ALICE Physics Analysis and Tier1/2 Workshop

March 3 to 7, 2014, Tsukuba, Japan.

筑波大学
University of Tsukuba

広島大学
HIROSHIMA UNIVERSITY

FRANCE-JAPAN PARTICLE PHYSICS
TOSHIKO YUASA LAB.

JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE · FOUNDED 1932 ·

Operations in Thailand

Chinorat Kobdaj and Suriya U-ruekolan

SURANAREE UNIVERSITY OF TECHNOLOGY

NECTEC
a member of NSTDA

LSR
Large Scale Simulation Research

6 March 2014

Tsukuba, Japan

Activities

Her Royal Highness Princess Maha Chakri Sirindhorn

18 May 2000 DELPHI Detector,

9 Dec 2003 RSIS: Role of Science in

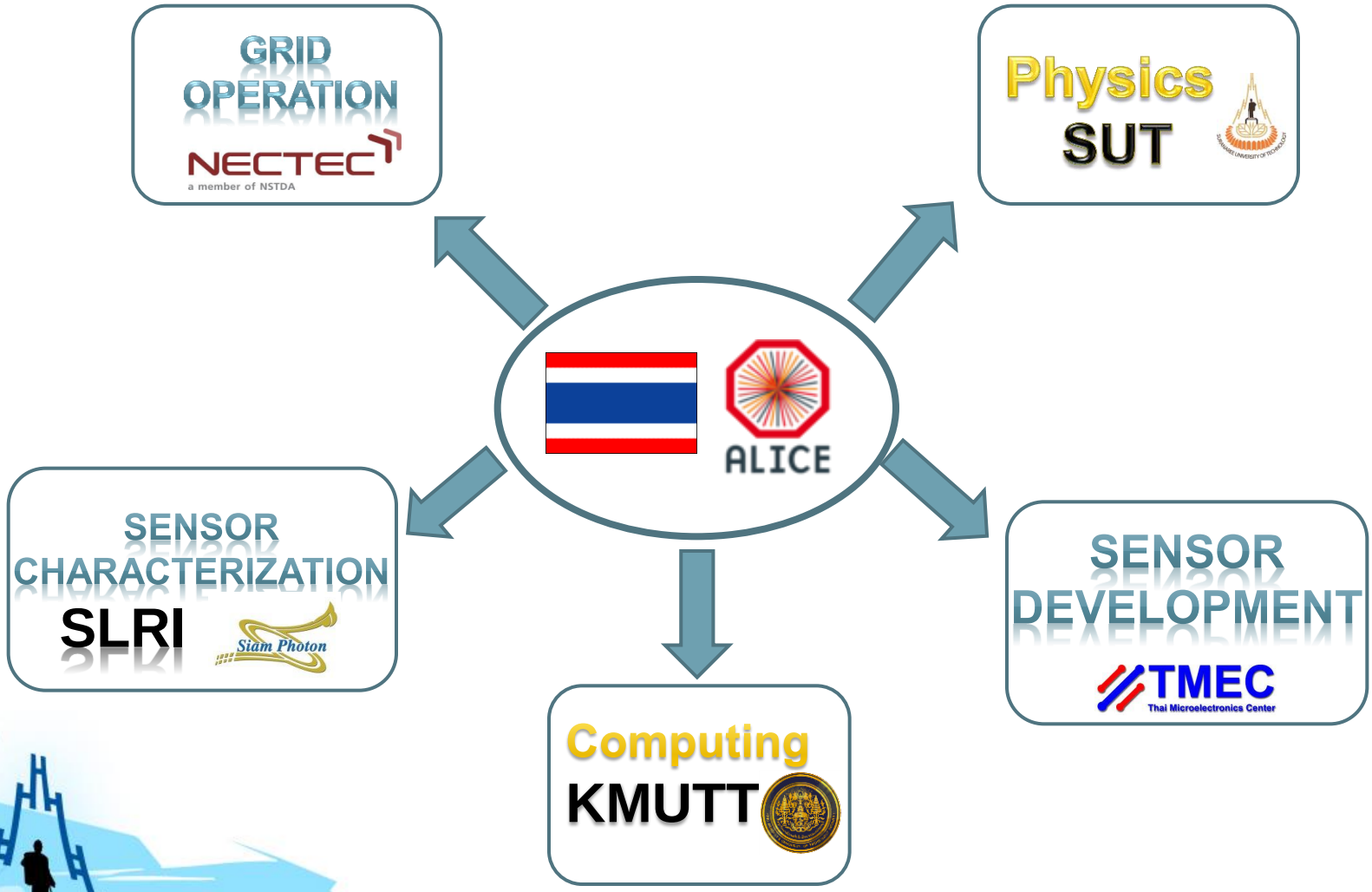
16 March 2009 CMS Detector, LHC

13th April 2010 LHC Briefing

25th December 2009 The Thai-CERN subcommittee consisting of delegates from universities and related research organizations has been appointed and chaired by Prof. Pairash Thajchayapong

National Science and Technology Development

ALICE-THAI COLLABORATION



Thailand participates in ITS upgrade as a consortium effort

- Suranaree University of Technology (SUT)
  - Geometry of the beam pipe and the inner barrel of ITS
  - Physics Analysis
  - Tier 2 site
- Thailand National Electronics and Computer Technology Center (NECTEC)
  - GRID Operation
- King Mongkut's University of Technology Thonburi (KMUTT)
  - Online-Offline operation (O^2)

- Thai Microelectronics Center (TMEC)
  - High resistivity wafer
  - Dummy chip
  - Silicon Micro-channel cooling
  - Thinning and laser dicing
- Synchrotron Light Research Institute (SLRI)
  - Characterization of prototype pixel chips using 1 GeV electron beam

Suranaree University of Technology (SUT)

- The university campus is located at Nakhon Ratchasima province, only 250 km from Bangkok

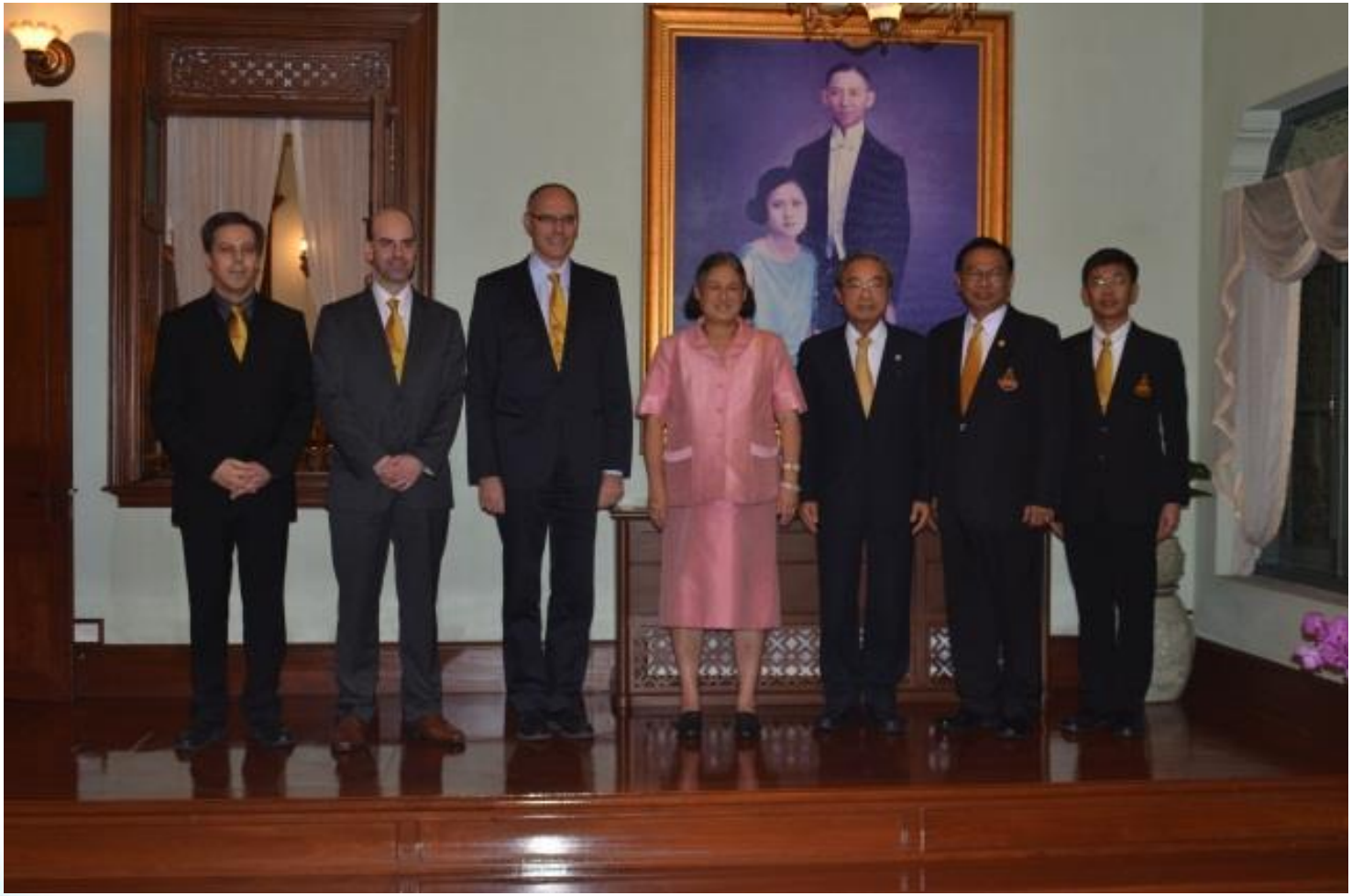
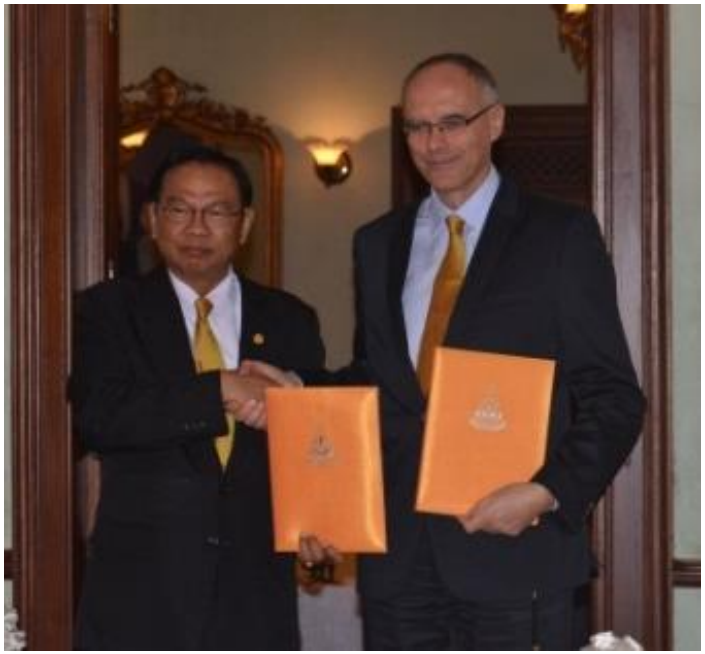


Photo taken at Sra Patum Palace on December 13, 2012

SUT is a full member of ALICE

On 13 December 2012 , there was a signing ceremony Memorandum of Understanding between SUT and ALICE.



NECTEC Background

- NECTEC was established on 16 September 1986, initially as a project under the Ministry of Science, Technology and Energy (the former name of the Ministry of Science and Technology).
- In 1991, NECTEC was transformed into a specialized national center under the National Science and Technology Development Agency (NSTDA), a new agency following the enactment of the Science and Technology Development.
- NECTEC is located at Pathumthani province, 28 km from Bangkok.

The visit to NECTEC from O^2 project

7-9 October 2013

Photo taken at Sra Patum Palace on October 10, 2013

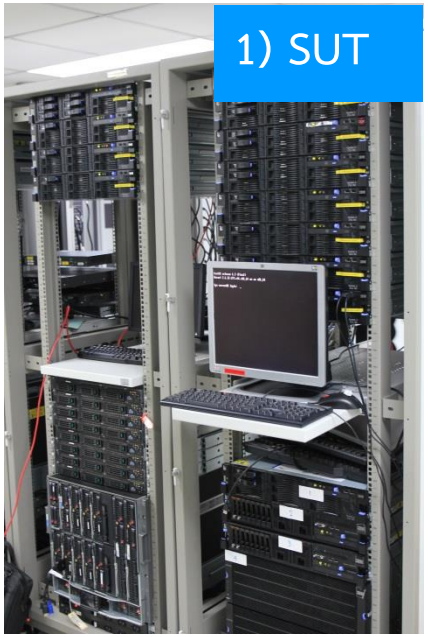
WLCG signing Ceremony

10 October 2013

Resources

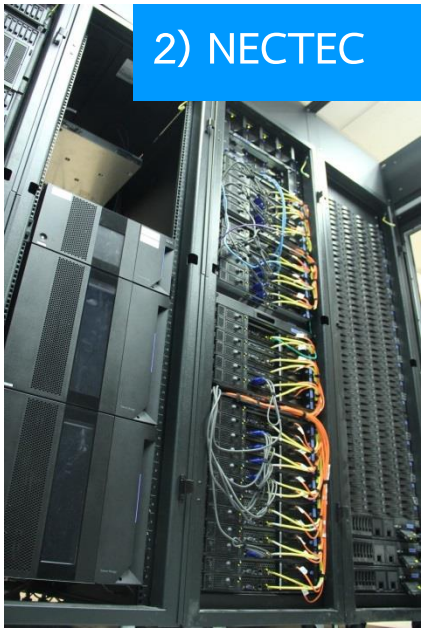
ALICE Grid site in THAILAND

- Collaborate with National Electronics and Computer Technology Center (NECTEC) to setup a Grid site for ALICE@SUT as part of the Thailand National e-Science Infrastructure Consortium



128 Cores IBM x3755 M3

100 TB IBM DCS 3700

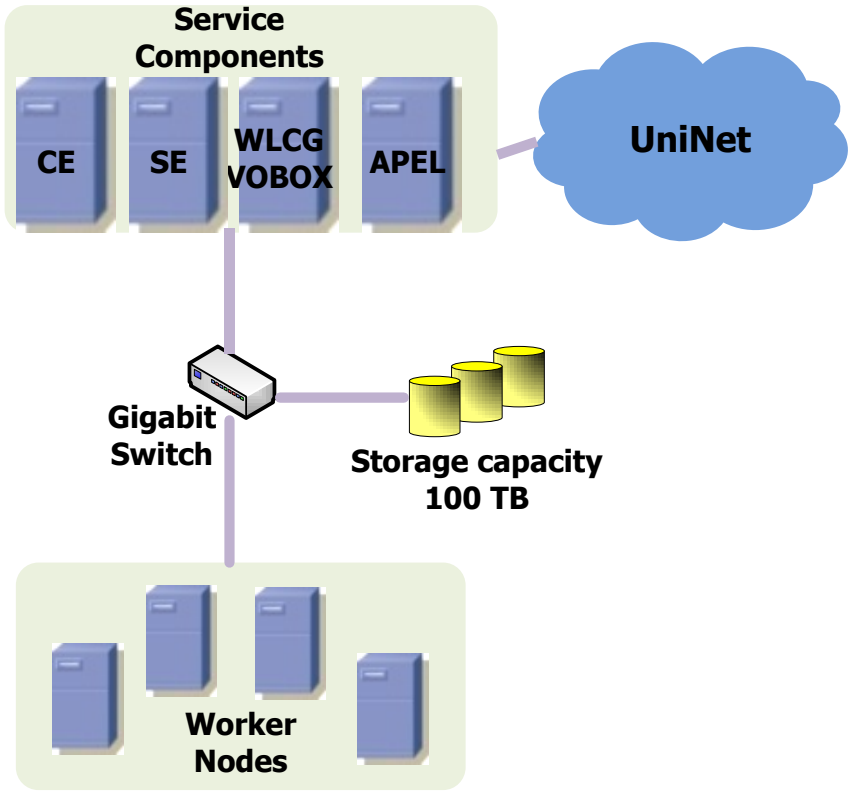


60 Cores IBM iDataPlex d360 M3

30 TB StorageIBM DS 3512

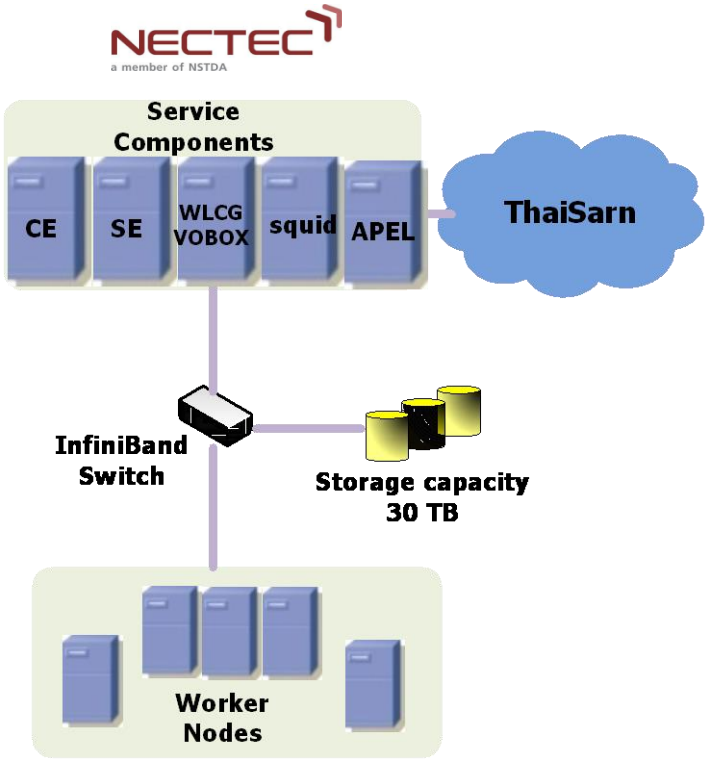
ALICE Grid resource at SUT

- 128 job slots, 2110 HEPSPEC06
- 4 nodes, 32 cores 96 GB RAM per node
- AMD Opteron 2.3 GHz
- Gigabit Ethernet switch
- OS SLC 6.4 with EMI-2 middleware
  - CE, SE, WLCG-VOBOX and Worker Nodes
  - CVMFS 2.1.15, installed on WLCG-VOBOX and all worker nodes
  - Pure Xrootd 3.1.0
  - AliEn software v2-19.218



ALICE Grid resource at NECTEC

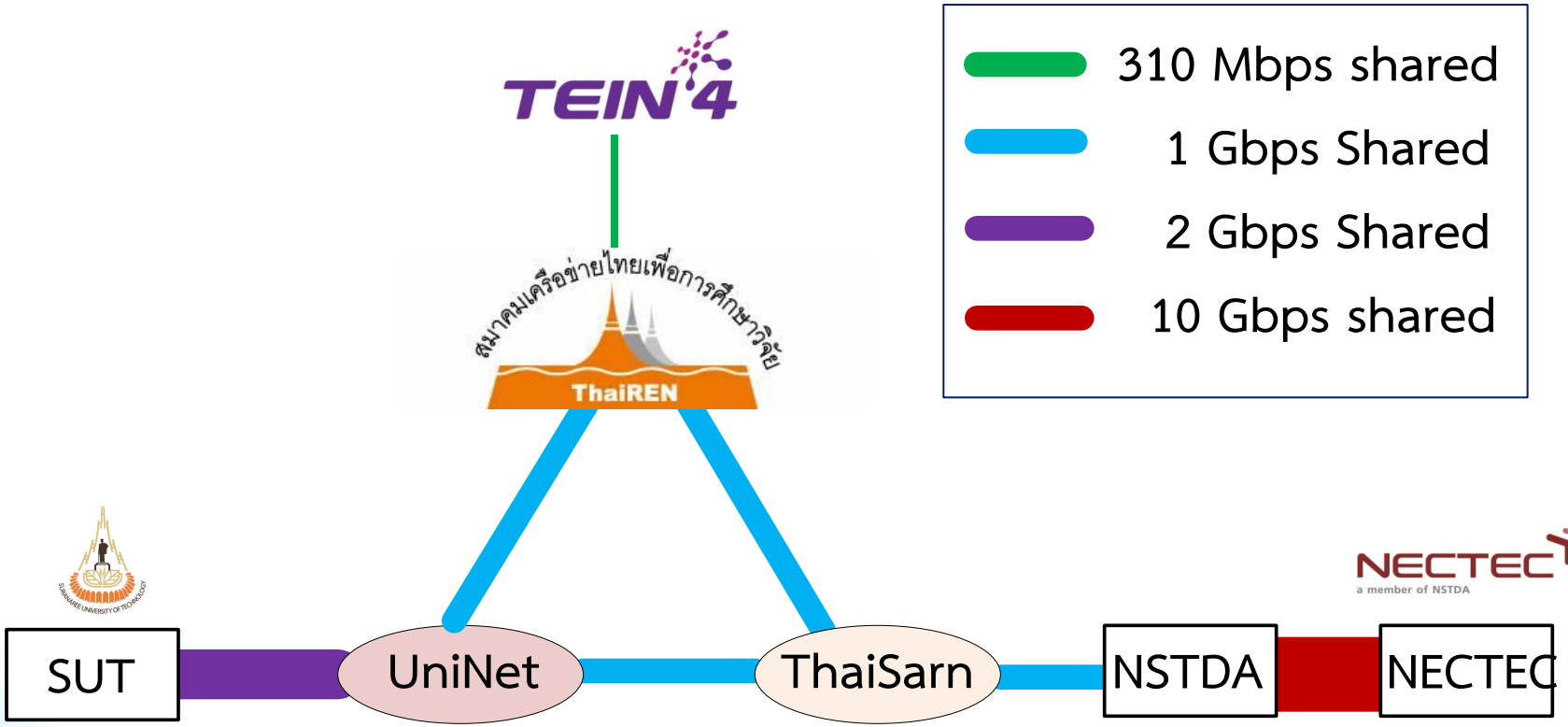
- 60 job slots, 912 HEPSPEC06
- 5 nodes, 12 cores 42 GB RAM per node
- Intel Xeon 2.6 GHz
- Gigabit Ethernet and InfiniBand switch
- OS SLC 6.4 with EMI-2 middleware
  - CE, SE, WLCG-VOBOX, squid frontier and Worker Nodes
  - CVMFS 2.1.15, installed on WLCG-VOBOX and all worker nodes
  - Pure Xrootd 3.1.0
  - AliEn software v2-19.218



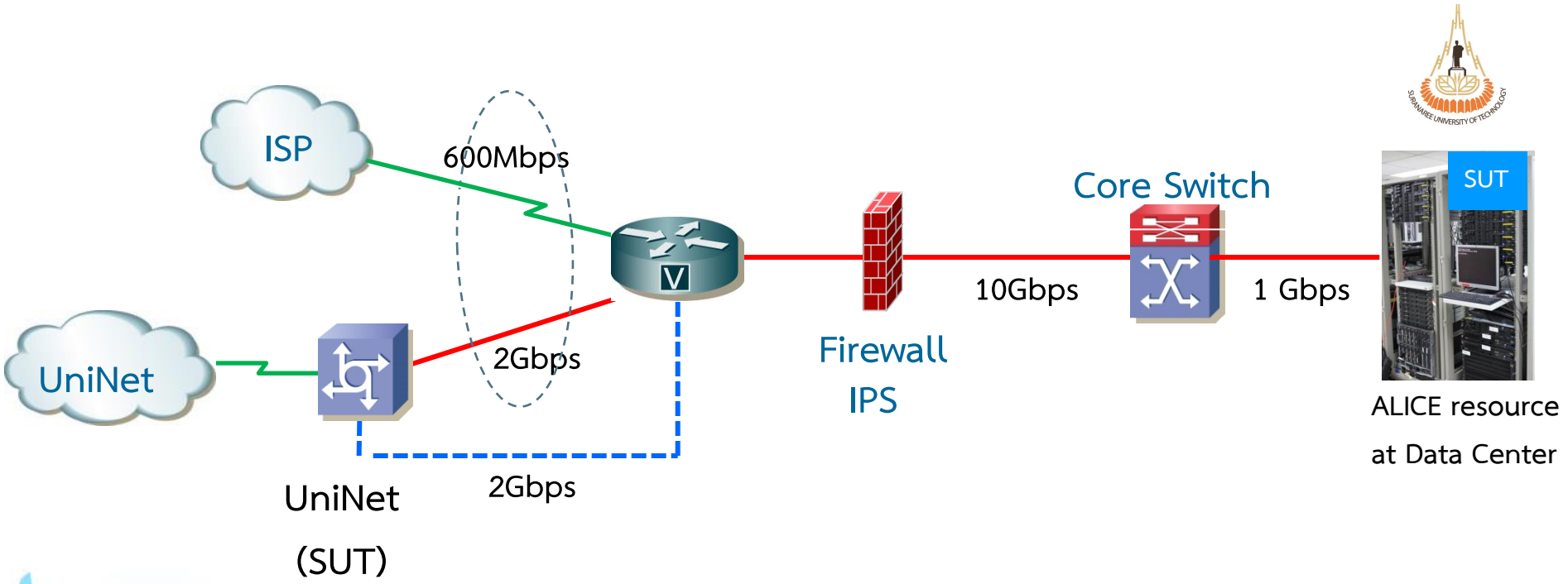
Large-Scale Simulation Research Laboratory
National Electronics and Computer Technology Center

Network

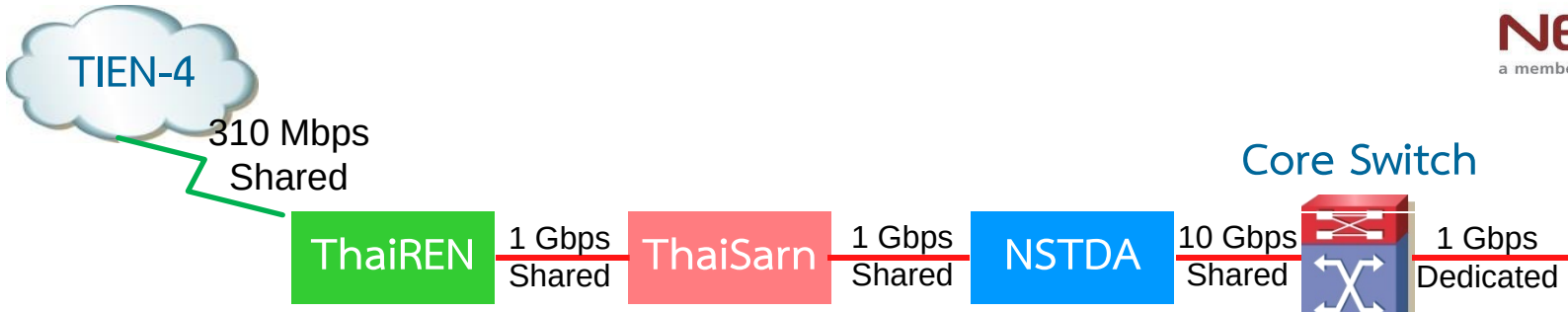
Network Diagram Overview of THAILAND



Network topology at SUT



Network topology at NECTEC



ALICE Resource at Data Center

Network Provider for SUT is UniNet

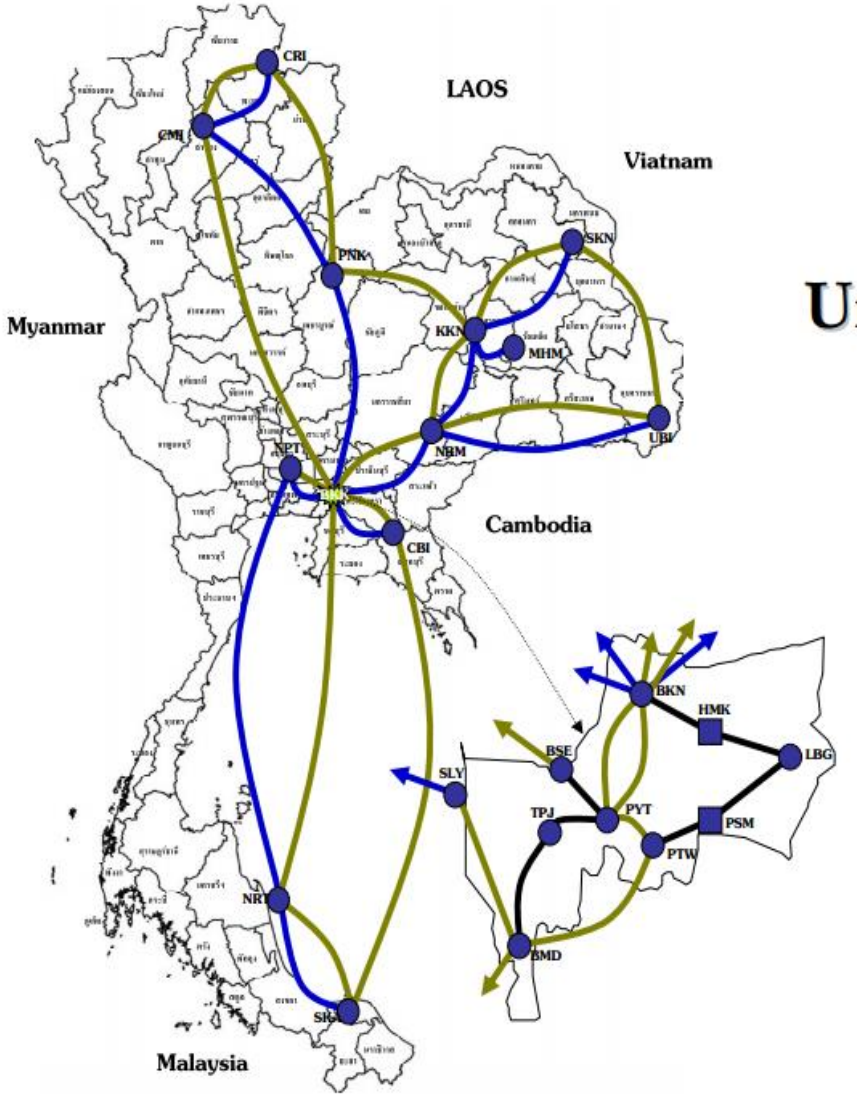
Thailand Education and Research Network

Objectives

- internet access for Universities
- network infrastructure for research
- Facilitate IT campus for Distance Learning

Dr. Wanchai Rivepiboon

UniNet2 Network Topology



ICON

- Giga-POP
- Layer 2 Switch
- LAMDA 10 Gbps
- DWDM_PEA 10 Gbps
- DARK FIBER 10 Gbps

Dr. Wanchai Rivepiboon

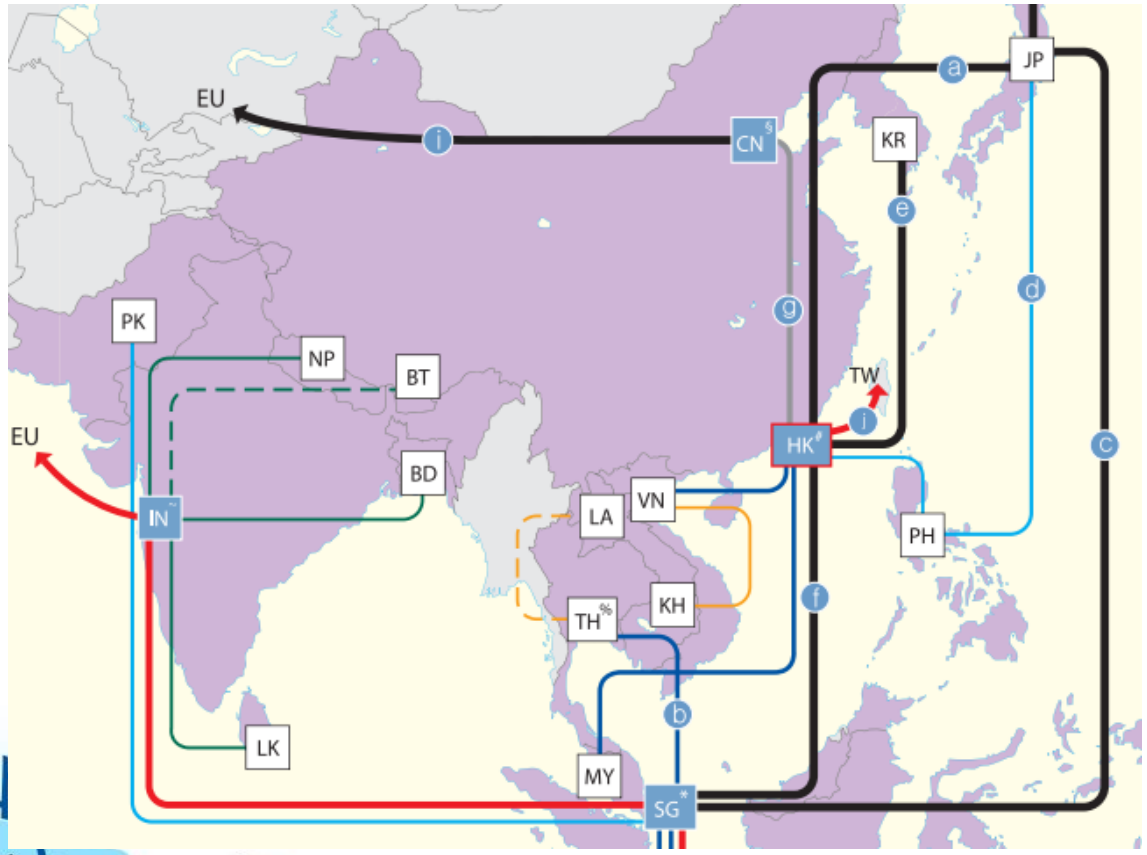
Network provider for NECTEC is ThaiSarn

- The National Electronics and Computer Technology Center (NECTEC) setup a national-wide network called Thai Social/Scientific Academic and Research Network (ThaiSarn)

ไทยสาร 3 ThaiSarn 3
Thailand's Next Generation Internet

NECTEC
a member of NSTDA

TEIN 4



10Gbps
155 Mbps
2.5 Gbps
45 Mbps
1 Gbps
10Mbps
622 Mbps
Planned
TEIN PoPs
TEIN NOC

* SingAREN connected to TEIN SG PoP at 90 Mbps

HARNET connected to TEIN HK PoP at 90 Mbps

~ NKN connected to TEIN IN PoP at 10 Gbps

§ CERNET connected to TEIN CN PoP at 2 x 1 Gbps

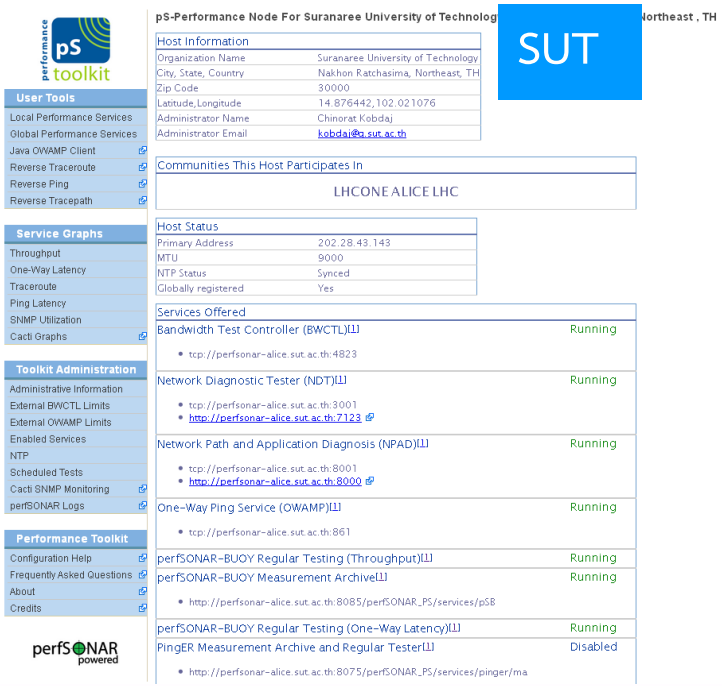
% ThaiREN Connected to TEIN SG PoP at 310 Mbps

www.tein.asia

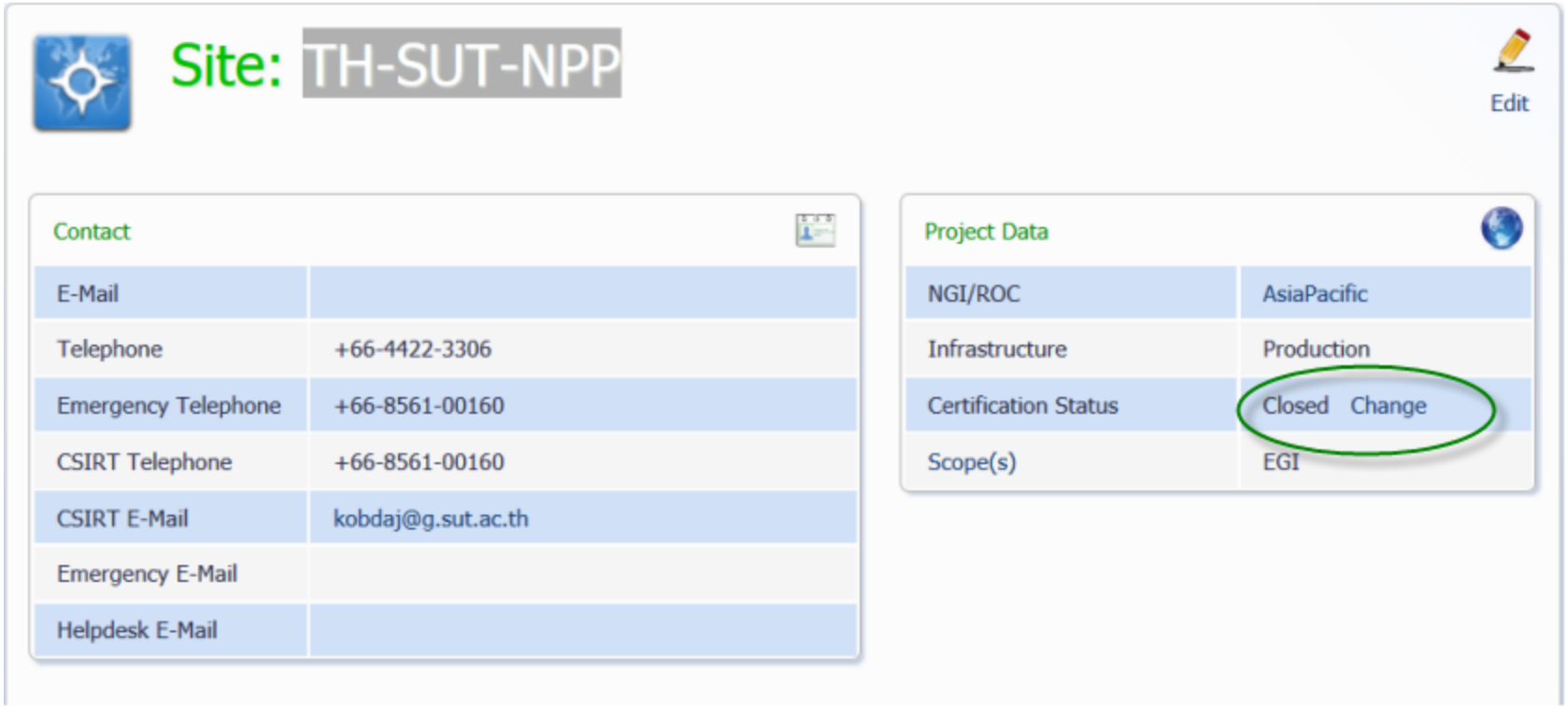
Monitoring

Perfsonar Toolkit

- The Perfsonar toolkit has been deployed on both SUT and NECTEC site for throughput measurement
  - SUT, http://perfsonar-alice.sut.ac.th
  - NECTEC, http://mercury-2.lsr.nectec.or.th



No SAM/SUM yet need GOCDB updated



Site: TH-SUT-NPP

Edit

Contact	
E-Mail	
Telephone	+66-4422-3306
Emergency Telephone	+66-8561-00160
CSIRT Telephone	+66-8561-00160
CSIRT E-Mail	kobdaj@g.sut.ac.th
Emergency E-Mail	
Helpdesk E-Mail	

Project Data	
NGI/ROC	AsiaPacific
Infrastructure	Production
Certification Status	Closed Change
Scope(s)	EGI

Ramp up

To do lists in 2014

- Improve the network performance
- Update our data in GOCDB
- SAM/SUM monitor
- Upgrade to EMI-3

Resource Roadmap 2015 and onwards

- Nothing changed
- Plan to upgrade in 2016 to either more CPUs, storage or network (subject to current performance evaluation)

NECTEC
a member of NSTDA

- Nothing changed

Outlook and plan

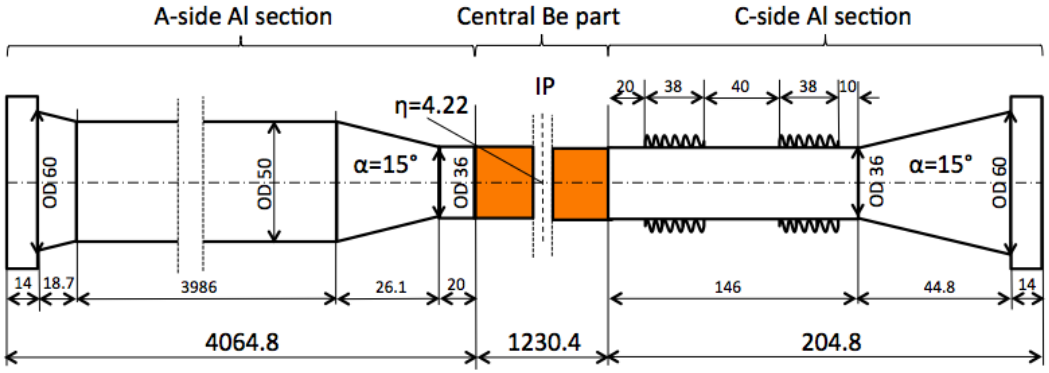
- Upgrade Network to IPV6
- Upgrade Xrootd with IPV6

Back Up

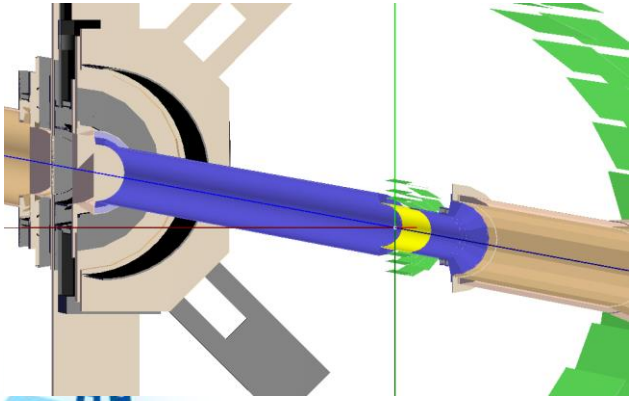
SUT contribution: Detector modeling & MC simulations

Influence of new beampipe geometry (and material) on the induced background

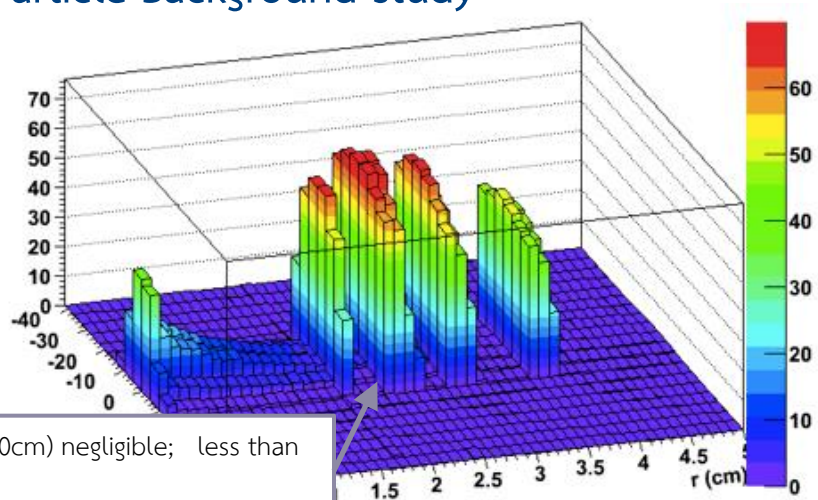
➔ The technical design



➔ AliRoot geometry



⇒ Particle Background study

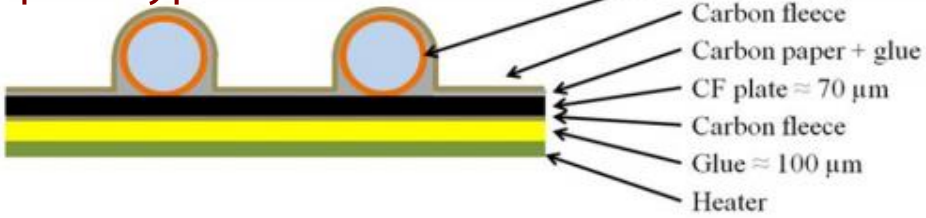


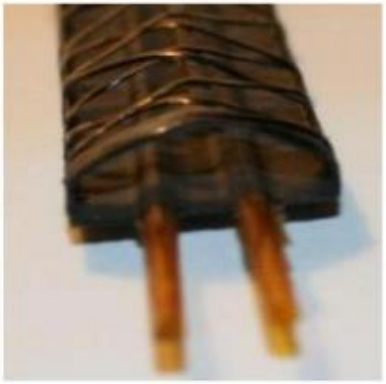
Effect of Al-part (|z|>40cm) negligible; less than 1 per event

More SUT contributions

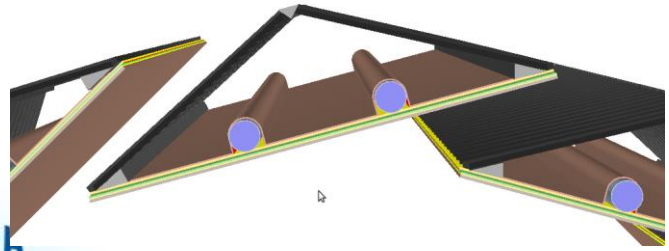
From the technical drawings to detailed material budget calculations

➔ Example prototype:

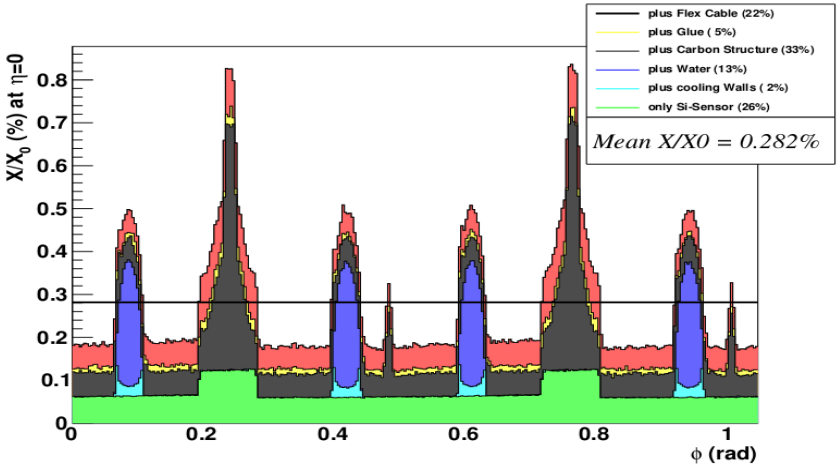




➔ AliRoot geometry

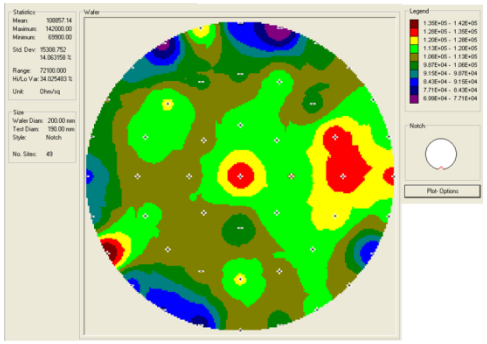


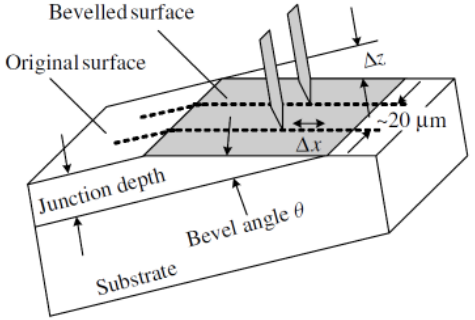
Material Budget



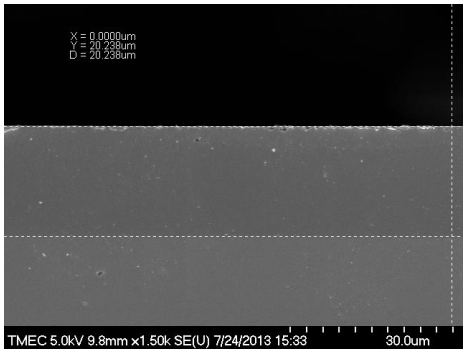
TMEC contribution: Sensor development

- Test of wafer resistivity (4-point probe measurement of the surface resistivity)

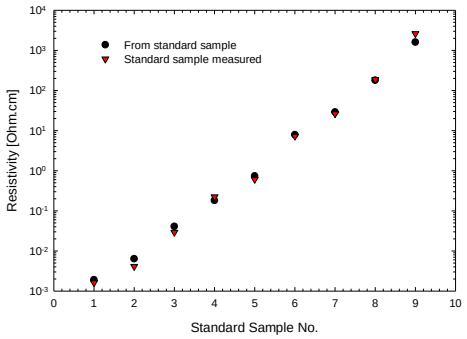




- SEM inspection and measurement of the epi layer thickness



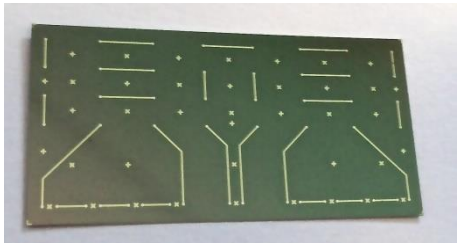
- SRP measurement in preparation

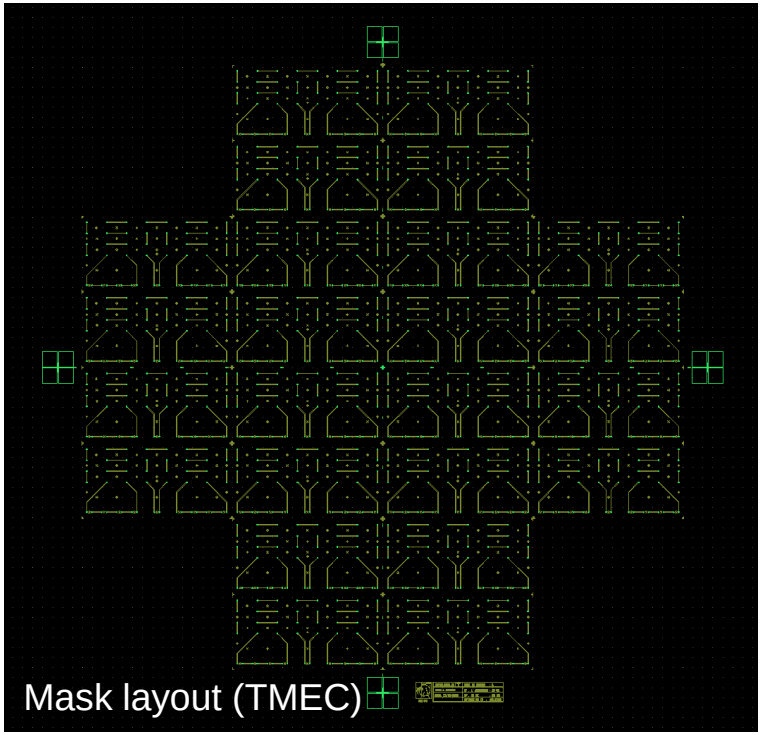


Pad wafer production

Produce mechanical/electrical silicon dies resembling the final ALICE ITS chip

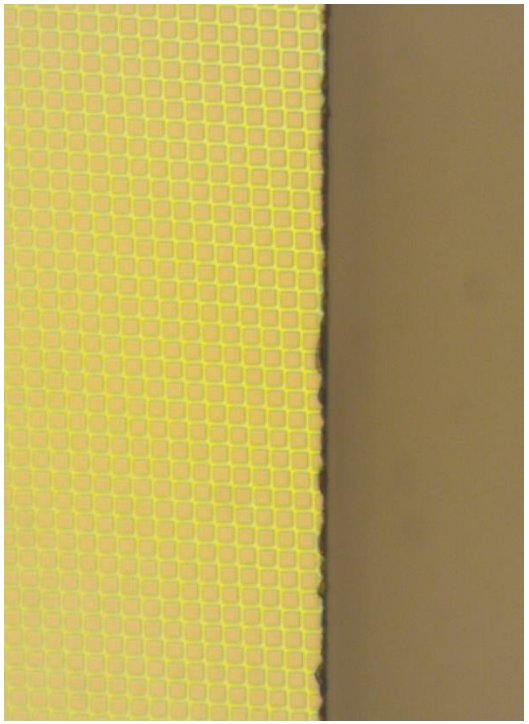
TMEC has produced wafers with the pad-pattern on 6” wafers in house with different metal finish



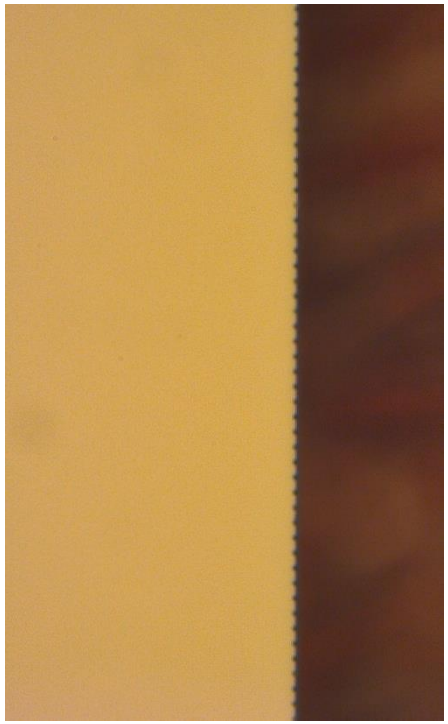


Mask layout (TMEC)

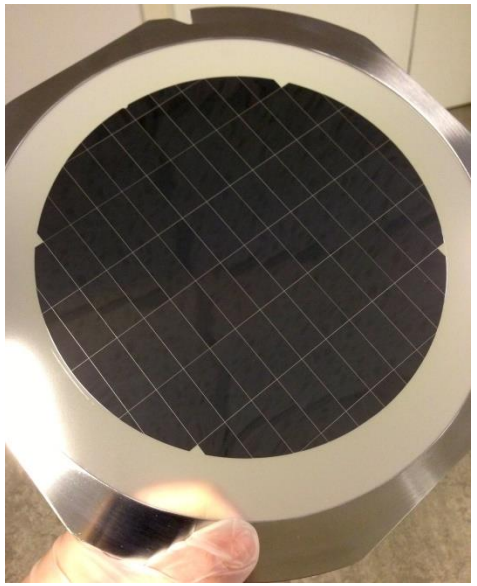
Thinning and laser dicing test using blank wafer done by TMEC partner (STARS



ER2013 wafer
Diamond wheel dicing
(2000 mesh wheel)

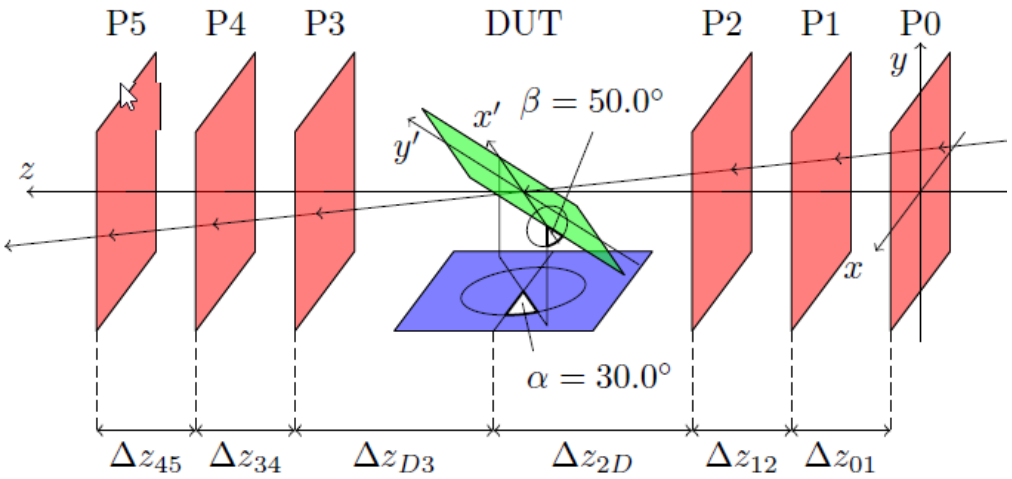


Blank wafer
Laser diced
(front view)

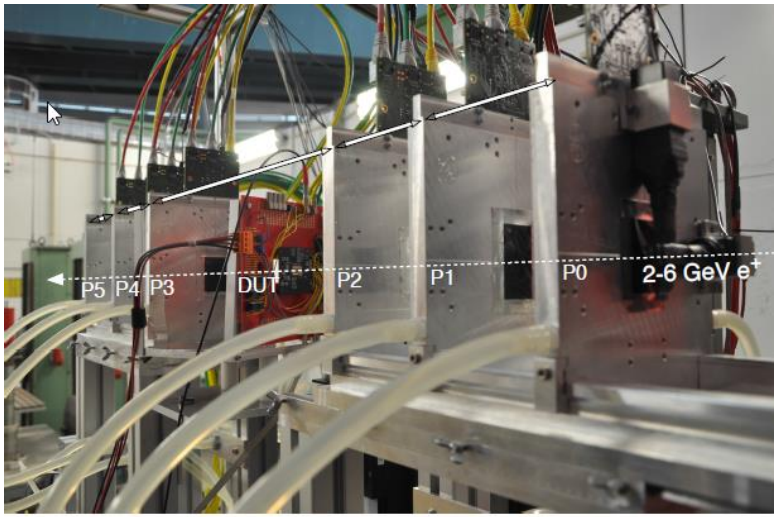


Blank wafer
Laser diced by STARS

Plan to setup similar to DESY beam test



DESY beam (4 GeV/c to 6 GeV/c e^+/e^-)
EUDET telescope (6 planes; ≈5 µm resolution) + DUT

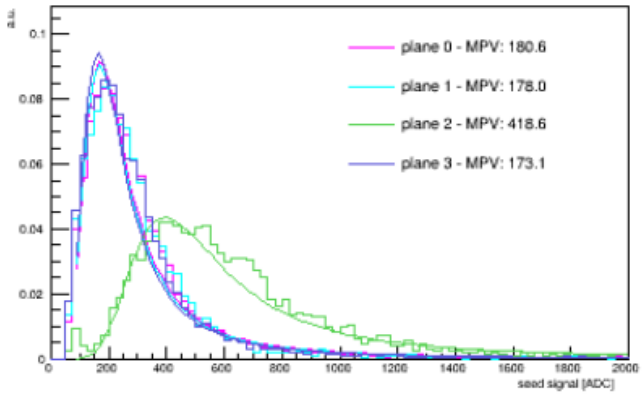


DESY beam (4 GeV/c to 6 GeV/c e^+/e^-)
EUDET telescope (6 planes; ≈5 µm resolution) + DUT

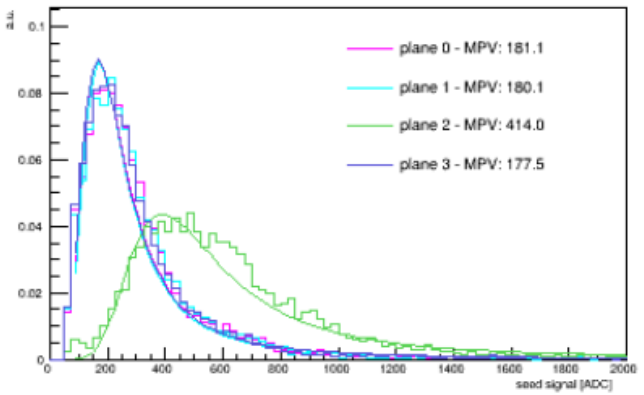
Explorer-1: 1 GeV beam

Study of feasibility of 1 GeV beam for Pixel Chip characterisation:

1 GeV



4 GeV



(plots by Narong Chanlek)

⇝ First results look very promising, study ongoing!