1. INTRODUCTION

At the last Co-Is meeting I was asked to consider ways of organising the ICC development work in such a way as to define as far as possible a set of workpackages each of which could be assigned to a single individual or institute on the understanding that it would be easier to provide and manage resources to participate in provision of a easily identified workpackage rather than contribute to the work of joint development teams. This document attempts to define such a set of workpackages, although some (coordination) activities will clearly have to be carried out by a team of representatives from several institutes – in these cases I have nominated the appropriate team leader as responsible.

This first version of the note makes no allocation of workpackages to institutes known to want to be involved in development of the ICC. This will be the subject for discussion at the Consortium Meeting in October.

2. WORKPACKAGES

2.1 General

This way of splitting the work will only operate effectively if workpackages are made the responsibility of a single institution, with a clearly identified manager, who has the authority to control the resources available to meet the required deliveries and milestones. Each manager will have to prepare a plan, including schedule, for providing the required outputs and meeting the required deadlines. These managers should be identified at the time that the workpackage is accepted.

The manager will be responsible for reporting progress to the ICC Development Manager

2.2 Data processing Workpackages

The main workpackages concern the processing of data from scientific observations and is based on the data processing steps identified by Tanya during her investigation of the calibration files required for processing SPIRE data. These may need to be modified as a better understanding of the SPIRE Observing modes becomes available.

For information the Data Flow diagrams observation data processing are attached at the end of the document.

Table 1 shows the data processing steps identified in Tanya's Data Flow Diagrams. These are grouped into workpackages containing a set of related processing steps and identifies the calibration files associated with each workpackage.

Table 1: Data Processing Workpackages

Responsible	WP Title	Processing Steps	Calibration Files
RAL	Engineering Data	Apply Bad Pixel Mask Convert to Digital Units Correct for Offsets and Gains Extract HK data	Bad Pixel Mask Conversion Tables
	Detector Response	Determine Relative Response Apply Relative Response Correction Determine Absolute Responsivity Correction Apply Absolute Responsivity Correction	Photometric Cal File Detector Cal File
	BSM	Assign Chop Position to Detector Timeline Assign Jiggle position to Detector Timeline Demodulation	
	Averaging	Statistical Deglitching Average Data	
	Degitching	Deglitching	
	Pointing	Assign S/C pointing to Detector Timeline Correct for Telescope pointing drift Absolute pointing reconstruction Assign Nod Position to new timeline Flag Telescope turn around period	Bolometer Array Offsets File
	Flat field	Correct for Electrical Crosstalk Correct for Optical Crosstalk Apply Flat Field Correction	Electrical Crosstalk File Optical Crosstalk File Flat Field Cal File
	Fourier Transform	Convert from Encoder Posn to Mechanical Posn Convert from Mechanical Posn to OPD Regrid interferogram Phase Correct Fourier Transform	Position Cal File OPD Cal file ZPD for each Detector
	SCAL	Correct for Drift in SCAL output	
	Telescope	Correct for Drift in telescope Background Remove Telescope Emission (TBC)	
	Spectral Response	Correct for Time dependency in Spectral Response Correct for Spectral Response	Time S/R Cal file Spectral Response File
	User Products	Avarage Spectra Convert to Watts Colour Correction Change units to Janskys Determine Source Signal and position	Conversion Calibration File Spectral Response or Colour Correction Cal File Conversion Factors mJy/Str PSF

In essence each workpackage contains the same set of activities associated with a set of data processing steps. These include:

- Definition of the input/output data products
- Definition of the required calibration information
- Checking that the Calibration Plan provides the calibration information
- Analysis of calibration test data to produce the required calibration information
- Specification of the Data processing Steps based on the agreed observing mode definitions
- Development/Coding of the Data Processing Steps in the IA environment, including
    a. the provision of test data
    b. software for generating quality information
    c. software for deriving long term trend data products
- Participation in the CALT, OBST and ISDT in their coordinating roles

The workpackages have been limited to those associated with providing the reduced set of Data Products identified at various meetings as the minimum set which will allow the general observer to start scientific analysis.

3. WORKPACKAGE SUMMARY

Currently only the workpackages for the Development Phase have been addressed

ICC Development Work Packages Summary

Continuous Tasks		
WP No	**Title**	**Responsible**
GHS11X1100	Overall ICC Management Activities	**RAL**
GHS11X3000	Product / Quality Assurance	**RAL**
GHS11X2000	ICC System Engineering	**RAL**
GHS11X4000	Herschel Ground Segment Development	**RAL**
GHS11X5000	ICC Operations during Development	**all**
GHS11X6000	Information dissemination	**all**
GHS13X2000	ICC Design	**all**
	Training	**all**
	Observations and Science Data Reduction Team	**ICSTM**
	Operations Team	**RAL**
	ICC Software Development Team	**RAL**
	Calibration Team	**CEA**

Generation of Instrument Information		
WP No	**Title**	**Responsible**
	Instrument Users Manual	**RAL**
	Instrument Observations	**OBST**
	Ground Testing of Instrument Observations	**RAL**
	Simulation of Instrument Observations	
	Time Estimator	

ICC Development		
WP No	**Title**	**Responsible**
GHS13X1100	SPIRE Contribution to the HCSS	**ISDT**
GHS13X3000	Software Development Infrastructure	**RAL**
GHS13X5000	Quick-Look Analysis	**ISDT**
Data Processing		
	IA Development System	**RAL**
	IA Access Tools	**RAL**
	Engineering Data	**RAL**
	Detector Response	
	BSM	
	Averaging	
	Deglitching	
	Pointing	
	Flat Fielding	
	Fourier Transformation	
	SCAL	
	Telescope	
	Spectral Response	
	User Products	
I/F only	Scan Mapping	
GHS13XB000	Quality Control 'Pipeline'	
	Photometric Data Analysis	
	Spectrometric Data Analysis	
Not Funded	Instrument Simulator	
Not Funded	Provision of Serendipity Mode Processing Software	
Not Funded	Key Programs	

Support to Instrument Team Activities		
WP No	**Title**	**Responsible**
GHS21	**ILT Support**	
GHS21X1000	Provision of ILT System(s) – includes integration of ILT systems	
GHS21X2000	Produce validation software to validate scripts and observation requests	
GHS21X3000	Produce Command Validator	
GHS21X4000	Populate Calibration Database (ILT data)	
GHS21X5000	Support to ILT Tests	
GHS22	**IST Support**	
GHS22X1000	Provision of IST System(s)	
GHS22X2000	Populate Calibration Database (IST data)	
GHS22X3000	Support to IST Tests	

ICC Operations Preparation		
WP No	**Title**	**Responsible**
GHS31	**Facilities**	
GHS31X1000	ICC Operations Centre	
GHS31X2000	DAPSAS (UK) Centre	
GHS31X3000	DAPSAS (Fr) Centre	
GHS33	**Integration and Test**	
GHS33X1000	ICC Integration	
GHS33X2000	Ground Segment Integration	
GHS33X3000	Ground Segment Testing	
GHS34	**Commissioning Phase**	
GHS34X1000	Provision of Commissioning Phase System (ICC@MOC)	
GHS34X2000	Commissioning Phase Support	

WP Title: Overall ICC Management Activities		**WP Number**	GHS11X1100
		Version:	1.2
WP Manager: ICC Development Manager		**Date:**	24 Sep 03
Description: This workpackage covers those activities related to overall management of the design and development of the SPIRE ICC and management of those activities specific to the Operations Centre			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:
1. Development Plans from other centres
2. Reports from other centres
3. Contributions to SIP

Activities:
1. ICC Development Planning, including SIP Provision
2. Organisation of ICC Definition Team Meetings
3. Reporting to ICC Steering Group
4. Progress reporting to SPIRE Project on ICC development activities
5. Progress reporting to Herschel Project on ICC development activities
6. Organisation and support to SPIRE ICC Reviews
7. Support to Herschel Ground Segment Reviews
8. ICC Project Control and Schedule Management
9.

Outputs:
1. SPIRE SIP
2. Progress Reports to SPIRE Project
3. Progress Reports to Herschel Project

Assumptions:
1. The facilities of the SPIRE Project Office are available for use by the ICC.
2. Livelink will be used for all documentation and administration of this system is outside the scope of this workpackage (and the ICC, during the Development Phase)

Notes:

Resources:

WP Title: Product / Quality Assurance		**WP Number**	GHS11X3000
		Version:	1.0
WP Manager: ICC PA Manager		**Date:**	10 Jan 2001
Description: This workpackage covers all PA/QA activities associated with the ICC in the Development Phase			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

1. Provision of ICC Hardware and Software PA/QA Plans
2. Operation of the Configuration Control System (SPR/NCR) for ICC Software development
3. Operation of the Configuration Control System (NCR) for ICC systems development
4. Configuration Control of On Board Software after delivery from IFSI
5. Acceptance of Delivered systems for ICC
6. Liaison with ESA PA Section

Outputs:

1. ICC PA Plan
2. ICC Software PA Plan

Assumptions:

Notes:

Resources:

WP Title: ICC System Engineering		**WP Number**	GHS11X2000
		Version:	1.0
WP Manager: ICC Systems Engineer		**Date:**	10 Jan. 2002
Description: This workpackage covers all system engineering activities associated with the ICC			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

1. SPIRE Operating Modes Document
2. SPIRE Operations Scenario Document

Activities:

1. Definition of Instrument Operations - breakdown to instrument command level
2. Definition of Instrument Data Interface with the spacecraft
3. Definition of SPIRE Operating Procedures
4. Definition of SPIRE Autonomy/Safety Concept
5. Definition of ICC Internal Interfaces
6. Definition of SPIRE ICC Operating Procedures
7. Definition of ICC Testing

Outputs:

1. Operating The SPIRE Instrument Document
2. SPIRE Data Interface Control Document
3. SPIRE Operations Document
4. SPIRE Autonomy/Safety Document
5. SPIRE ICC Interfaces Document
6. SPIRE ICC Operating Procedures Document
7. SPIRE ICC Test Plan
8. SPIRE ICC End-to-End Test Plan

Assumptions:

Notes:

System Engineering activities related to the interface to the FSC are contained in other workpackages

Resources:

WP Title: Herschel Ground Segment Development		**WP Number**	GHS11X4000
		Version:	1.0
WP Manager:		**Date:**	10 Jan. 2002
Description: This workpackage covers all management activities concerned with development and design of the Herschel Ground Segment, including both interactions with ESA and the other Herschel instrument groups.			
Start Date:	**End Date:**	**Type:** Continuous	
Inputs:			
Activities: 1. HGSAG Activities 2. HCSSMG Activities 3. HGS System Engineering 4. Liaison with HSC Development Manager 5. Liaison with ICC Development Managers 6. Monthly progress reporting for SPIRE HCSS development activities 7. Support to Ground Segment Reviews			
Outputs: Monthly Development Progress Reports			
Assumptions:			
Notes: Work related to software development and design is included in the relevant workpackages elsewhere			
Resources:			

WP Title: ICC Operations during Development		**WP Number**	GHS11X5000
		Version:	1.1
WP Manager:		**Date:**	24 Sep. 2003
Description: This workpackage covers all activities concerned with operating ICC facilities during the Development Phase. As ICC systems are developed, purchased, or supplied, they will be operated and maintained as part of the ICC by the relevant centres.			
Start Date:	**End Date:**	**Type:** Continuous	
Inputs:			
Activities: 1. Computer Systems procurement, installation and maintenance, including software licences 2. Defining and Operating procedures for control of access to HSC/ICC systems 3. Operation of ICC Help Desk (TBC) 4. General software maintenance activities for systems that do not have a specific maintenance work package.			
Outputs:			
Assumptions: The SPIRE Project Office will handle all day-to-day organisation and administrative duties			
Notes: For convenience, all recurrent costs (Telephone, Teleconference, Video Conference, consumables) are accumulated under this Workpackage This includes: Software Licensing, Hardware maintenance costs, Publicity materials			
Resources:			

WP Title: Information dissemination		**WP Number**	GHS11X6000
		Version:	1.0
WP Manager:		**Date:**	10 Jan. 2002
Description: This workpackage covers all activities concerned with the dissemination of information to the consortium, astronomers and the general public.			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

1. ICC Web page design and Maintenance
2. Provision of Publicity material
3. Participation in Press conferences
4. Support to PPARC publicity events
5. Maintenance of mail/email distribution lists
6. Participation in Consortium meetings

Outputs:

1. Press Releases
2. Publicity Material

Assumptions:

Notes:

Resources:

WP Title: ICC Design		**WP Number**	GHS13X2000
		Version:	1.0
WP Manager:		**Date:**	10 Jan. 2002
Description: This workpackage covers all activities concerned with the design of the ICC itself			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

The ICC will be designed and developed following an object–oriented methodology employing the following steps:

1. Definition of ICC User Requirements
2. Definition of ICC Conceptual Model and Operations Scenario(s)
3. Definition if ICC Use Cases
4. Definition of ICC Workpackages
5. Definition of Internal ICC interfaces
6. Provision of Design documentation

Outputs:

1. ICC User Requirements
2. Conceptual Model and Operations Scenario(s)
3. ICC Use Cases
4. ICC Workpackages
5. Internal ICC interfaces
6. Design documentation

Assumptions:

Notes:

Resources:

WP Title: Training		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	10 Jan. 2002
Description: This workpackage covers all training activities in the ICC. It is the responsibility of each group participating in the ICC to provide suitable training for their staff			
Start Date:	**End Date:**	**Type:** Continuous	
Inputs:			
Activities: This is the high-level summary workpackage covering ICC training activities throughout the ICC Development Phase: 1. Training in the use of HCSS systems – CUS, MPS, Scheduling 2. Training in the use of external systems – MIB Editor, SCOS2000 3. Other training – programming languages, Operating systems, databases			
Outputs:			
Assumptions:			
Notes:			
Resources:			

WP Title: Observations and Science Data Reduction Team		**WP Number**	
		Version:	1.0
WP Manager: OBST Leader		**Date:**	24 Sep. 2003
Description: This workpackage covers activities concerned with the management of the activities of the OBST as defined in the WP 'Instrument Observations'			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

1. Plan/Control and manage the activities of the OBST
2. Organising and run meetings of the OBST
3. Report on OBST Activities

Outputs:

1. Minutes of Meetings
2. OBST Reports

Assumptions:

Notes:

Participation in the work of the team is covered by individual Data Processing workpackages and the Instrument Observations workpackage. This WP covers the extra tasks and responsibilities of the team leader.

Resources:

WP Title: Operations Team		**WP Number**	
		Version:	1.0
WP Manager: OPST Leader		**Date:**	24 Sep. 2003
Description: This workpackage covers all activities concerned with verifying the operational modes of the instrument and calibration testing and setting up and integrating the ICC for operations			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

1. Provision of MIB, CUS and other instrument databases necessary to implement the instrument operational modes, including observations and building blocks
2. Specification of tests (on the ground and during the Commissioning Phase) to verify correct operation of the instrument in all its operating modes
3. Provision of scripts (Test Control, TOPE, QLA etc) to perform calibration and observation verification tests
4. Analysis of data from tests to verify the correct operation of the instrument in its operating modes
5. Specification and Development of software to process instrument engineering data to monitor the continuing health and performance of the instrument
6. Specification of date processing steps for instrument monitoring during the operations phase
7. Definition of operating procedures and provision of an Operations Plan
8. Installation and test of externally provided systems (SCOS, MIB editor, HCSS, IA)
9. Definition and execution of ICC integration Tests and Herschel Ground Segment Tests
10. Provision of all ICC infrastructure (hardware) and installation of software for use by ICC teams for analysis of test data and for use during the Operations Phase
11. Provision of training for users of ICC Systems
12. Setup of the instrument Cryogenic Test Facility for use during Operations
13. Setup and Training of the Operations Team for the Operations Phase
14. Training of ICC-external users in ICC software and systems
15. Plan/Control and manage the activities of the OPST
16. Report on OPST Activities

Outputs:

1. MIB and CUS databases
2. Test Specifications
3. Test scripts
4. Test Reports
5. Operations Plan
6. OPST Reports

Assumptions:

Notes:

Resources:

WP Title: ICC Software Development Team		**WP Number**	
		Version:	1.0
WP Manager: ISDT Leader		**Date:**	24 Sep. 2003
Description: This workpackage covers all activities concerned with coordination of software development activities in the ICC.			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

1. Coordination of QLA softwar edevelopment
2. Provision of QLA software
3. Provision of QLA documentation (UsersGuide etc)
4. Coordination of IA data processing software development
5. Provision of SPIRE IA software
6. Provision of IA Documentation (Users Guide, Installation Manual, Data Products Definition etc)
7. Support to delivery/installation and test of SPIRE IA Software
8. Plan, Control and Manage the activities of the ISDT
9. Report on ISDT Activities

Outputs:

1. Minutes of Meetings
2. ISDT Reports

Assumptions:

Notes:

Most of the work of the team is covered by individual software development workpackages. This WP covers the extra tasks of the team with respect to delivery of QLA and IA

Resources:

WP Title: Calibration Team		**WP Number**	
		Version:	1.0
WP Manager: CALT Leader		**Date:**	24 Sep. 2003
Description: This team is responsible for defining the calibration plan for the instrument, coordinating activities associated with obtaining the required data and analysing it.			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

Activities:

1. Definition of the SPIRE Calibration Plan (Ground and Flight)
2. Specification of calibration ground tests
3. Coordination of analysis of data from ground calibration tests held at instrument-level
4. Definition of the calibration database
5. Population of the calibration database from ground testing and other facilities (subsystem tests, other telescopes, literature)
6. Coordination of IA data processing modules for calibration data processing
7. Definition of calibration processing procedures
8. Plan/Control and manage the activities of the CALT
9. Report on CALT Activities

Outputs:

1. Calibration Plan
2. Calibration Database
3. Calibration Processing Procedures
4. CALT Reports

Assumptions:

Notes:

Resources:

WP Title: Instrument Users Manual		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep. 2003
Description: The Instrument Users Manual is a document delivered to ESA, which describes all aspects of the instrument design and behaviour. The SPIRE instrument manual will be delivered in two parts: the manual itself, being as far as possible, extracts from existing SPIRE documentation plus operating procedures taken from the AIV activities; and a SCOS2000 database (MIB) containing definitions of the instrument commands and telemetry.			
Start Date:	**End Date:**	**Type:** Continuous	
Inputs: 1. OIRD – contains a table of contents for the IUM 2. Selected SPIRE documentation 3. SPIRE Operating procedures			
Activities: 1. Negotiate contents of IUM 2. Compile IUM from extracted data from SPIRE documentation and AIV Procedures 3.			
Outputs: 1. April 2004: IUM Version1 (CQM/AVM) – delivered with CQM/AVM 2. June 2005: IUM Version 2 (PFM) – delivered with PFM 3. June 2006: IUM Version 3 (Flight) 4. MIB for testing purposes – as needed			
Assumptions:			
Notes:			
Resources:			

WP Title: Instrument Observations		**WP Number**	
		Version:	1.0
WP Manager: OBST Team Leader		**Date:**	24 Sep. 2003

Description: This workpackage covers all activities concerned with end-to-end specification and verification of the instrument observations and their data products. This will require coordination and discussion with all parts of the consortium and with ESA to ensure the optimum use of the instrument and Herschel satellite.

Start Date:	**End Date:**	**Type:** Continuous

Inputs:

1. Simulated data for Observing modes

Activities:

1. Specification of the AOTs, their input parameters as seen by the observer, the logic for translating these into a series of instrument building blocks.
2. Specification of the building blocks in detail (e.g. chop size/frequency, FTS scan lengths/speed, calibration. operations). This will require simulation of expected observation data as well as testing of building blocks with the instrument – see other WPs
3. Specification of the data products from each observation type
4. Specification of the required data processing steps to reduce data from observations into the data products. (The Algorithms used are the responsibility of the s/w writers)
5. Coordination with the HSC and other instruments to ensure compatibility of the observations, processing and data products across the Herschel instruments.
6. Preparation of Verification Plans for Ground and In-Flight (Commissioning and PV Phase) to verify the different observational modes and data processing software
7. Generation of observations to implement the Ground and In-Flight Verification
8. Processing and Analysis of Ground Verification observation data
9. Provision of initial data processing procedures ('pipeline') for standard reduction of observation data
10. Provision of the SPIRE Observer's Manual and additional documentation required for informed used of the instrument

Outputs:

1. April 2004: AOT Specifications
2. April 2004: Building Block Specifications
3. September 2004: Data Processing Step Specifications
4. January 2005: Ground Observation Verification Plan
5. January 2005: Observers Documentation
6. January 2006: Ground Verification observations
7. June 2006: In-flight Observation Verification Plan
8. June 2006: In-flight Verification observations
9. June 2006: Standard Data Processing Pipeline definition

Assumptions:

Notes:

Resources:

WP Title: Ground Testing of Instrument Observations		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep. 2003
Description: This workpackage covers activities associated with testing instrument observation modes and the building blocks that are used to create them. This information is used to select the correct way to implement building blocks and their use in observations			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

1. April 2004: Building Block Specifications
2. April 2004: Observation mode specifications

Activities:

1. Generation of building blocks and observations in the CUS to represent the specifications
2. Specification of tests to verify the building blocks and observations
3. Execution of the tests to verify the building blocks and observations
4. Analysis of the data from tests

Outputs:

1. July 2004: Test Reports
2. December 2004: Test Data for use in testing processing steps

Assumptions:

Notes:

Resources:

WP Title: Simulation of Instrument Observations		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep. 2003
Description: This workpackage covers activities associated with simulating the affect of different building block specifications (e.g. FTS scan speed, chopping frequency etc) on the data that is produced by the instrument. This information is used to select the correct way to implement building blocks and their use in observations.			
Start Date:	**End Date:**	**Type:** Continuous	
Inputs: 1. April 2004: Building Block Specifications 2. April 2004: Observation mode specifications			
Activities: 1. Simulation of the data from specified building blocks 2. Analysis of the data			
Outputs: 1. Test Reports 2. December 2004: Simulated Data for use in testing processing steps			
Assumptions:			
Notes:			
Resources:			

WP Title: Time Estimator		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep. 2003

Description: The time estimator is required to allow observers to check the feasibility of observations and to optimise proposal inputs. There are two versions of the time estimator required; the first is a simple algorithm for estimating the total time of an observation. This will be put into the observers manual and be used by observers to plan proposal submission; the second time estimator will be part of the proposal input system and will give observers an accurate estimate of the time of each observation they enter. It Is not clear how much work this second TE will incur as the proposal input tool interfaces to the CUS, which should be able to provide accurate times for command sequences. The only task will then be too provide information on the way in which observers input is translated into command sequences .

Start Date:	**End Date:**	**Type:** Continuous

Inputs:

1. SPIRE Observation and Building Block Specifications

Activities:

1. Determination of an algorithm for determining the time of an observation
2. Provision of information to allow translation of observers input parameters into command sequences
3. Provision of additional software required for time estimation (TBC)

Outputs:

1. Time Estimator algorithm
2. Time Estimator software (TBD)

Assumptions:

Notes:

Resources:

WP Title: SPIRE Contribution to the HCSS		**WP Number**	
		Version:	1.0
WP Manager: ISDT Leader		**Date:**	24 Sep. 2003
Description: This workpackage covers the contribution made by SPIRE to the development of the HCSS and IA			
Start Date:	**End Date:**	**Type:** Continuous	

Inputs:

1. HCSS System Software Project Management Plan

Activities:

1. Participation in CSDT meetings
2. Participation in IA/QLA working group meetings
3. Participation in HCSS and IA Reviews
4. Software development of specific modules
5. Documentation

Outputs:

1. HCSS and IA software modules
2. HCSS and IA documentation

Assumptions:

Notes:

Resources:

WP Title: Software Development Infrastructure		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03

Description:

Provision of system(s) necessary to allow software development in a controlled manner

This includes provision of a problem reporting system, a version control system, and management of their use.

Start Date:	**End Date:**	**Type:**

Inputs:

1. SPIRE Configuration Management Plan

Activities:

1. Provision of a system for storage and version control of software code
2. Provision of a system for software problem reporting and management
3. Configuration control of software development and releases (including running Configuration Control Board meetings)

Outputs:

1. Software Version Control system
2. Software Problem Reporting system
3. Procedures for use of the systems
4. CCB meeting minutes

Assumptions:

The ESA SPR system and CVS server will be available for use by the ICC.

Milestones:

1. Jan 2003: Version Control system available
2. Jan 2003: Software Problem Reporting system available

Notes:

This WP will make use of much of the HCSS development infrastructure. Only the extra effort to configure it for use by the ICC and for running the CCB are covered by this WP

Resources:

WP Title: Quick-Look Analysis		WP Number	GHS13X5000
		Version:	1.2
WP Manager:		**Date:**	24 Sep 2002
Description: This work package covers the development of the Quick-look Analysis (QLA) software. Several versions will be required for use with different instrument Models.			
Start Date: July 2001	**End Date:** July 2007	**Type:**	
Inputs:			
Activities: 1. Requirements definition 2. Analysis and design 3. Implementation 4. Maintenance 5. Participation in ICC Software Development Team (ISDT) meetings			
Outputs: 1. QLA Requirements Document 2. June 2003: QLA Version 1.0 (AVM) 3. October 2003: QLA Version 2.0 (CQM) 4. June 2004: QLA Version 3.0 (FM) 5. June 2006: QLA Version 4.0 (Flight)			
Assumptions: QLA is outside the scope of the HCSS, though it will make use of it. QLA will attempt to use functionality provided as part of the common IA framework			
Notes: The versions correspond to milestones. It is envisaged that development will be an incremental one with other versions between milestones as new features are added.			
Resources:			

WP Title: IA Development System		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03

Description:

Provision of a system to allow development of IA processing steps. This involved adaption of the common IA working group output to SPIRE requirements

Start Date:	**End Date:**	**Type:**

Inputs:

1. HCSS and IA framework produced by Herschel common development teams
2. Test Data from ground testing or simulation

Activities:

1. Provision of IA Development System hardware
2. Installation of HCSS and IA framework on IA Development System
3. Maintenance of the IA Development System (Updates to hardware and software)
4. System Management of the IA Development System
5. Provision of Stand-Alone IA
6. Provision of documentation for using the Stand-Alone IA System
7. Installation of Test Data on the IA Development System (produced by simulation or from ground testing)

Outputs:

1. IA Development system containing Test Data
2. Stand-Alone IA Software
3. SPIRE Stand-Alone IA Installation Guide
4. SPIRE IA Programmers and User Guides
5. SPIRE Software development guidelines (coding standards, GUI characteristics etc)

Assumptions:

HCSS and IA framework are available in the Spring of 2004

Milestones:

1. June 2004: IA Development System Available
2. July 2004: Delivery of first version of Stand-Alone IA

Notes:

It is expected that IA is normally delivered as a system to be installed on machines at the developer's site and operated in a stand-alone mode.

A central IA Development System (HCSS + IA) will be installed to allow testing of ICC IA activities and will allow remote access to data products by developers. It will also provide for external developers remote retrieval and storage of data products.

This WP include any development of the HCSS Access Control System and the HCSS Sandbox environment necessary to control developers access to the HCSS

Resources:

WP Title: IA Access Tools		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03
Description: Provision of a set of tools to allow IA processing steps developers access to data products.			
Start Date:	**End Date:**	**Type:**	
Inputs:			
Activities: 1. Provision of software to allow reading and writing of data products from/to files (to include FITS format files) by IA 2. Provision of software to allow **local** retrieval/storage of data products on an HCSS system (the central IA Development System) from IA 3. Provision of software to allow **remote** retrieval/storage of data products on an HCSS system (the central IA Development System) from IA 4. Participation in Software Development Team (ISDT) Meetings			
Outputs: 1. 'Import/Export Data Product' software 2. 'Local Data Access' Software 3. 'Remote Data Access' software			
Assumptions:			
Milestones: July 2004: Delivery of 'Import/Export Data Product' software July 2004: Delivery of 'Local Data Access' Software January 2005: Delivery of 'Remote Data Access' software			
Notes:			
Resources:			

WP Title: Engineering Data		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03

Description:

Provision of IA processing steps to extract raw data from the database, convert into engineering units and format as Engineering (Level 1) Data Products.

These processing steps should deal with data from Detectors, PCAL, SCAL, SMEC, S/C, Housekeeping and BSM and convert from ADC values into voltage, current etc.

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Definition of Spacecraft pointing data
3. TM data (ingested into the HCSS) containing data of each type
4. Conversion information from instrument manufacturer
5. Test data from ground testing
6. Simulated/test spacecraft data

Activities:

1. Define Level 1 Data products for each type of data (in coordination with other users of the data)
2. Provide software modules to convert raw data into engineering units for each type of data
3. Provide software modules to convert input conversion information and/or test data into conversion tables
4. Prepare conversion table from input data from instrument manufacturers and testing for each instrument model
5. Generation of test data products
6. Participation in OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Conversion tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

1. January 2005: Delivery of Processing Modules for Detector, PCAL, BSM, Housekeeping data
2. TBD: Delivery Spacecraft (pointing) Data definition
3. TBD: Delivery of Processing Module for Spacecraft (pointing) Data

Notes:

Resources:

WP Title: Detector Response	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

Provision of IA processing steps to correct for the relative response of detectors as measured using the PCAL during observations and applying an absolute responsivity correction determined by separate calibration observations.

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information for absolute calibration
3. TM data (ingested into the HCSS) containing test PCAL data
4. Processed test detector and PCAL data products

Activities:

1. Define input data products for detector and PCAL data (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Define a method of using PCAL for relative response determination
4. Define relative responsivity calibration files
5. Define absolute responsivity calibration files
6. Check Calibration Plan provides required calibration files
7. Analysis of data from Calibration Tests
8. Provide software to generate calibration files from input instrument information
9. Provide software modules to determine the relative detector response from PCAL operations and to apply this to detector data.
10. Provide software modules to determine the absolute responsivity correction and to apply this to detector data
11. Define Quality Control data products for monitoring observation quality
12. Provide software modules for deriving Quality Control data products
13. Define long term trend data products for monitoring detector response
14. Provide software modules for deriving long term trend data products for monitoring detector response
15. Participation in OBST, CALT and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Calibration Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

It is TBD whether this WP should also cover use of SCAL to monitor spectrometer detector response

Resources:

WP Title: BSM		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03

Description:

This workpackage deals with the handling of BSM data processing

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information for BSM pointing determination
3. TM data (ingested into the HCSS) containing test BSM data
4. Processed test detector

Activities:

1. Define input data products for detector and BSM data (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Define BSM pointing calibration files
4. Check Calibration Plan provides required calibration files
5. Analysis of data from Calibration Tests
6. Provide software module(s) to determine the relative pointing position from the BSM data
7. Provide software module(s) to use the relative and absolute pointing position to demodulate the chopped data
8. Provide software to generate calibration files from input instrument information
9. Define TBD Quality Control data products for monitoring observation quality
10. Provide TBD software modules for deriving Quality Control data products
11. Define long term trend data products for monitoring BSM operation
12. Provide software modules for deriving long term trend data products for monitoring BSM operation
13. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Calibration Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Averaging	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage covers the data processing for averaging detector data.This will involve taking into account the absolute position of the pixels on the sky.

Included in this WP is some form of statistical analysis to remove outlying data values (deglitching)

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Processed test detector data products

Activities:

1. Define input data products for detector data (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Provide software module(s) to spatially average the detector data and identify and removing (TBC) 'glitched ' data using the absolute pointing position of each pixel
4. Define TBD Quality Control data products for monitoring observation quality
5. Provide TBD software modules for deriving Quality Control data products
6. Define long term trend data products for monitoring detector glitches
7. Provide software modules for deriving long term trend data products for monitoring detector glitches
8. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Deglitching	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage covers those data processing steps used to identify and remove (or flag for removal, TBC) detector data that is affected by 'glitches' – assumed to be caused by cosmic ray hit son the detector

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Processed test detector data products

Activities:

1. Define input data products for detector data (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Provide software module(s) to identify and removing (TBC) 'glitched ' data
4. Define TBD Quality Control data products for monitoring observation quality
5. Provide TBD software modules for deriving Quality Control data products
6. Define long term trend data products for monitoring detector glitches
7. Provide software modules for deriving long term trend data products for monitoring detector glitches
8. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Pointing	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage covers data processing steps, which use spacecraft pointing data to correct for telescope pointing drift and to reconstruct the absolute pointing during an observation

It also covers handling the Nodding mode of the telescope and flagging telescope turn around periods during scan mapping

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Processed test detector and S/C data products

Activities:

1. Define input data products for detector and S/C data (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Define pointing calibration files
4. Check Calibration Plan provides required calibration files
5. Analysis of data from Calibration Tests
6. Provide software module(s) to assign s/c pointing information to the detector data, correcting for telescope pointing drift, reconstructing the absolute pointing, assigning nodding information and flagging telescope turnaround periods.
7. Define TBD Quality Control data products for monitoring observation quality
8. Provide TBD software modules for deriving Quality Control data products
9. Define TBD long term trend data products for monitoring BSM operation
10. Provide TBD software modules for deriving long term trend data products for monitoring BSM operation
11. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Flat Fielding	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage covers data processing steps to remove the different sensitivity of pixels in the SPIRE arrays.

This workpackage initially also includes corrections for optical and electrical crosstalk between pixels, although this may have to be taken care of elsewhere.

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information for flat fielding and crosstalk removal
3. Processed test detector data products

Activities:

1. Define input data products (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Define calibration files for flat fielding and electrical and optical crosstalk removal
4. Check Calibration Plan provides required calibration files
5. Analysis of data from Calibration Tests
6. Provide software module(s) to correct for electrical and optical crosstalk between pixels
7. Provide software module(s) to flat field the detector data
8. Provide software to generate calibration files from input instrument information
9. Define TBD Quality Control data products for monitoring observation quality
10. Provide TBD software modules for deriving Quality Control data products
11. Define long term trend data products for monitoring flat fielding
12. Provide software modules for deriving long term trend data products for monitoring flat fielding
13. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Calibration Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Fourier Transformation	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage covers processing steps to convert photometrically corrected detector data timeline into a spectrum using converted SMEC Data.

This involves assigning an Optical Path Difference to each detector sample, interpolating into an equally sample dataset (TBC), phase correction and Fourier transformation.

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information to convert from SMEC encoder position to Optical Path Difference
3. TM data (ingested into the HCSS) containing test SMEC data
4. Processed test detector and SMEC data products

Activities:

1. Define input data products for detector and SMEC data (in coordination with other users of the data)
2. Define output data products for spectra (in coordination with other users of the data)
3. Define SMEC calibration files
4. Check Calibration Plan provides required calibration files
5. Analysis of data from Calibration Tests
6. Provision of software modules to convert SMEC positional data to Optical Path Difference
7. Provision of software modules to regrid detector data, extract, phase correct and transform interferograms into spectra
8. Provide software to generate conversion table/curves from input data from instrument manufactures and testing
9. Define TBD Quality Control data products for monitoring observation quality
10. Provide TBD software modules for deriving Quality Control data products
11. Define long term trend data products for monitoring SMEC operation
12. Provide software modules for deriving long term trend data products for monitoring SMEC operation
13. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Conversion Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: SCAL	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

SCAL provides a continuous signal into the second port of the FTS. The resultant interferogram reflects the difference between this signal and the input signal.

This deal with data processing to correct for variations in the SCAL signal with time and its spectral content

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information to convert from SCAL housekeeping to signal and spectrum onto detectors
3. TM data (ingested into the HCSS) containing test SCAL data
4. Processed test detector and SCAL data products

Activities:

1. Define input data products for detector and SCAL data (in coordination with other users of the data)
2. Define output data products for detector (in coordination with other users of the data)
3. Define TBD SCAL calibration files
4. Check Calibration Plan provides required TBD calibration files
5. Analysis of data from TBD Calibration Tests
6. Provision of software modules to convert SCAL housekeeping data to signal/spectrum on to detectors
7. Provision of software module(s) to correct detector signal levels for time variation of signal from SCAL
8. Provision of software module(s) to remove for spectral input signal from SCAL from detector signals
9. Preparation of Conversion table/curves from input data from instrument manufactures and testing
10. Define TBD Quality Control data products for monitoring observation quality
11. Provide TBD software modules for deriving Quality Control data products
12. Define long term trend data products for monitoring SCAL operation
13. Provide software modules for deriving long term trend data products for monitoring SCAL operation
14. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Conversion Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products
January 2005: Delivery of Processing Modules
January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Telescope	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage deals with data processing to correct for variation in the input signal due to drifts in the telescope background and removal of telescope emission from spectra

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information to convert from S/C housekeeping to signal and spectrum from the telescope
3. TM data (ingested into the HCSS) containing test S/C data
4. Processed test detector and simulated S/C data products

Activities:

1. Define input data products for detector and S/C data (in coordination with other users of the data)
2. Define output data products for detector (in coordination with other users of the data)
3. Define telscope calibration files
4. Check Calibration Plan provides required calibration files
5. Analysis of data from TBD Calibration Tests
6. Provision of software modules to convert S/C housekeeping data to signal/spectrum on to detectors
7. Provision of software module(s) to correct detector signal levels for time variation of signal from telescope
8. Provision of software module(s) to remove for spectral input signal from telescope from detector signals
9. Preparation of Conversion table/curves from input data from instrument manufactures and testing
10. Define TBD Quality Control data products for monitoring observation quality
11. Provide TBD software modules for deriving Quality Control data products
12. Define long term trend data products for monitoring telescope signal
13. Provide software modules for deriving long term trend data products for monitoring telescope signal
14. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Conversion Data/Tables for S/C

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Spectral Response		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03

Description:

This workpackage deals with data processing to correct for the spectral response of the instrument

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Calibration information to correct fro the instrument spectral response
3. Processed test detector data products

Activities:

1. Define input data products for detector data (in coordination with other users of the data)
2. Define output data products for detector data (in coordination with other users of the data)
3. Define calibration files
4. Check Calibration Plan provides required calibration files
5. Analysis of data from Calibration Tests
6. Provision of software module(s) to correct for the instrument spectral response (it is TBD if this will need to take into account time variations in spectral response)
7. Preparation of Conversion table/curves from input data from instrument manufacturers and testing
8. Define TBD Quality Control data products for monitoring observation quality
9. Provide TBD software modules for deriving Quality Control data products
10. Define long term trend data products for monitoring spectral response variations
11. Provide software modules for deriving long term trend data products for monitoring spectral response variations
12. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Conversion Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: User Products	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

This workpackage deals with data processing to reduce into a form suitable for use by observers for scientific analysis. This completes the generation of minimal SPIRE Data Products.

The currently identified processing includes:

- Averaging Spectra
- Flux conversion to Watts
- Colour correction (TBC)
- Flux conversion to Janskys (TBC)
- Determination of source signal and position from Jiggle observations

Start Date:	**End Date:**	**Type:**

Inputs:

1. IA Development System
2. Definition of Output Data products
3. Processed test detector data products

Activities:

1. Define input data products (in coordination with other users of the data)
2. Define required calibration files
3. Check Calibration Plan provides required calibration files
4. Analysis of data from Calibration Tests
5. Provision of software module(s) to reduce the detector data into the form required
6. Preparation of Conversion table/curves from input data from instrument manufacturers and testing
7. Define TBD Quality Control data products for monitoring observation quality
8. Provide TBD software modules for deriving Quality Control data products
9. Define long term trend data products for monitoring jiggle operations
10. Provide software modules for deriving long term trend data products for monitoring jiggle operations
11. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Processing modules
3. Conversion Data/Tables for each instrument model

Assumptions:

This software will be written in Java/Jython to run inside the IA framework

Milestones:

July 2004: Definition of Data Products

January 2005: Delivery of Processing Modules

January 2005: Delivery of Conversion Data/Tables

Notes:

Resources:

WP Title: Scan Mapping		**WP Number**	
		Version:	1.0
WP Manager:		**Date:**	24 Sep 03

Description:

Full analysis of scan-map data to produce final maps, noise estimates and source extraction will be complex and specialised. This observing mode is expected to be used for large spatial survey programmes carried out by large consortia with relevant expertise, and bringing to the project additional data-processing capabilities over and above what the ICC will provide.

This WP covers the tasks needed to coordinate the provision of this software from external users and define the input data products to be supplied

Start Date:	**End Date:**	**Type:**

Inputs:

Activities:

1. Definition of input Data Products (in coordination with other users of the data)
2. Coordination of Development activities
3. Organisation of Meetings
4. Participation in CALT, OBST and ISDT Meetings

Outputs:

1. Data Product Definitions
2. Data processing software
3. Minutes of meetings

Assumptions:

Milestones:

Notes:

Resources:

WP Title: Quality Control 'Pipeline'	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

The HSC will pass each observation through a standard set of processing steps (pipeline), which should produce an output that allows an assessment of the quality of the data obtained with that observation. Data Processing workpackages include activities to provide quality data at each step of the data processing. This workpackage covers the specification and provision of any additional processing required to provide Quality information and the generation of a Quality Control 'pipeline' for use by the HSC

Start Date:	**End Date:**	**Type:**

Inputs:

1. Specification of the SPIRE Observation modes

Activities:

1. Definition of QCP output products (in coordination with HSC)
2. Development of additional data processing steps, as required
3. Preparation and test of the QCP pipeline

Outputs:

1. Data Product Definitions
2. Processing modules
3. QCP pipeline

Assumptions:

It is assumed that the majority of the processing steps will already be present as part of the standard processing pipeline additional software may be needed to consolidate the information already present in the data products (errors etc) and to perform processing to look for specific problems.

Milestones:

Notes:

Resources:

WP Title: Photometric Data Analysis	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

It is currently planned that the ICC standard processing will stop with the reduction and calibration of the detector data. There is no intention to co-add images to produce maps or to identify sources in these. It is expected that the data can be imported into existing data analysis packages to provide this functionality.

Phase 1 of this work package covers the investigation of available data analysis packages (e.g. SURF) and production of a report on their suitability, both from a functional point of view, and our ability to include it as part of the Herschel Interactive Analysis distribution package (including cost to Herschel and the users)

Phase 2 of this work package, if appropriate, covers the development of the interface to a selected package.

Start Date:	**End Date:**	**Type:**

Inputs:

Phase 2:

1. Processed test IA data products

Activities:

Phase 1:

1. Define the Functional Requirements of the additional package
2. Evaluate available packages
3. Provide a report on their suitability

Phase 2:

4. Development of interface(s) to the package, including testing with data
5. Participation in Software Development Team (ISDT) Meetings

Outputs:

Phase 1:

1. Report on Suitability of Data Analysis packages

Phase 2:

2. Processing modules to interface to package

Assumptions:

Milestones:

Notes:

PACS are providing such an analysis package themselves and would like to discuss its use for SPIRE data. A joint development may be a possible alternative to be considered (though the effort available may preclude this)

It remains to be seen if phase 2 of this workpackage can be accommodated in the ICC budget

Resources:

WP Title: Spectrometric Data Analysis	**WP Number**	
	Version:	1.0
WP Manager:	**Date:**	24 Sep 03

Description:

It is currently planned that the ICC standard processing for spectral observations will stop with the reduction and calibration of the detector data into individual spectra. There is no intention to, for example, co-add spectra or to identify lines within these. It is expected that the data can be imported into existing data analysis packages to provide this functionality.

Phase 1 of this work package covers the investigation of available data analysis packages and production of a report on their suitability, both from a functional point of view, and our ability to include it as part of the Herschel Interactive Analysis distribution package (including cost to Herschel and the users)

Phase 2 of this work package, if appropriate, covers the development of the interface to a selected package.

Start Date:	**End Date:**	**Type:**

Inputs:

Phase 1:

1. Define the Functional Requirements of the additional package
2. Evaluate available packages
3. Provide a report on their suitability

Phase 2:

4. Development of interface(s) to the package, including testing with data
5. Participation in Software Development Team (ISDT) Meetings

Activities:

Phase 1:

1. Report on Suitability of Data Analysis packages

Phase 2:

2. Processing modules to interface to package

Outputs:

Phase 1:

1. Report on Suitability of Data Analysis packages

Phase 2:

2. Processing modules to interface to package
3. Participation in Software Development Team (ISDT) Meetings

Assumptions:

Milestones:

Notes:

PACS are providing such an analysis package themselves and would like to discuss its use for SPIRE data. A joint development may be a possible alternative to be considered (though the effort available may preclude this)

It remains to be seen if phase 2 of this workpackage can be accommodated in the ICC budget

Resources:

GHS4	ICC Operations Phase

GFS41	ICC Operations Continuous Tasks
GHS41X1000	Operations Management
GHS41X2000	Project Office
GHS41X3000	Product/Quality Assurance
GHS41X4000	Support to Consortium
GHS41X5000	Recurrent Costs

GHS42	Routine Operations Activities
GHS42X1000	Monitor Instrument Health
GHS42X2000	Calibration Processing
GHS42X3000	Performance Monitoring
GHS42X4000	Trend Analysis
GHS42X5000	Quality Control
GHS42X6000	HelpDesk
GHS42X7000	Information dissemination
GHS42X8000	Generate Calibration Observations
GHS42X9000	Scheduling Observations

GHS43	Non-Routine Activities
GHS43X1000	Performance verification
GHS43X2000	Key Programmes
GHS43X3000	Problem Handling
GHS43X4000	Calibration Evolution
GHS43X5000	Use of Test Facilities

GHS44	Software Evolution
GHS44X1000	IA Framework Evolution
GHS44X2000	**Data Processing Modules evolution**
44X2100	Implement New/Updated Modules
44X2200	Science Verification
GHS44X3000	Calibration Analysis Modules Evolution
GHS44X4000	Trend Analysis Modules Evolution

GHS45	Software Maintenance
GHS45X1000	SPIRE Contribution to HCSS S/W Maintenance
GHS45X2000	Interactive Analysis Framework and Modules Maintenance
GHS45X3000	Software Infrastructure Maintenance
GHS45X4000	Other ICC Software Maintenance