



ACCELERATING INDUSTRY-ACADEMIA

COLLABORATION THROUGH CLUSTER DEVELOPMENT

28-June-2013

TalentCorp
MALAYSIA

CREST
COLLABORATIVE RESEARCH IN ENGINEERING, SCIENCE & TECHNOLOGY CENTER

asQED
Symposium 2013

- ❑ E&E Sector Overview
- ❑ Key focus areas for growth
- ❑ Challenges and interventions
- ❑ Cluster development model
 - Academia-Industry Collaboration
- ❑ Conclusion

E&E Story | How it all began?

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Eight Multinational, famously companies known as "Eight Samurai" started the electronic industry in Penang in 1972.

 *National
Semiconductor*

 **AMD**

 **intel**

 **OSRAM**
Opto Semiconductors

 **HEWLETT®
PACKARD**

 **HITACHI**
Inspire the Next

 **BOSCH**

 **Clarion**

E&E Story | The Growth

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- Over the 40 years, more multinational companies set up their operations in Penang.
- All these made possible by strong foundation in
 - (i). manufacturing capabilities,
 - (ii). knowledge-based talent pool and
 - (iii). government incentives.



E&E Success Stories of MNCs in Malaysia

Intel success story



- Assembly and Test
 - Intel's 1st overseas site was in Penang (1972)
 - Today: sites in Penang, Kulim
- Intel Penang Design Center
 - Large-scale
 - Leading edge chips



Agilent Success Story



Agilent Technologies

- 85% of Agilent Electronics Test & Measurement equipment produced in Penang
- World's Largest Integrated Campus with Full Global Business Charters and Accountabilities.



Human Resources
Minister Award 2012



Best Employer of Choice 2012



Motorola success story



MOTOROLA

- Substantial share of Motorola's of two-way subscriber radios produced in Malaysia
- First regional center in Asia-pacific with combined manufacturing, R&D, and distribution of the products



... including successful local players

Silterra

SILTERRA

- World technology and market leader (~20% global share) in small-panel LCD driver chips for mobile phones
- Global Tier-1 customer base
- International recognition:
 - Semiconductor International's Top Fab Award
 - Frost & Sullivan's SEA Industrial Technologies Award (Consumer Elect.)
 - 2x winner US Commerce Assc Best of San Jose Award for Semicon Devices
- Running at full capacity past six quarters



IRIS

IRIS Bringing Solutions to Life

Digital Identity Solution Provider

- 1st company in Asia to set up fully integrated manufacturing facilities for Contact & Contactless Smart Cards, electronic passport inlays & covers

Pioneered...

- World's 1st electronic passport 1998
- Multi-application smart ID (MyKad)
- World's 1st immigration autogate,
- World's 1st automatic e-passport renewal kiosk

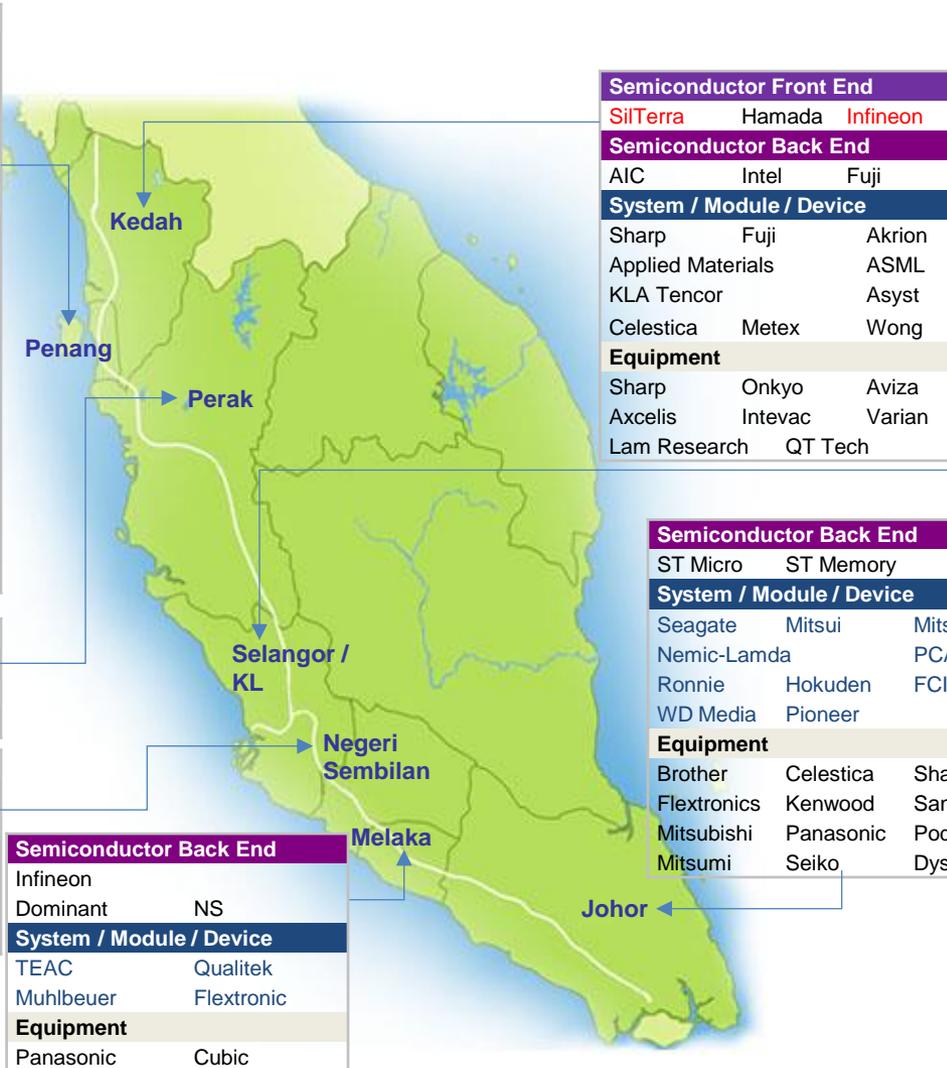


Malaysia E&E Ecosystem

Semiconductor Back End		
Intel	AMD	Linear
Spansion	Marvell	Globetronic
Osram	Lumileds	Altera
IDT	Avago	ASE
Fairchild	Renesas	Sumitomo
System / Module / Device		
Seagate	Plexus	Knowles
Smart Mo	Molex	Jabil
Sanmina	Kontron	Flextronic
Amphenol	WD Media	Motorola
National Instruments		
Equipment		
Dell	Solectron	VDO
Agilent	Sanyo	LKT
Inventec	Ben-Q	Pentamaster
Clarion	Bosch	Vitrox
Bose		

Semiconductor Back End		
Carsem	Unisem	IDS
System / Module / Device		
Murata		

Semiconductor Back End		
On Semi	NXP	
System / Module / Device		
Alps	TDK	NHK
Equipment		
Samsung	Xyratex	



Semiconductor Front End		
SilTerra	Hamada	Infineon
Semiconductor Back End		
AIC	Intel	Fuji
System / Module / Device		
Sharp	Fuji	Akron
Applied Materials		ASML
KLA Tencor		Asyst
Celestica	Metex	Wong
Equipment		
Sharp	Onkyo	Aviza
Axcelis	Intevac	Varian
Lam Research	QT Tech	

Semiconductor Back End		
ST Micro	ST Memory	
System / Module / Device		
Seagate	Mitsui	Mitsutoyo
Nemic-Lamda		PCA Tech
Ronnie	Hokuden	FCI
WD Media	Pioneer	
Equipment		
Brother	Celestica	Sharp
Flextronics	Kenwood	Sanyo
Mitsubishi	Panasonic	Podoyo
Mitsumi	Seiko	Dyson

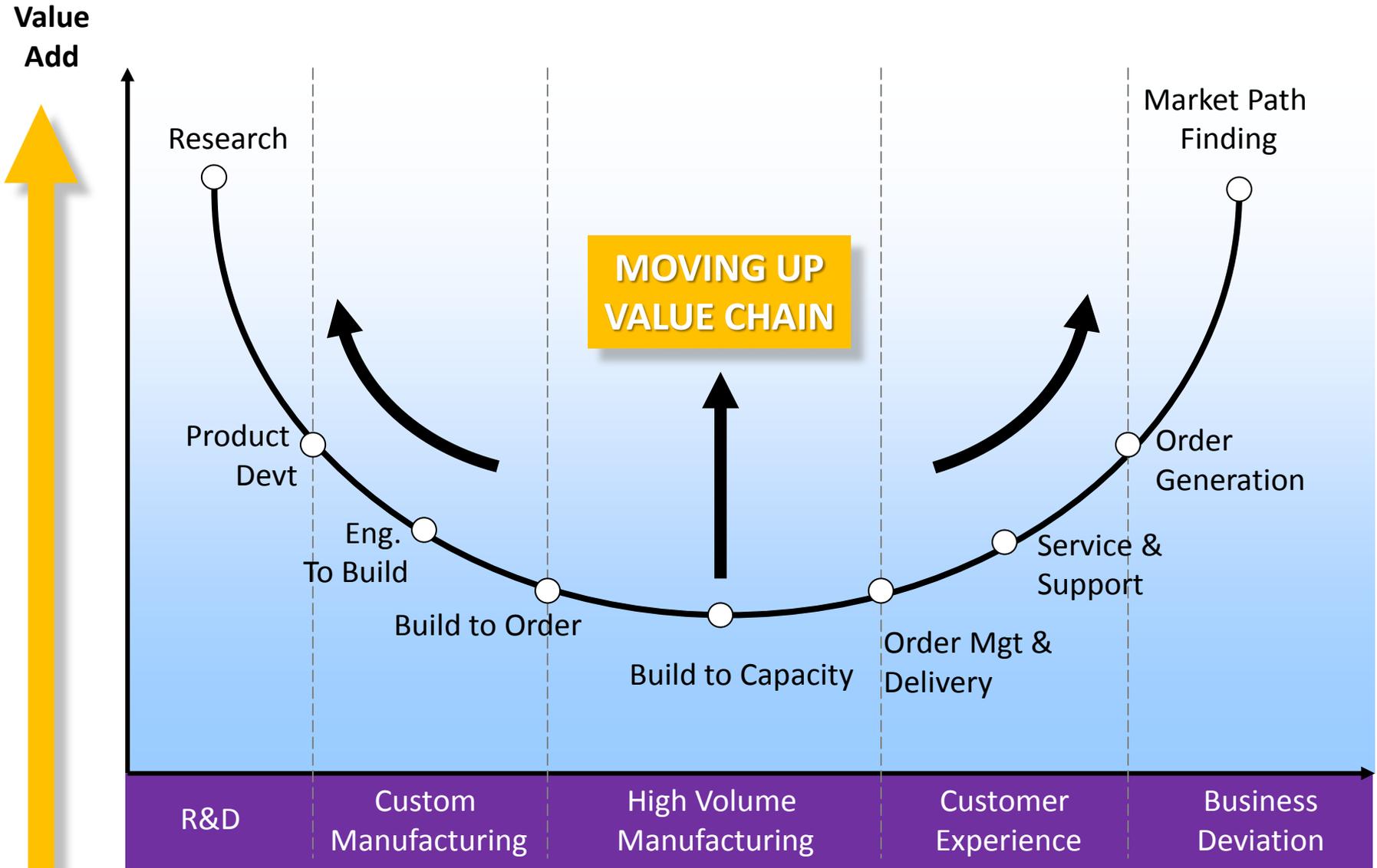
Semiconductor Front End		
S.E.H.	MEMC	
Semiconductor Back End		
Freescale	TI	Toshiba
Spansion	ChipPack	NEC
System / Module / Device		
Sensata	Flextronic	Nichia
ChungHua		
Equipment		
WD	Epson	Samsung
Panasonic	Sony	Flextronics
Hitachi	Sharp	Onkyo
Canon		



Semiconductor Back End	
Infineon	
Dominant	NS
System / Module / Device	
TEAC	Qualitek
Muhlbeuer	Flextronic
Equipment	
Panasonic	Cubic

In Black – Manufacturing
In Red – Manufacturing and R&D

E&E 3.0 Moving Up the Value Chain

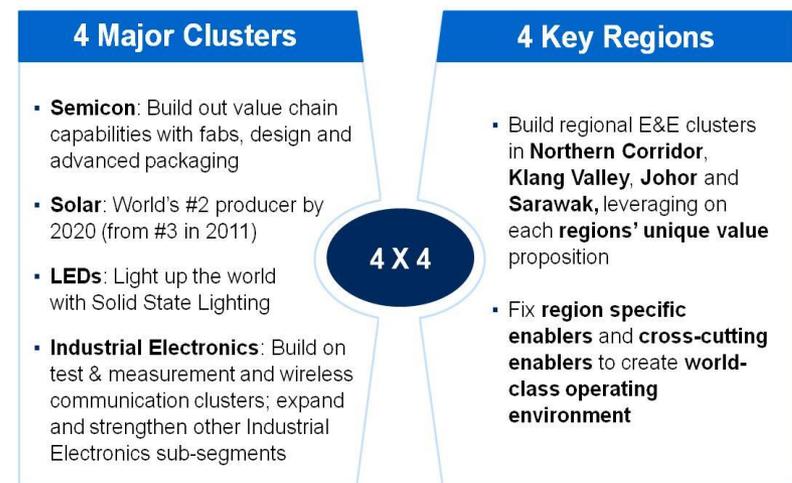


NKEA - Driving Economic Growth

- E&E Sector is one of 12 key growth areas defined in the National Key Economic Areas (NKEA) in increasing the Gross National Income (GNI) by 2020.



- Four major clusters are identified to fuel the E&E sector growth through high value added R&D, logistic and operational headquarters activities to be distributed in key regions.

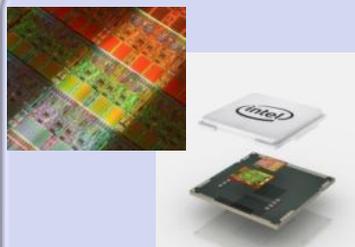


Opportunities in Major Clusters

2010 NKEA E&E LAB 1.0

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Semiconductor & Embedded



SILTERRA

RENESAS

Industrial Electronics



IRIS
Bringing Solutions to Life

Opto-electronics / SSL



Solar

SUNPOWER



2020 GNI impact: US\$16.9B | Jobs 157,000

Public funding: US\$3.7B | Private funding: US\$20.6B

NKEA - Driving Economic Growth

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- Key challenges identified to ensure growth
 - Industry-relevant Talent
 - R&D Collaboration
 - Shared facilities, infrastructure

- E&E Sectoral Working Group formalized to address the needs (Nov'10)

- Key interventions on talent and research collaboration identified



IMMEDIATE INTERVENTION PLAN

 **FastTrack** Post-graduation **apprenticeship** to nurture "industry-ready" talent

 **MyBrain15** Post-graduate programs and incentives aligned to industry needs – MSc in ESDE (USM)

 **CREST Internship** **Extended internship** program for Year 3 and 4 students

 **CREST** **Platform** for industry- academic collaboration

Introducing CREST..

Accelerating R&D Growth in the Electrical & Electronics Sector

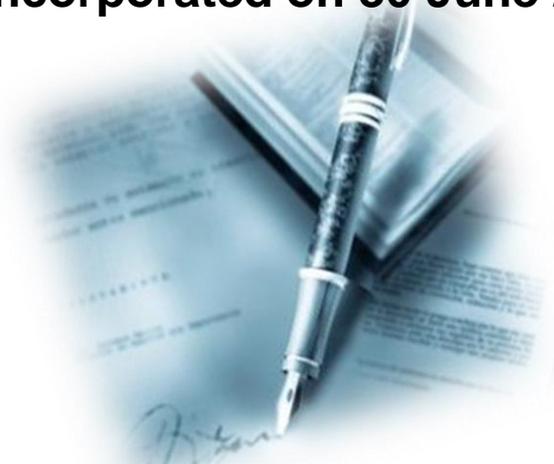


Can we take the curve at a higher speed?

Joint presentation to the Economic Council
18th April 2011



CREST officially incorporated on 30 June 2011



Launched on 9 June 2012

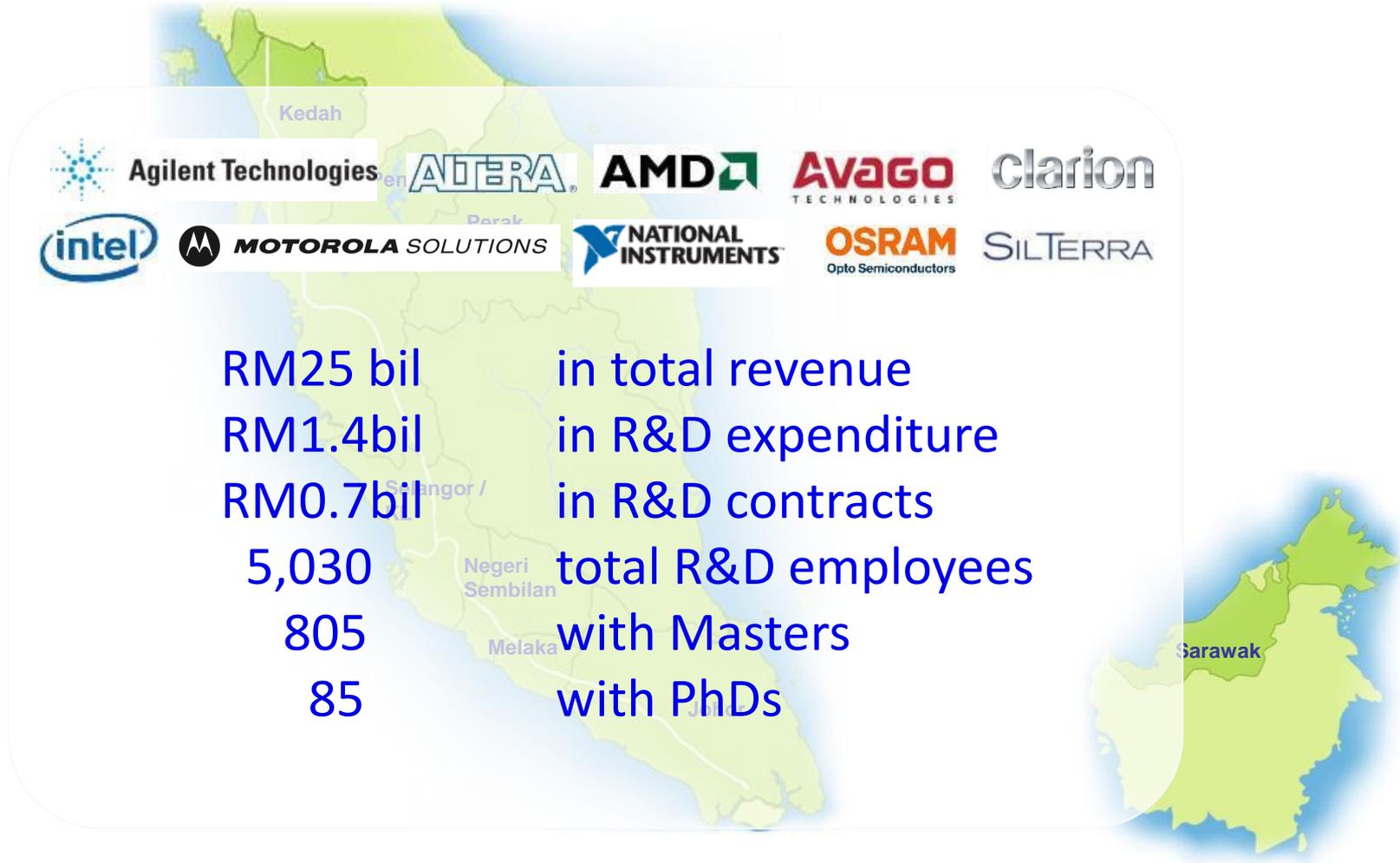


10 companies have signed up to become Founder Members of CREST

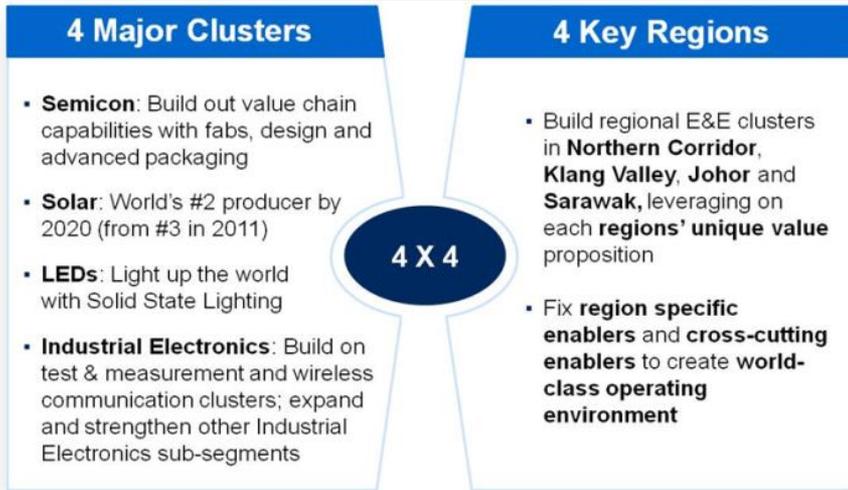


- **CREST has syndicated with key Federal Government Agencies**
- **Endorsed by the Economic Council**

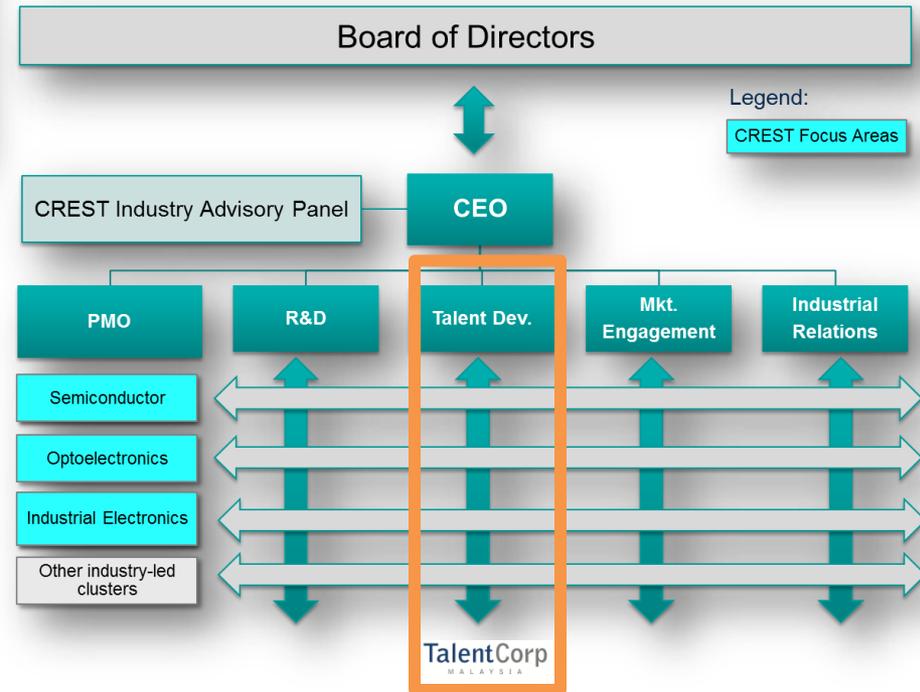
Mfg and R&D Contribution by Founding members



E&E Talent Engagement Model



CREST key clusters are validated and defined by key stakeholders (founding members) aligned to NKEA E&E major clusters



Program Management Office is structured to facilitate, support and drive cluster-focus activities through the programs under the R&D, Talent Development, Shared Services and other relevant department. It works closely with cluster teams, industry and academic partners.

Alignment to Talent Corp on E&E Talent agenda

Journey with the E&E Sector

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November 12, 2010
Talent Corporation
EE Sector Meeting

Attracting Key Talents
Grow & Nurture
Talent Agenda

24 April, 2011

Formalize SWG

Launched Fastrack Programme



**Congratulations to
2011-2012 FasTrack Engineers**
FasTrack 1 Graduation - 9 June, 2012

July, 2012
CREST S...

April 2012

UK Outreach
& Career Fairs



Firm to woo M'sians back
TalentCorp organises outreach sessions for professionals in Britain

9 June, 2012

Launching of **CREST**
& FasTrack Graduation

29-30 June, 2012
Graduan Aspire



January, 2011

Talent Corp established in January
2011 to catalyze enhanced talent
supply in the critical areas of the ETP



April 24, 2012

Launching of
Talent Roadmap
2020

**TALENT
ROADMAP
2020**



November 2011
US Outreach
& Career Fairs

Journey with the E&E Sector continues

December 2012

- RF i-COE (Agilent-UMP)
- USM Engineering, Science & Technology Career Fair



April 2013

- Career Talk in UKM
- E&E NPO
- HIRSE Graduation
- UKEC London



July 2013

- Graduan Aspire
- i-COE Wireless Comm. Mapping
- UiTM curriculum Mapping
- Innovate Malaysia Finale
- Career Talk in UNITEN, Taylor's Uni



September 2013

- Starting of FasTrack 201
- Korea Outreach

August 2013

- LSB (Osram & Altera)
- FasTrack 2 Graduation



October 2013



May 2013

- Career Talk in UNIMAP

October 2012

- E&E Strategies & Plans
- Launching of Ready4Work Portal



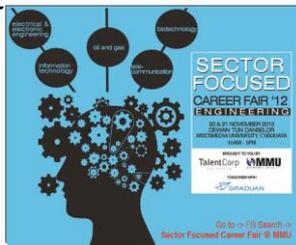
January 2013

- TXC Phase 1 PoC Completed & Endorsed by Agilent Technologies



November 2012

- CREST IC Analog Cluster Initiation
- MMU SFCF



Cluster Development - R&D Collaboration

R&D Grant Summary 2012-2013

Grant Cycle	Total Value (RM mil)	MNCs Cont. (RM mil)	SMEs Cont. (RM Mil)	Public Cont. (RM mil)	IPs	Publication	MSc	PhD
2012-1 2012-2 2013-1	24.1	11.6	4.3	8.2	21	101	37	17

Grant Cycle	SMEs	MNCs	Universities
2012-1 2012-2 2013-1	SiITerra, QDOS, QT HighTech, Pentamaster, Scrap Computer Trading, TT Vision Technologies, Wynstech, EXT Technologies, Penchem Technologies, Polytool Integration (10 SMEs)	Altera, Intel, Motorola, Infineon, National Instruments, OSRAM (6 MNCs)	USM, UniMAP, Uniten, UTP, Taylor's University, Wawasan Open University, MMU, Monash, UM, UTeM, UTM, UTAR University of Missouri, 12 local universities 1 foreign university

Promoting joint R&D collaboration between SMEs, MNCs, local and foreign universities in **Semiconductor** (IC Design, embedded, wafer technology, materials), **industrial electronics** and **opto-electronics**

HOW WE ACCELERATE INDUSTRY-ACADEMIA COLLABORATION ?

Nurturing "Industry-Ready" Talent

Need for R&D engineers

E&E sector is moving up the value chain and in need of more competent R&D engineers

- Current graduates need time to be productive as competent R&D engineers
- Modularized competency based industrial training necessary to accelerate learning

Industry members are committed in nurturing local talent !

2011
- 2013

FasTrack program developed

FasTrack program designed by industry, developed with PSDC to address immediate needs providing

- Technical & Behavioral Modification curriculum with competency based assessment.
- Apprentices will be coached & mentored on real life projects at host companies

2013 - 2015

**End in mind,
FasTrack content adoption into university curriculum to ensure relevance of future graduates !**

E&E TALENT DEVELOPMENT PROGRAM

FasTrack – Towards Market Driven HCD

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- Modelled after MIMOS



- Developed into by PSDC

FasTrack

- Psychometric Based Selection
- Domain & Behavioral Competency Based Training
- Competency & Performance Management
- On-the-Job Training
- 1st Batch Graduated in June 2012
5 MNCs, 101 apprentices
100 hired by companies, 1 MSc
- 2nd Batch Intake June 2012
7 MNCs, 131 graduated on 24-Aug'13
- 3rd Batch starting Jul'13 – 185 pax

An Elite Program leading to High-Paying Jobs

Your passport to Industry Relevant Expertise in just 12 months

FasTrack
12-month Apprenticeship Program

Intake 13 JUNE 2011 **RM 3,000**
allowance per month

Entry Requirements

- University Engineering Graduates
- Min CGPA of 3.0
- Year of Graduation 2011

NOVICE → QUALIFIED → PROBANT → EXPERT

What's in 2013-2014 Session ?

The logo for FastTrack, featuring the word "FastTrack" in a stylized, italicized blue font with horizontal lines through the letters.

3.0 (R&D focus)
SFAM (Fab - MIMOS)
MSc (USM)

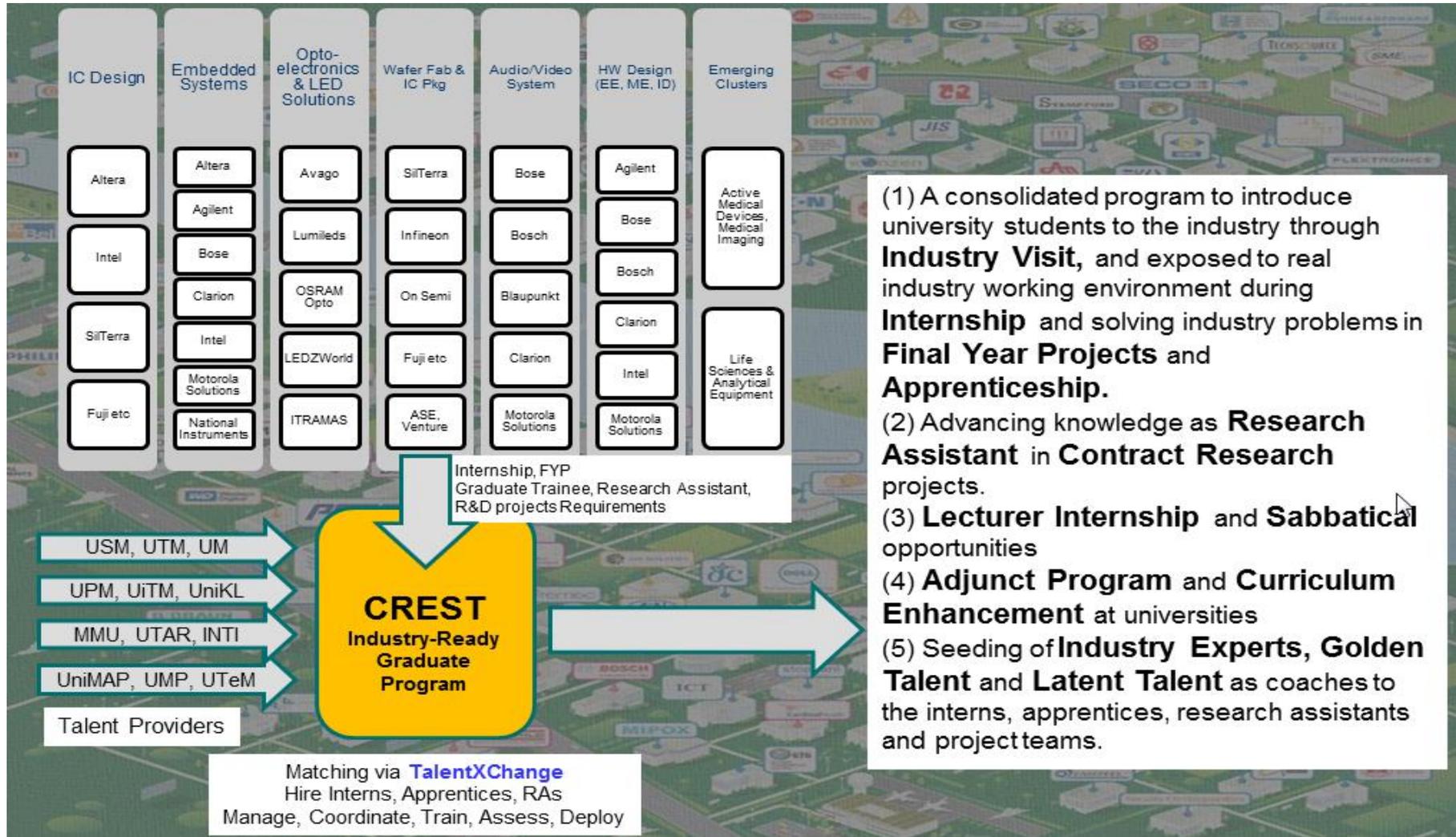
2013 Session – Open for Placement



Curriculum Embedment
Adjunct Lecture
Cluster Co-Op

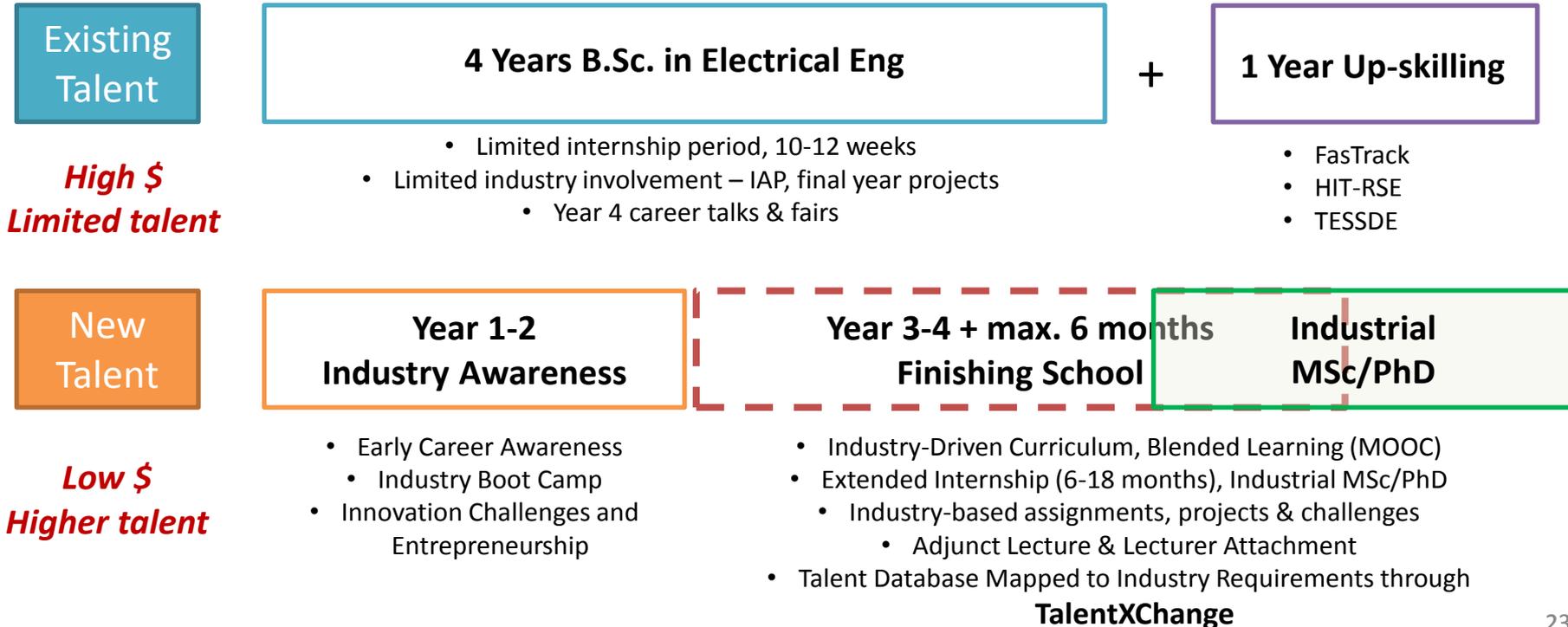
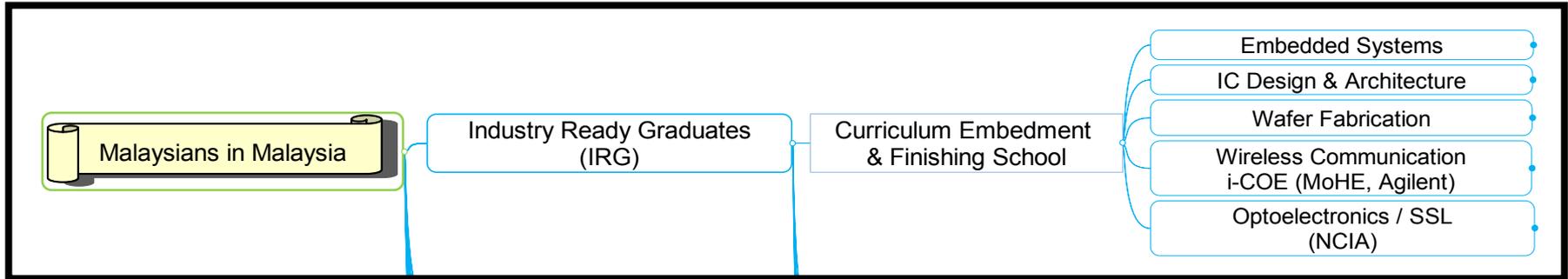
Industry-Ready Graduate Program

Cluster-focused Internship, Apprenticeship, Research Program

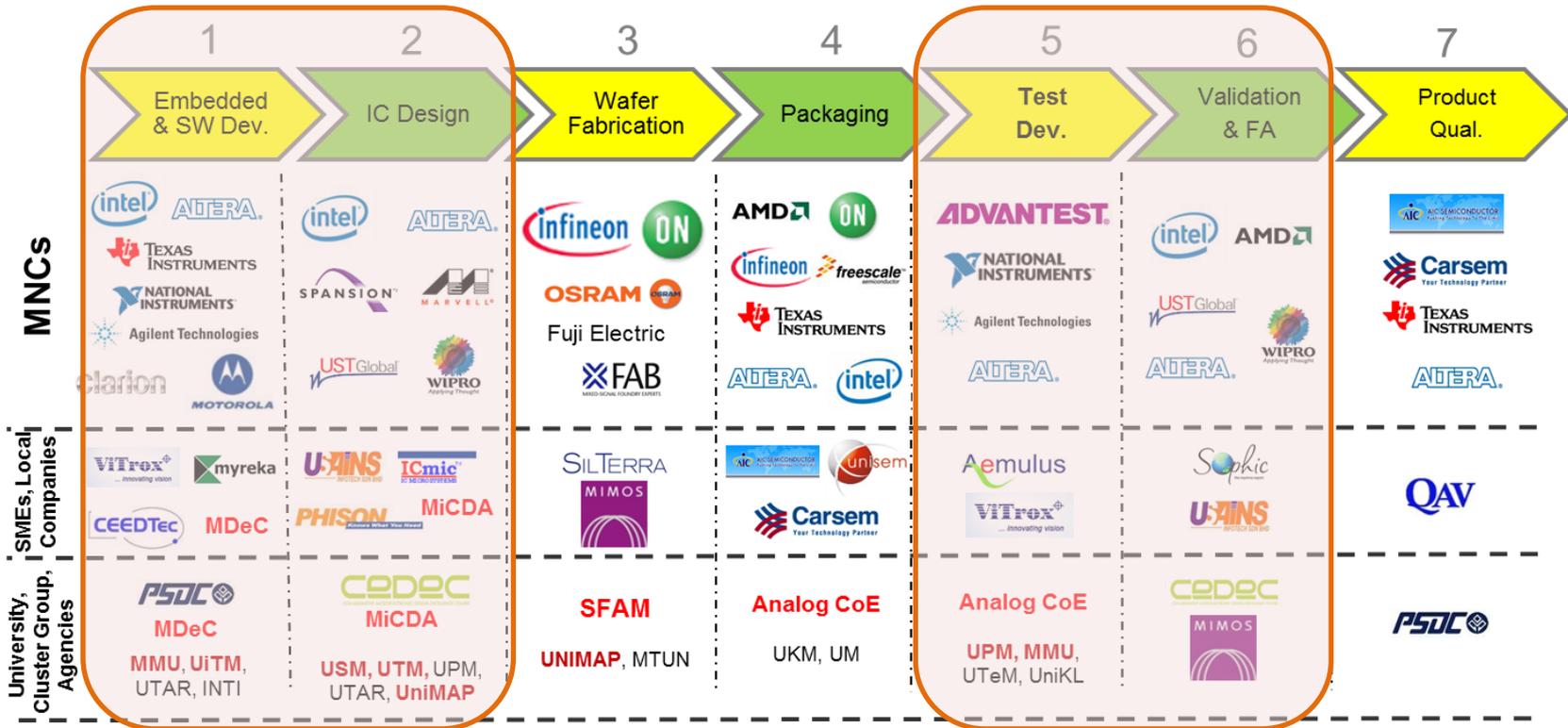


E&E Talent Ecosystem

“Addressing Graduate Employability”



Finishing School System in Semiconductor Value Chain (including Embedded Systems)



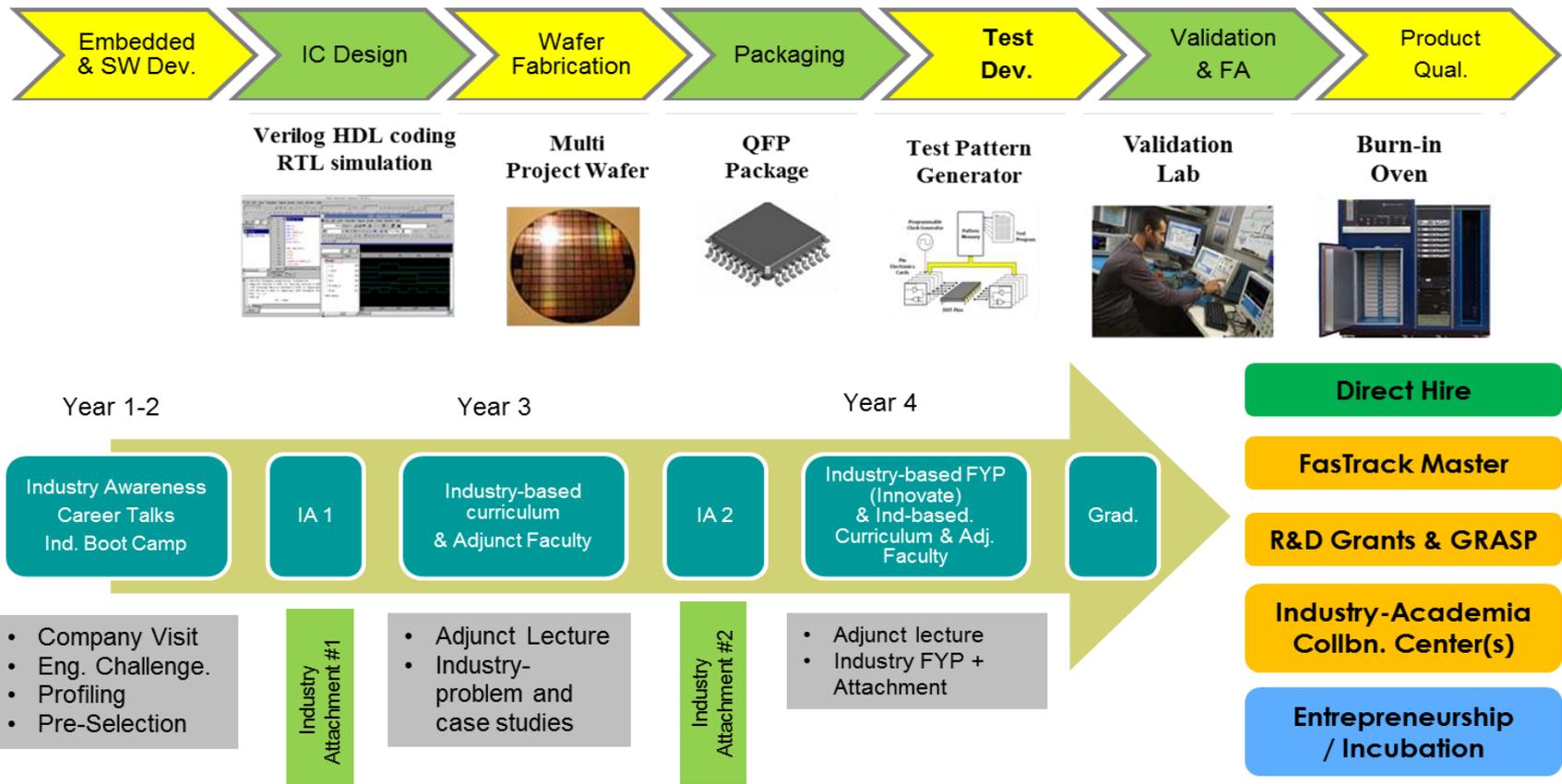
Industry & Technology Track

1. Embedded & SW Development (Technology domain)
2. IC Design
3. Wafer Fabrication
4. Packaging
5. Test Development
6. Design Validation
7. FA & Product Qualification
8. NPI & Manufacturing

**Pilot project starts
Sep'13 with Embedded,
IC Design and Wafer
Fab tracks**

Finishing School System in Semiconductor Value Chain (including Embedded Systems)

- Semiconductor components design and manufacturing value chain (inclusive of embedded solutions)
- Pilot program for cluster co-operative education program bringing career awareness, industry topics, projects, and subject matter experts into campus from Year 1 to Year 4 – preparing for Industry Ready Graduates, and pipeline for postgraduate research or entrepreneurship path (specialist vs. industrialist)



Industry Boot Camp (IBC) – *first step* towards Industry-Ready-Graduates (IRG) Funnel

The Industry-Ready-Graduates (IRG) Funnel “Accelerating R&D Growth in the E&E Sector”



To serve as a platform for students to converge and gain industry exposure and career guidance from various industry players in the Electrical & Electronics (E&E) Sector that is aligned with industry needs.

FasTrack Curriculum Embedment

FasTrack
Modules

Univ. Curriculum
Assessment

Delivery
Mechanism

Key modules

- Wafer Fabrication
- Electronics Systems Design
- RF Communication Design
- SW Application Development
- **Embedded Software**

Gap Assessment

- Review competencies requirement & FasTrack courses
- Map against Courses Outcome
- Identify gap in curriculum
- Content delivery method
 - Embedded into existing courses
 - New courses
 - Technical talks and seminars
 - On-line learning plus tutorial on-campus
 - Structured Internship plus Industry-focused Final Year Projects
- Focus on E&E **Top Talent Providers** + UTAR, INTI, UMP, UTEM, UTP

Talent Corp Commitment

- Technical Talks and Seminars
- Adjunct Lecturers from industry
- Train the trainers (lecturers)
- Training of interns attached to FasTrack companies during the internship period
- Training of final year students working on projects from FasTrack companies.
- On-line content development (MOOC)

University Commitment

- Organize the Technical Talks and Seminars for students
- Incorporate content into existing courses or develop new courses



Industry – Academia Networking

Connecting to local and foreign experts

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Networking Program

UNIVERSITY OF MALAYA
CREST

02 July 2013
9.00 am - 5.00 pm

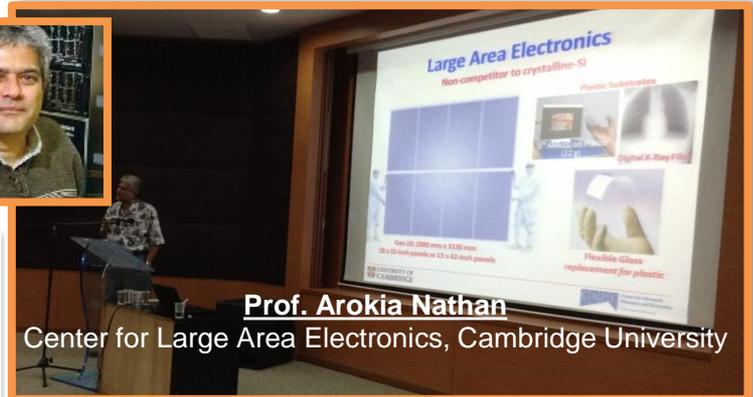
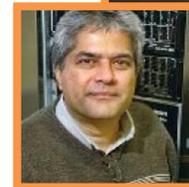
Exhibition Hall,
Ground Floor,
Research Management and
Innovation Complex,
University of Malaya,
50603 Kuala Lumpur

Organized by
Advanced Engineering and Technology
Research Cluster,
IPPP, University of Malaya and
Collaborative Research in Engineering,
Science & Technology Centre (CREST)

In cooperation with
Advanced Fundamental Research Cluster,
Computation and Informatics Research Cluster
and
Community and Industry Relations Centre
(CIRa)



R&D Grant Roadshow 2013-Cycle 2	
18 June 2013 (Tuesday)	Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor
19 June 2013 (Wednesday)	Universiti Teknikal Malaysia Melaka (UTeM), Hang Tuah Jaya, 76100 Durian Tunggal, Melaka
24 June 2013 (Monday)	Universiti Malaysia Perlis (UniMAP) Pauh Putra Campus, 02600 Arau, Perlis
25 June 2013 (Tuesday)	Universiti Sains Malaysia (USM), 11800 Penang
26 June 2013 (Wednesday)	Multimedia University (MMU), Cyberjaya Campus, Jalan Multimedia, 63100 Cyberjaya, Selangor
27 June 2013 (Thursday)	Universiti Teknologi PETRONAS (UTP) Bandar Seri Iskandar, 31750 Tronoh, Perak



**Global
Malaysian
Network
(GMN)**

Prof. Arokia Nathan
Center for Large Area Electronics, Cambridge University

IEEE Distinguished Lecture, IMEN-UKM, 18 July '13
Industry Tech Talk, sains@usm, 19 July '13

PMO Central – Cluster Management Model

PMO Central Strategic Workshop & Retreat

20-21 Sep. & 5-6 Oct.

More than 20 technical leaders from industry and related government agencies participated in 1 ½ days Strategic Workshop on 20-21 Sep to outline the pain points in the major clusters – IC Design, Embedded and Optoelectronics – and brainstorm solutions that will alleviate research and development over next 3-5 years.

Findings and recommendation were shared on 5-6th Oct to the CEOs, MDs and leaders from our founding member companies and key agencies. Summary of 3-5 years plan presented to Minister in the Prime Minister's Department, Tan Sri Nor Mohamed Yakcop, and Datuk Noharuddin Nordin, CEO of MIDA.



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Clarion Symposium on Global Connected Cars Solution CREST 5 Nov. 2012

CREST and Clarion collaborated in hosting a symposium on Global Connected Cars Solution at One World Hotel on 5th Nov, 2012 aiming at promoting partnership between local embedded design and software application companies under MDeC umbrella and technology partners for Clarion namely Wind River, Prodigium-Mobile, Elektrobit and Plextek. More than 50 participants from 30 MDeC companies attended from which 11 companies were identified as potential partners for Clarion and its technology partners in developing next generation in-vehicle infotainment solutions to global market. The Symposium was officially opened by Datuk Noharuddin Nordin, CEO of MIDA.



Continue seeking inputs from industry through workshops, symposiums and call for actions

CREST Symposium on Growing Innovation Clusters through Collaboration in Research, Design and Talent Development, 7 Nov, 2012

Our inaugural symposium attracted close to 100 participants from industry and academia mostly from Penang and Northern corridor area. This symposium brought together speakers from Agensi Inovasi Malaysia, Altera, Intel Lab, Dreamcatcher and OSRAM sharing their personal and organizational experience in developing R&D ecosystem and promoting innovation at various settings. Few key takeaways are the needs to develop our local design capabilities that meet global standards, envisioning the future to drive innovation and provide hands-on experiential learning for children at young age to cultivate the interest and passion in science and mathematics which are essential for sustaining growth of this sector in our region. Our patron minister, Tan Sri Nor Mohamed Yakcop gave his closing speech and congratulate the participants and organizers on the successful symposium.



MIDA Analog IC Center of Excellence Workshop CREST 6 Dec, 2012

More than 30 participants from Analog IC companies and agencies supporting the semiconductor industry spent a day in a workshop to identify the pain points of their industry, and generated recommendations on solutions on talent, shared service facilities and research collaboration to advance this industry to a new height in developing advanced semiconductor solutions for global market. Specific actions to close the gaps for Analog IC Design, Materials and Packaging, Manufacturing, Test and Equipment areas are proposed for recommendation to relevant agencies to provide immediate and medium-to-long term solutions to the problems. Workshop was hosted by MIDA at their KL Sentral office. CEO, Datuk Noharuddin Nordin spent time to listen to the discussions and recommendations by the participants.



Partnering for Talent

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Thank You