
Introduction

MTCA Workshop
IEEE Real Time 2018
Williamsburg VA June 9, 2018

Ray Larsen

*SLAC National Accelerator Laboratory
for the xTCA for Physics Collaboration*



History of xTCA Physics Workshops

- Physics MTCAs Workshops

- 2007 – RT FermiLab USA, PICMG expert tutorials
- 2008
- 2009 – RT IHEP Beijing CN, xTCA Committees Formed
- 2010 – RT Lisbon Portugal
- 2011 –
- 2012 – RT Berkeley USA
- 2013 –
- 2014 – RT Nara Japan
- 2015 –
- 2016 – RT Padua Italy
- 2017 -
- 2018 – RT 2018 Williamsburg USA

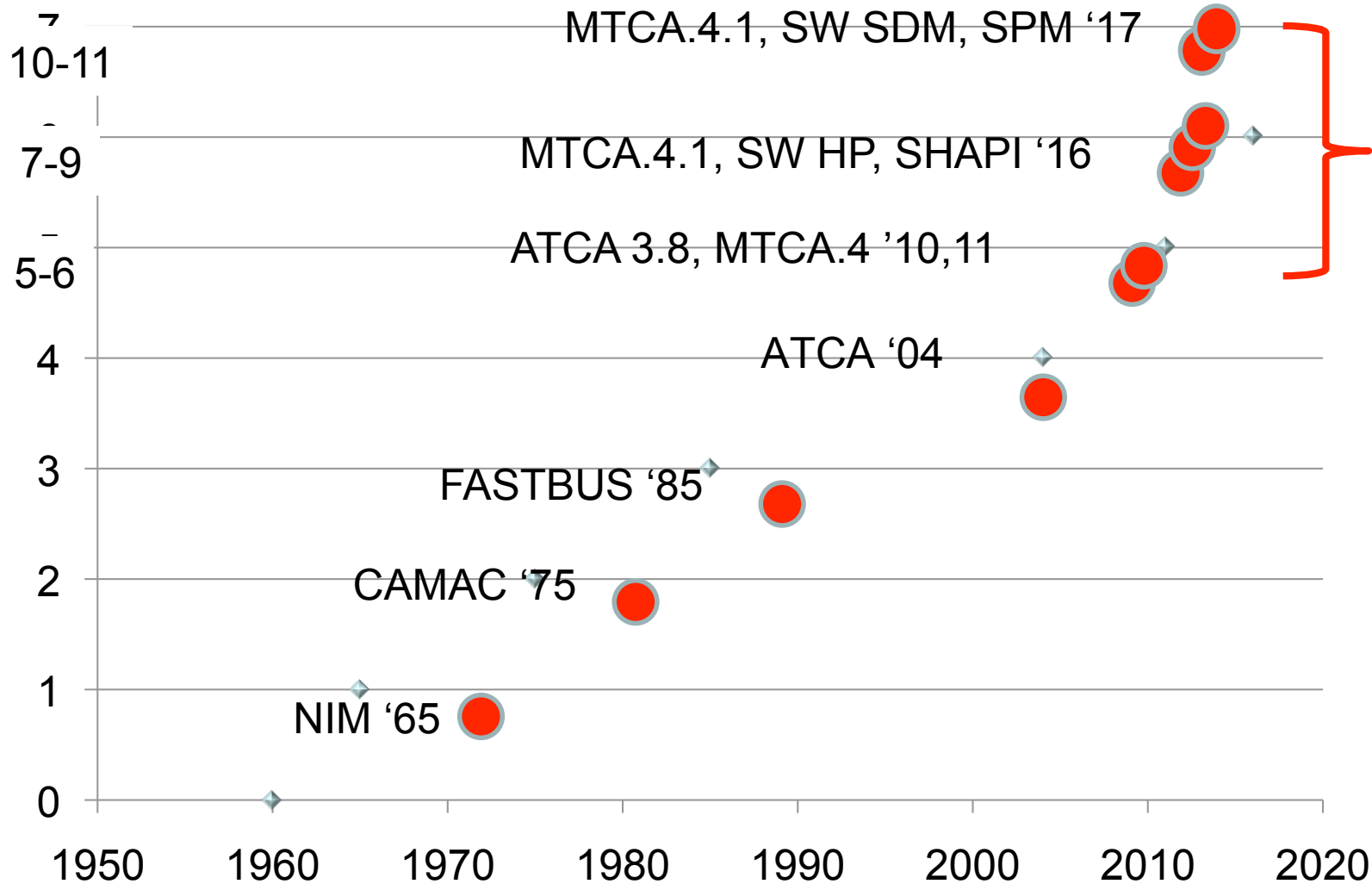
DESX MTCAs
DEC. 2012-2017
2018=7th Annual
CERN Interest Group

Physics Standards History

- Standards driven by new innovations for economic, performance advantages
- Timeline
 - 50 Years ago, ~1965, NIM, Nuclear Instrument Module
 - 40 Years ago, ~1975, CAMAC Data bus modules
 - 30 Years ago, ~1985, FASTBUS 10X BW bidirectional
 - 14 Years ago, ~2004, ATCA, MTCA announced by PICMG
 - Multi-GHz serial technology backplane
 - Redundancy for 0.99999 Availability at Shelf (Crate) level
 - Intelligent Platform Management Interface (IPMI)



Physics Standards Timeline



**xTCA WG
New Standards & SW
Guidelines
2009-17**

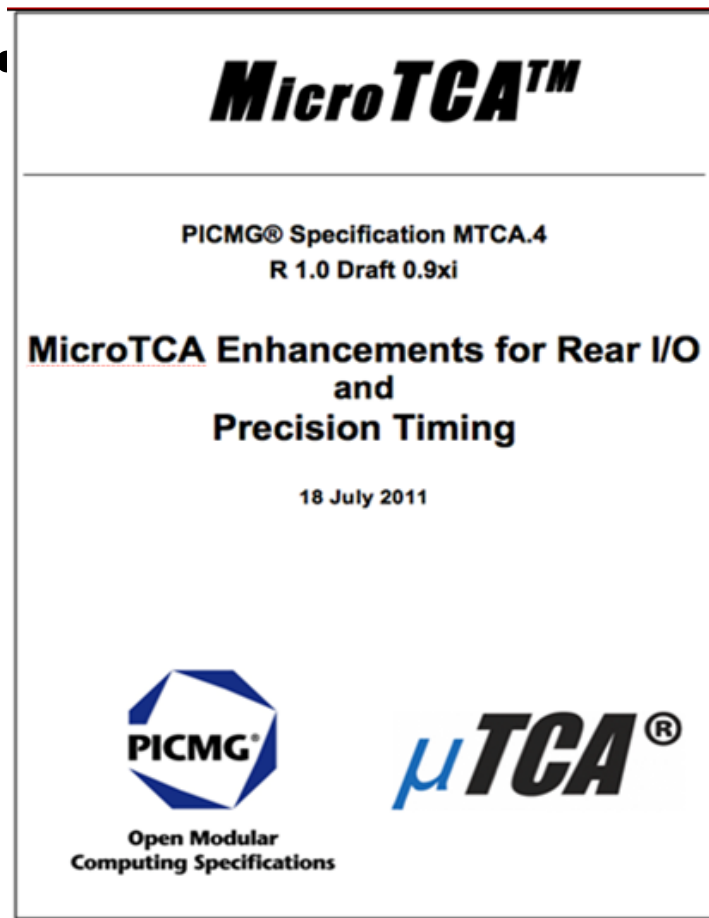
PICMG xTCA for Physics 2002-16

- 2002 ATCA Announced by PICMG for Telcom
- 2004-06 ATCA with μ TCA announced
- 2004-11 NSS-MIC paper advocating ATCA for ILC Controls
- 2005-07 Snowmass Physics controls papers DESY, SLAC
- 2005-11 Gromitz controls presentations DESY, SLAC
- 2007-06 First xTCA workshop FNAL
- 2009-06 xTCA for Physics WG's Announced IHEP IEEE Real Time
- 2011-07 MTCA.4 with RTM Released
- 2016-11 MTCA.4.1 Released; submitted Hot Plug, SHAPI Guidelines
- 2017 -03 Last of 4 SW Guidelines completed



MTCA.4 released July 2011

- MTCA.0 Extensions =>MTCA.4 for Physics



Extension Features:

- AMC-RTM connector standardized with E-Keying, JTAG, IPMI Management & Power from AMC to RTM
- Low-jitter clock lines, point-to-point connections for vector, interlock summing
- RTM added hot-swap feature same as AMC

Enhancements MTC.A.4 =>MTC.A.4.1

- 1. Auxiliary Backplane
- 2. Rear Power Modules (RPMs)
- 3. MCH-RTM
- 4. Boards & Protective Covers
- 5. Applications Classes of RTMs

MTCA.4.1 Final Released 2016


MicroTCA™

PICMG® Specification MTCA Enhancements
MTCA.4.1 D0.8


**MTCA.4.1 Enhancements for
MicroTCA.4**

- ❖ Auxiliary Backplane for Rear Transition Modules (µRTMs & MCH RTM)
- ❖ Rear Power Modules (RPMs)
- ❖ MCH Management Support & Extended Rear Transition Module (MCH-RTM)
- ❖ AMC & RTM Protective Covers
- ❖ Applications Classes of µRTMs

September 16, 2016



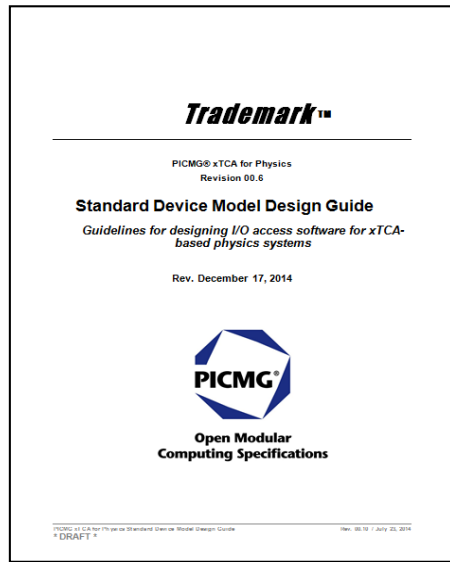
PICMG®
Open Modular
Computing Specifications



µTCA®

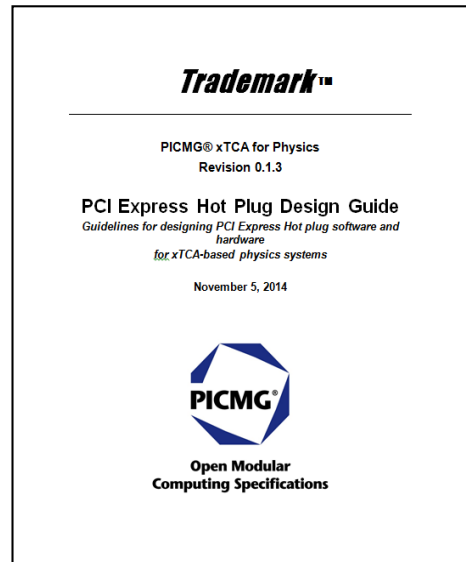
- Name *MTCA.4.1 Enhancements* suggested by PICMG
- Approved, adopted, in printing November 2016

Software Guidelines Completed



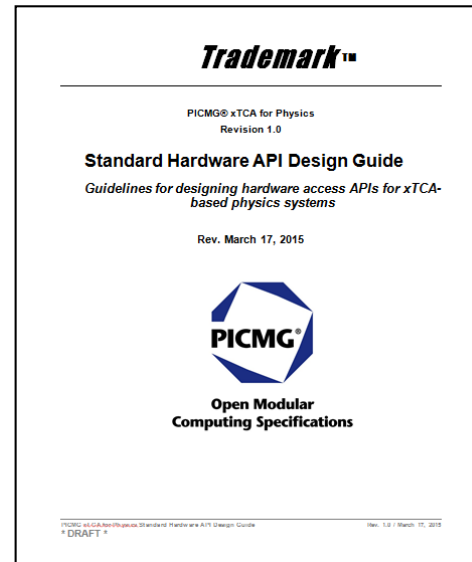
Standard
Device Model
SDM

Dec. 2014



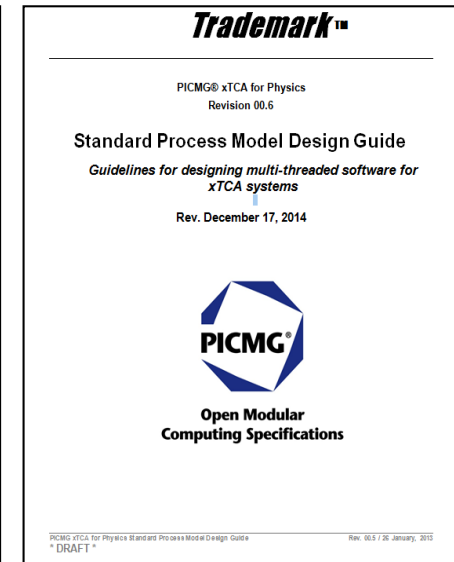
Standard
Hot Plug
Procedure
SHPP

Nov. 2014



Standard
Hardware API
SHAPI

Mar. 2016



Standard
Process Model
SPM

Dec. 2017

Final Steps

- PICMG HW, SW Committees
 - PICMG Policy: Dissolve after Statement of Work complete; renew if new standards work needed; Physics Coordinating Committee can continue to correct, update or renew in future.
 - HWG has to be reformed if undertakes new SOW (re-open to all PICMG Members to participate)
 - SWG will remain active to oversee maintenance issues only until new SOW undertaken (same as HW)
 - Finished Guidelines reside in DESY GitHub repository for community-wide use (contact DESYLab)
- Special thanks to all WG Members and their supporting lab-industry institutions
 - To the entire team; see list of key contributors on following page.

Key Contributors

Hardware WG

- B. Bellur
- K. Czuba
- V. Dirksen
- N. Koll
- T. Lesniak
- Z-A. Liu
- F. Ludwig
- D. Makowski
- D. Mann
- K. Rehlich
- M. Thompson
- E. Waltz
- C. Xu
- A. Young

Software WG

- A. Lowell
- B. Fernandes
- P. Gessler
- B. Goncalves
- M. Killenberg
- D. Makowski
- M. Correia
- M. Munroe
- L. Petrosyan
- P. Fortuna Carvalho
- K. Rehlich
- S. Simrock
- J. Sousa
- T. Straumann
- M. Thompson
- E. Williams

Laboratories

- DESY
- XFEL
- IHEP
- ITER
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- IPFN Lisbon
- IN2P3 Saclay
- ESSB Portugal

Companies

- Triple Ring
- Pentair Schroff
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