The document needs to be changed to reflect this.

5.6: As part of this change the panel recommends the team re-define the actor list , ensuring that all actors are being external to the system under consideration. The panel believes the team may find the HCSS actor list helpful in this regard.

5.7: In making these structural changes the panel believes that the team will identify missing actors and use-cases, which should be included in the revised document as and when they appear. It is also of course possible that an interaction of the SPIRE ICC with the HCSS that is not presently captured by a corresponding HCSS use-case.

5.8: The panel strongly recommends that the team re-examine the decision to create the QLA from a requirement list rather than a use-case analysis. The panel believes that going through this exercise now for QLA will not only be a useful exercise in its own right but will make the creation of the IA system later on much easier. The QLA use-case analysis should be included in the revised document presented for re-review in July.

5.9: The panel recommends that the team identify in the use-cases where appropriate which tasks fit into which release of the HCSS and hence which releases of the SPIRE ICC.

5.10: The panel identified a number of detailed technical errors in the use-case document, which are included as an appendix to this report.

6: ICC WORKPACKAGES AND MANAGEMENT

6.1: The presentation from K.J. King was very helpful in helping the panel understand the work breakdown structure, and the overall proposed management scheme. The panel was disappointed however not to see the matrix mapping use-cases onto workpackages and felt that it was essential that this be complete before the next review in July.

6.2: The state of the workpackage description is still very primitive, and it is clearly unrealistic to expect it to be sufficiently complete for detailed review in July. However the panel recommends that at least a summary breakdown be presented, along with the mapping of use-cases to workpackages. The panel recommends that it is essential that as part of this mapping it is essential to identify which work-packages describe essential requirements and which desired requirements.

6.3: The panel recommends that each workpackage is prioritised not just in terms of the requirements as mentioned in 6.2 but in terms of time and software release version as well.

6.4: The panel recommends that by July the ICC manager produce a detailed plan and schedule for the work of the ICC over the next 12 months. One of the key tasks identified in this plan must be the creation of a full plan and schedule for the delivery of the rest of the ICC system over the rest of the project, with all key milestones identified.

6.5: The panel recommends that the ICC manager takes a more active role in leading the activity of the development team than appears to have been the case to date, this is particularly important in filling the communication gap identified between the ICC development team and the SPIRE instrument team.

APPENDIX: Detailed comments on specific aspects of the use-case document

1: HCSS Interaction

There are HCSS use cases defined which address ICC activities. These use cases fall into 3 categories:

1.1: ICC actors interacting with HCSS actors

An example of this is UC-HSC002: Support HSC query. This use case, together with the HCSS use case UCF-121 describes the end-to-end process of answering a user query. A reference (at least) should be made in UC-HSC002 to UCF-121.

1.2: ICC actors interacting with the HCSS

The TN "HCSS use cases for ILT" describes how (we at the HSC see) the instrument engineer and instrument tester using the HCSS during ILT. These should map onto some SPIRE ICC use cases or at least be referenced [and, if possible, the HCSS use cases reviewed for accuracy].

1.3: The HCSS being used as a secondary actor

In HCSS use cases such as UCF-757 and UCF-711 the ICC actor is using an ICC system which then communicates with the HCSS. In these use cases statements are made such as "USR/ EGSE-ILT interact without HCSS participation" or "IT/ EGSE interaction without HCSS participation to execute the test procedure". The SPIRE ICC use cases should fill in what goes on in these situations.

2: Use-case Titles

Some of the use-cases have titles which are nouns. Use-cases are designed to identify actions/operations that actors require of the system - there should be no attempt to explicitly identify candidate classes. Thus, the following use-cases must be re-titled ("verbed"):

UC-CON001
UC-HSC001
UC-ICC007
UC-ICC011
UC-OTH001
UC-DAC106
UC-DAC108
UC-DAS103
UC-DAS105
UC-DAS106
UC-FTS103
UC-FTS107
UC-FTS109
UC-FTS112

3: Examples of Confusion of Nomenclature

3.1: Misidentified Triggers in UC-FTS116, UC-FTS117

In these two use-cases the triggers look more like "motivation" for the use-cases. A trigger should be an event, not a requirement. The text here ought to be under the title "motivation" or perhaps in the "stakeholders and interests" section - as the text describes the reason for creating the use-case. There are other similar examples that the team need to go through and correct (e.g. UC-DAS105)

3.2: Misidentified Actors

In the same two use-cases, the identification of IA as an actor appears to be wrong as the IA entity is clearly not external. Again, there are several other examples of this misuse of actors - many of the data analysis use-cases look, in the present document, like they have an IA actor that should not exist, e.g. UC-DAS105.

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