

PICMG xTCA for Physics Coordinating Committee

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I. Committee Organization (CCTS)

The xTCA for Physics Coordinating Committee Technical Subcommittee (CCTS) was successfully formed by petition to PICMG¹ by four laboratories² and two companies³ and held its first organizing meeting on March 10, 2009. The Committee as of April 15, 2009 has a membership of 44 industry entities including 5 laboratories and 65 members. The CCTS oversees the formation of Working Groups which then become broadly advertised by a Call for Participation to the PICMG membership. More laboratories are expected to join as the Working Group Technical Committees (WGTS's) become active. PICMG requires approval of the Statement of Work (SOW) of each Technical Subcommittee formed.

II. Officers

PICMG Technical Subcommittees require a Chairman, Recording Secretary and Documents Editor to be elected as Officers at the Organizing Meeting. Elected for the CCTS on March 10th were:

Chair

Ray Larsen, SLAC National Accelerator Laboratory, larsen@slac.stanford.edu

Recording Secretary

Augustus (Gus) P. Lowell, Triple Ring Technologies, apl@tripleringtech.com

Documents Editor

Zhen'An Liu, Institute of High Energy Physics (IHEP), liuza@ihep.ac.cn

Two Assistant positions were also appointed:

Assistant Chair

Stefan Simrock, DESY, stefan.simrock@desy.de

Assistant Secretary

Robert Downing, SLAC consultant. rwd4@mindspring.com

¹ PCI Industrial Computer Manufacturers Group, www.picmg.org

² DESY, FNAL, IHEP & SLAC

³ Cypress Point Research and Performance Technologies

III. Technical Issues

In the first month of meetings range of technical issues was explored through various presentations of work in progress at the participating laboratories. The basis of all discussion is how to extend the existing specifications for physics usage with minimum disruption to the existing standards so as to optimize compatibility (“interoperability”) with COTS products and avoid unnecessary product and market fragmentation.

The foremost areas of need are those in which ongoing projects very soon need to make hardware, software and firmware architecture, packaging and interconnect decisions. These lie in the areas of large machine control systems, notably at DESY for the new XFEL project, and at SLAC and other labs starting upgrades of legacy accelerator control systems. A short summary of major work areas are:

1. Specify Rear IO capability for physics form factor AMC modules in a MicroTCA format with μ RTM
2. Specify AMC modules with IO and compatible ATCA carrier cards
3. Specify a method for distributing timing synchronization and triggering signals to the shelf, carrier and AMC levels.
4. Specify protocols for inter-module and inter-carrier communication for range of usage including low latency fast feedback controls or data acquisition and pre-processing , inter-carrier communications, external long-distance communications
5. Develop specifications and guidelines for enterprise-wide software, IPMI and configuration management systems
6. Develop guidelines for maximum interoperability with existing COTS AMC designs
7. Develop guidelines for cooling system options for AMC, MicroTCA including air, conduction or combination

IV. Working Groups (WGTS's)

The following Working Group Technical Subcommittees are formed:

WG1: Hardware (xTCA I/O, RTM, Timing and Synchronization etc.)

Tasks & Deliverables:

1. Specification of electrical and mechanical interfaces for AMC's with Rear I/O (AMC-REAR-IO) and an associated μ RTM.
2. Specification of electrical and mechanical interfaces of the ATCA carrier for the AMC-REAR-IO.
3. Specification of electrical and mechanical interfaces of an ATCA RTM module that will accommodate the AMC-REAR-IO along with support features such as power, management, JTAG, etc.
4. Specification of E-keying code extensions to the Shelf Management Section to accommodate the additions to the AMC, RTM, μ RTM and the μ TCA shelf specifications.

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5. Specification of lines, both bussed and radial, that are in both ATCA and μ TCA backplanes that could be used for Physics clocks, gates and triggers. If necessary, specify lines that are not in the ATCA and μ TCA backplanes but could be added to the RTM and/or μ RTM for such use.

Officers:

Chair

Robert W. Downing, R.W. Downing Inc., rwd4@mindspring.com

Secretary

Vince Pavlicek, Fermi National Laboratory, vince@fnal.gov

Documents Editor

Dicks Somes, Arroyo Technology Consultants, arroyotech@wbhsi.net

Members:

Advantech	Peter Marek	Intel	Kevin Bross
Agilent	Steve Narciso	Kontron	Stephan Rupp
Arroyo Technology Consultants	Dick Somes	NAT	Vollrath Dirksen
Bittware	Ron Huizen	National Instruments	Matt Friedman
DESY	Stefan Simrock	PCI Systems	C-J. Gross
DESY	K. Rehlich	Pentair/Schroff	Michael Thompson
DESY	T. Jezynski	Pentair/Schroff	Dietmar Mann
Diversified Technology	Joe McDevitt	Pentair/Schroff	Paul Rutherford
Diversified Technology	JP Landry	Performance Technologies	Pete Hawkins
DTI	Joe McDevitt	Performance Technologies	Tony Romero
DTI	Patrick	PICMG Japan	Yoshio Yamaguchi
Emerson	Chris Engels	Pigeon Point Systems	Mark Overgaard
ERNI	Bernd Eifer	RadiSys	Bob Pebly
Fermi Lab	Paul Kasley	SLAC	Bob Downing
FNAL	V. Pavlicek	SLAC	Ray Larsen
IHEP	Z" A. Liu	Foxconn	Elwood Parsons
IHEP	Xu Hao		

WG2: Software (xTCA Architectures & Protocols, Management Systems)

Preliminary SOW:

1. Define protocols and APIs for management and control of real-time data acquisition and machine-control components, to include calibration, synchronization, and triggering mechanisms.
2. Define protocols and APIs for high-rate and low-latency distribution of data among the various data acquisition, machine-control, data processing,

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data storage, and data transmission components, including use of the backplane fabrics within shelves and use of external links between shelves.

3. Define the mechanisms and techniques within the ATCA/ μ TCA infrastructure to manage component-, shelf-, subsystem-, experiment-, and facility-level redundancy and automated failover.
4. Define protocols and APIs for management of resources within an xTCA network, including identification and allocation of common functional modules among subsystems and experiments, management of active module disposition and status, and auditing of component usage and maintenance.
5. Define a common set of APIs and functional blocks at the software and FPGA firmware levels to be provided as a standard development library for xTCA application development, including standard operating system and thread management functions, module identification and data routing functions, standard I/O management functions, and standard data processing blocks.

Officers: *Chair*
 Stefan Simrock, DESY, Stefan.simrock@desy.de
 Secretary
 Augustus Lowell, Triple Ring Technologies,
 alowell@TripleRingTech.com
 Documents Editor
 Ray Larsen, SLAC, larsen@slac.stanford.edu

Members:

Agilent	Steve Narciso	National Instruments	Matt Friedman
Continuous Computing	Mike Coward	Pentair	Michael Thompson
DESY	Stefan Simrock	Pentair	Dietmar Mann
DESY	Koprek	Pentair	Andreas Lenkisch
DESY	Rehlich	Performance Technologies	Pete Hawkins
Diversified Technology	JP Landry	Performance Technologies	Tony Romero
Diversified Technology		PICMG Japan	Yoshio Yamaguchi
Emerson	Chris Engels	Pigeon Point Systems	Mark Overgaard
FCI	Bill Northey	Polaris	Bud Biswas
Huawei	Shanfu Lee	SLAC	Ray Larsen
Intel	Kevin Bross	Triple Ring	Augustus Lowell

Future Guideline Working Group Topics (TBD)

1. Guidelines for Commercial Mezzanine Cards in xTCA
2. Guidelines for Custom Detector Packaging of Standard ATCA and AMC Modules
3. Guidelines for Shelf & Rack Cooling, Environmental Control

V. User Survey

Physics User Survey Task Group (CCTS)

This will be a special task group, also in formation, working under the CCTS. Its purpose is to connect with known physics users who are using or intend to use xTCA platforms in future systems, to assess their requirements and help tailor the WG activities toward addressing them. It will also identify key user contacts to help provide resources to the working subcommittees.

Task Group Leader: Stefan Simrock, DESY

Members to Date: Tomasz Jezynski, DESY; Vince Pavlicek, FNAL
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VI. Working Group Process

The Preliminary Statements of Work (SOW's) are an initial guide to forming Working Groups, each of which becomes a Technical Subcommittee reporting to PICMG but with the results of their work (Specifications or Guidelines) first reviewed and approved by the CCTS Coordinating Committee. The procedure is as follows:

1. Core interest group of CCTS members composes the SOW and proposes formation
2. SOW and formation are approved by the PICMG Executive Committee
3. PICMG-wide Call for Participation is issued
4. WG elects officers at first meeting: Chair, Recording Secretary, Documents Editor
5. SOW may be refined and re-approved
6. Timeline for completion is established
7. Results of the WG are drafted into a Specification or Guideline
8. Draft Specification or Guideline submitted to CCTS
9. CCTS reviews/approves and WG submits to PICMG
10. PICMG-wide vote results in approval after any objections and revisions are addressed

VII. Form of Deliverables

Deliverables will be documents of specifications and guidelines that have been verified against prototype testing and verification.

The documents will be separate *xTCA for Physics Extensions* to the three main documents, namely the ATCA, AMC and MTCA Base Specifications.

Deliverables are submitted to the standard PICMG Approval Process in which the full membership has opportunity to review, request modifications or corrections, and vote final approval.

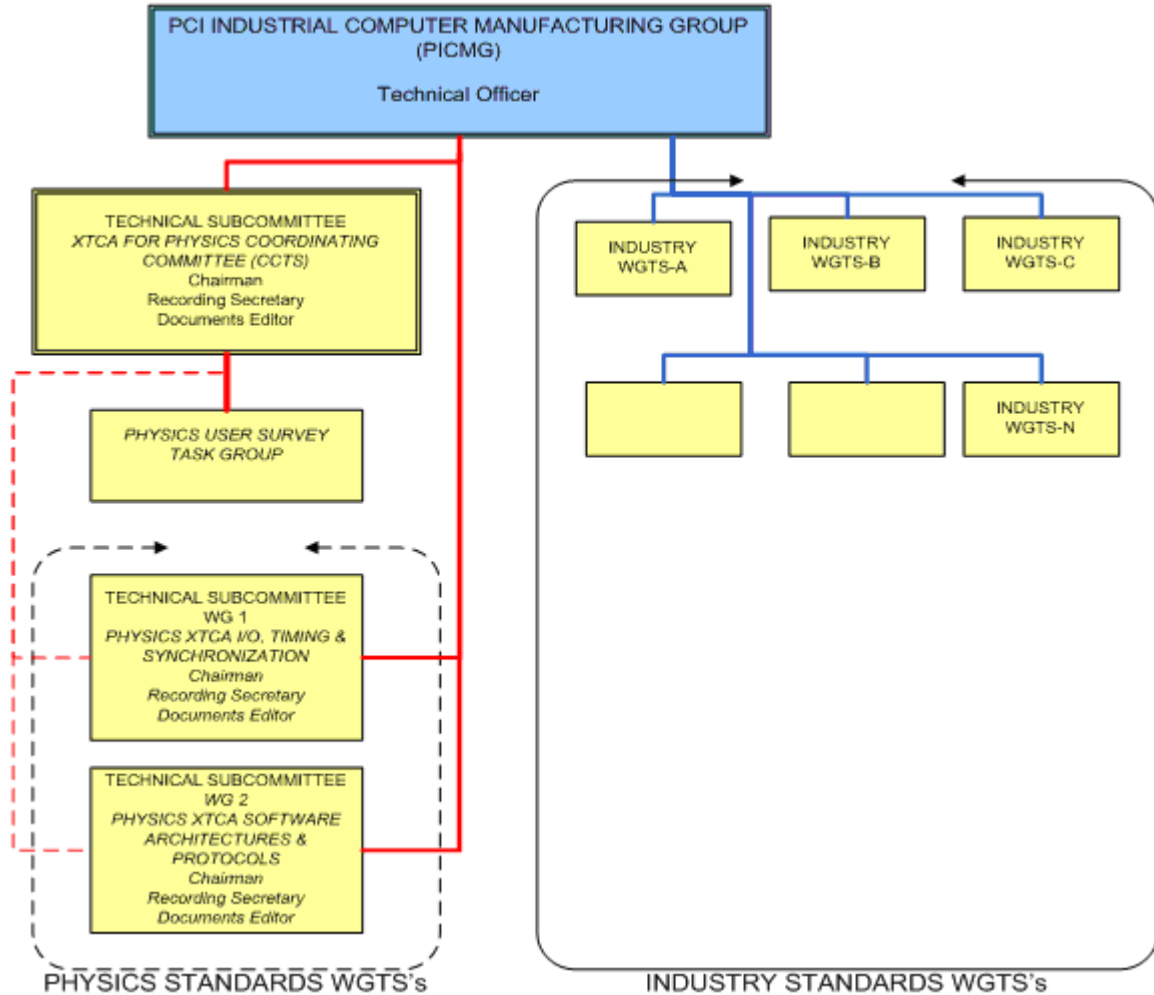
VIII. Organization Chart

The CCTS and any separate Working Groups report to the Technical Officer (TO) of PICMG. The CCTS is responsible for defining and initiating Working Groups which then report directly to the TO along with all existing Industry Working Groups.

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The Work Products of the Physics Working Groups, as described above, are reviewed by the CCTS before being forwarded to the PICMG Executive and issued for vote of approval by the full PICMG Membership.

The relationships are shown in the chart below.



IX. Corporate Member List

The corporate members as of 061209 are listed below. Original sponsors of the Physics Coordinating Committee are shown in **bold**.

Adlink	Diversified Technology	Hybricon	Performance Technologies
Advanet	Elma	IHEP	PICMG Japan
Alcatel-Lucent	Elma/Bustronic	Intel	Pigeon Point Systems
Alstom	Emerson	Jblade	Pinnacle Data Systems
Arroyo Technology Consultants	FNAL	Kontron	RadiSys
Astek	Forshungzentrum Juelich	Lecroy	Rittal/Kaparel
BittWare	Foxconn	Linear Tecxhnology Corp	SAIC
Carlo Gavazzi	Gage	N.A.T.	Scan Engineering Telecom
Communication Automation	GE Fanuc	National Instruments	SLAC National Accelerator Lab
Cypress Point Research	Harting	PCI Systems	Triple Ring Technologies
DESY	Huawei	Pentair/Schroff	Yamaichi

X. How to Join

The xTCA for Physics Coordinating Committee wishes to strongly encourage a broad spectrum of laboratories to join the effort in order to achieve the best possible results for the physics and scientific communities as a whole. Membership applications are handled by Ellen Ricciardelli, ericiardelli@virtualmngmt.com.

To join the PICMG Physics Coordinating Committee or a Working Group, the applicant's corporation or laboratory must first join PICMG at the Associate or Executive level. See PICMG, <http://www.picmg.org> for membership information.

Once corporate PICMG membership is granted, which includes naming a corporate representative individual, membership in the *PICMG Physics Technical Subcommittee* or one or more of the *Working Groups* can be requested specifically. This can be done in response to a Call for Participation or by requesting to be added to an established group. In the latter case the group must vote to accept the member to be added which is usually a formality.

Each individual member of the new member corporate entity who wishes to participate must submit a signed Intellectual Property Rights (IPR) form to PICMG which binds the member to not discuss company or laboratory proprietary information in committee, and to not violate the spirit of the open standard specifications development agreement by seeking to extract proprietary rights from committee work products.

XI. Committee Meetings & Website

The Coordinating Committee meets every 4th week on Tuesdays by Live Meeting and phone at 0700-0900 Pacific Time. All agendas, minutes and presentations are posted to a members-only website under PICMG sponsorship.

WG1 Hardware Working Group meets three weeks out of 4 at the same time as above, alternating with CCTS.

WG2 Software Working Group meets every Wednesday at 0700-0900 Pacific Time by Live Meeting and Phone.

XII. Further Information

Membership Application: Ellen Ricciardelli, ericiardelli@virtualmngmt.com

Organization: Doug Sandy, Technical Officer, Doug.Sandy@Emerson.com

Meeting Information:

CCTS and WG2 Software, Augustus (Gus) Lowell, Secretary, apl@tripleringtech.com;
WG1 Hardware, Vince Pavlicek, Secretary, vince@fnal.gov

General Information:

xTCA for Physics Coordinating Committee: Ray Larsen, Chair, larsen@slac.stanford.edu

WG1 Hardware Working Group: Robert Downing, Chair, rwd4@mindspring.com

WG2 Software Working Group: Stefan Simrock, Chair, Stefan.simrock@desy.de

Asian Contact: Zhen'An Liu, Documents Editor, liuza@ihep.ac.cn