

Project Specification

Project Name: Tera-Pixel APS for CALICE

Scope: WP-3

Version: 1.1

APPROVAL

	Name	Signature	Date
Project Manager	Jamie Crooks		
Customer/Sponsor	Paul Dauncey		

DISTRIBUTION:

Project Manager:	Jamie Crooks
Customer/Sponsor:	Paul Dauncey
Group Leader responsible for the project:	Renato Turchetta
Division Head responsible for the project:	Marcus French
Project Managers of related projects:	
Programme Manager:	
Quality Manager:	Steve Quinton

1 DESCRIPTION

This document defines the full extent of effort for the WP3 MAPS for CALICE project, covering RAL Technology, RAL PPD, Imperial College London and University of Birmingham. For the purpose of this document, Imperial and Birmingham appear as subcontractors. Indication of assignment of responsibilities is included where relevant.

The WP3 project aims to establish the feasibility of MAPS as a basis for an electromagnetic calorimeter. This is being done within the context of International Linear Collider (ILC) detector developments and in particular within the CALICE collaboration. The project was funded for the period up to the end of FY08/09 with a total budget of £1034k. The full text of the CALICE proposal and WP3 description can be found at

<http://www.hep.ph.ic.ac.uk/calice/>

Note: This document has been updated (April 2008) to reflect recent changes in available funding for this project, due to STFC delivery plan. The primary effect of this cut is the originally planned ASIC2 is no longer possible, but remaining funds allow for a revision to the first test structure to further understanding and aid publications.

1.1 Related Documents

- Project Management Plan: Written specifically to cover the ASIC design work only, which will be undertaken and managed within the EID QA system.
- ASIC1 Technical Specification: Approval as for Project Specification document
- **ASIC1.1 Technical Specification**
- ASIC1 Testing Specification
- **ASIC 1.1 Testing Specification**
- Risk Management Plan
- Stakeholder Plan

2 SCOPE

2.1 Includes

Item	Responsibility
Feasibility study & report	RAL Technology
Specification of ASIC1	RAL Technology
Specification approval	Customer
Design work (ASIC1)	RAL Technology
Interim & final pixel/die NWELL profiles for physics simulations	RAL Technology
Device simulations to support design choices during design	RAL PPD
Physics simulations to support design choices during design	Birmingham, Imperial
Selection of PCB/assembly house & agreement of bond pad specifications	Imperial, RAL Technology
Non-wirebonding feasibility/technique search	RAL Technology
Peripheral/example PCB circuit schematics	Imperial, RAL Technology
DAQ test system for ASIC1	Imperial, RAL Technology
PCB assembly for ASIC1	Birmingham, Imperial
Non-wirebonding tests (see Testing Specification document)	RAL Technology
Basic tests ASIC1 (see Testing Specification document)	RAL Technology
Detailed tests: ASIC1 (see Testing Specification document)	Birmingham, Imperial, RAL PPD
Specification of ASIC1.1	RAL Technology
Specification approval	Customer
Design work (ASIC1.1)	RAL Technology

DAQ test system for ASIC1.1 (as for ASIC1)	Imperial, RAL Technology
PCB assembly for ASIC1.1 (as for ASIC1)	Birmingham, Imperial
Basic tests ASIC1.1 (see Testing Specification document)	RAL Technology
Detailed tests: ASIC1.1 (see Testing Specification document)	Birmingham, Imperial, RAL PPD
Design of beam test PCB	Birmingham
Beam test PCB FPGA design	Birmingham, RAL PPD
Beam test PCB assembly	Birmingham
Beam test DAQ system firmware	Imperial
Beam test operations and data analysis	Birmingham, Imperial, RAL PPD

2.2 Excludes

See responsibility column above.

3 DELIVERABLES

Item	Responsibility
ASIC1 Design to agreed specification	RAL Technology
ASIC1 Common test & evaluation system (DAQ)	Imperial, RAL Technology
ASIC1 Radioactive source test system (hardware)	Imperial
ASIC1 Cosmics evaluation system (hardware)	Birmingham
ASIC1 Testing report	RAL Technology, Birmingham, Imperial, RAL PPD
ASIC1.1 Design to agreed specification	RAL Technology
ASIC1.1 Common test & evaluation system (DAQ)	Imperial, RAL Technology
ASIC1.1 Radioactive source test system (hardware)	Imperial
ASIC2 Cosmics evaluation system (hardware)	Birmingham
ASIC2 Beam test system & DAQ	Birmingham, Imperial, RAL PPD
ASIC1.1 Testing report	RAL Technology, Birmingham, Imperial, RAL PPD

4 CONSTRAINTS

4.1 Budget

Please refer to the Financial Summary sheet that accompanies this document set

4.2 Schedule

- Feasibility study - continuing until end Apr 06
- First design - Start May 06 to end Dec 06
- First fabrication - Start Jan 07 to end Apr 07
- First basic tests - Start May 07 to end Jun 07
- First detailed tests - Start Jun 07 to end Mar 08
- Second design - Start May 08 to end Jun 08
- Second fabrication - Start Jul 08 to end Aug 08
- Second basic tests - Start Sep 08 to end Sep 08

- Second detailed tests - Start Oct 08 to end Nov 08
- ~~Beam test PCB design and fabrication - Start Oct 07 to end Sep 08~~
- ~~Beam test period - Start Oct 08 to end Mar 09~~

4.3 **Performance**

Evaluation of ASIC devices consists of “basic tests” and “detailed tests”, and is documented in the Testing Specification document.

4.4 **Regulatory**

None

5 **IPR AND CONFIDENTIALITY**

The Technology Business Unit (TBU) owns the design databases it has produced. TBU will procure any production tools such as masks or photo-tools, derived from these databases. None of these items will be released unless the appropriate protective agreements are in place.

Aspects of the “OPIC intelligent pixel” design from which some circuits for this project may be derived have been filed for patent protection in the UK. Application number 0412296.6 dated June 02 2004.

6 **PROJECT MONITORING**

The RAL Technology responsibilities of this project will be managed using the online PMFS system, by J. Crooks.

Aspects of this project that are not assigned to RAL Technology are not managed using the online PMFS system, and will be managed by those organisations to which they are assigned in accordance with the processes and procedures in place as appropriate.