

# Commercialization Procedures

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- **Commercialization Routes**
- **Research Collaborations/Sponsored Research**
- **Licensing**
- **Spin-offs and New Business Creation**
- **Technical Services**

# Technology Transfer Structures



- There is no “one size fits all” approach
- Managing IPR requires institutional, financial and human resources
- Tech transfer offices - fairly recent phenomenon
- Governments are providing more support to PRO patenting and licensing in many countries
- Countries (eg Denmark, Germany, Korea, UK) experimenting with regional or sector-based technology transfer offices:
  - **Advantage: economies of scale, portfolio diversification**
  - **Disadvantage: difficulty in developing close working relationships with researchers**

Source: OECD extract

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## Research Collaborations



- Engagement with the industry to achieve commercialization other than direct licensing and spin-offs.
- Value can be realized including
  - **Industry revenue**
  - **Licensing income**
  - **Investments in Singapore**
  - **More R&D in Singapore**
  - **Job creation**
  - **Strengthening of existing business**
- Structured approach to negotiation of contracts with clear escalation process for issues to be resolved

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# Collaboration Models with Industry

## Consortia / Taskforces

- ❖ Consolidate Expertise
- ❖ Application-driven R&D
- ❖ Technology Road mapping
- ❖ T-Up



Industry  
(MNCs / SMEs)

Industry  
Engagement



## Research

- ❖ Joint Research
- ❖ Manpower Development

## Facilities

- ❖ Sharing of facilities / equipment to jumpstart operations
- ❖ Lab-in-RI
- ❖ Test-bedding opportunities

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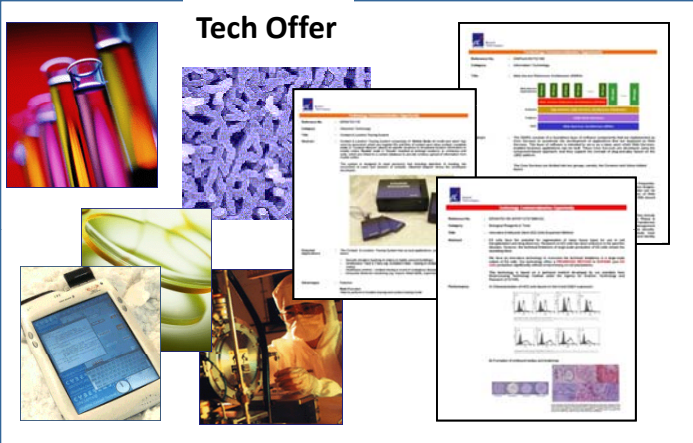


# Who We Work With

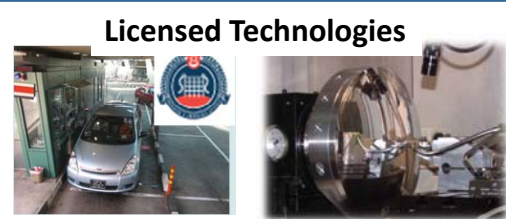


In FY2008, A\*STAR RIs undertook more than 300 Projects with more than 250 companies

# Licensing



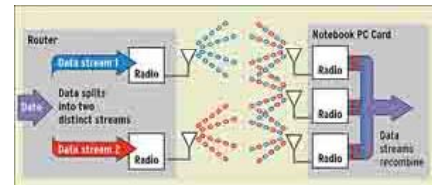
Tech Offer



Licensed Technologies

Licensed Plate Recognition

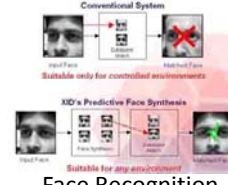
Ultrasonic-Assisted Diamond Cutting



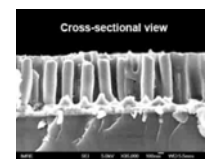
Multi-Input Multi-Output (MIMO)



Trade Shows / Conferences



Face Recognition



Magnetic Fingerprint



## Why License and not Assign?

- License
  - A\*STAR retains ownership
  - A\*STAR retains a degree of control over the IP
  - A\*STAR may be restricted from granting subsequent licenses to other Parties
  - Licensed IP remains part of A\*STAR's asset base
- Assignment
  - Outright transfer of ownership of IP
  - IP becomes part of the assignee's assets
  - A\*STAR will no longer own or control the IP

# Types Of Licenses

- Exclusive
- Non-exclusive
- Sole-license (use clear language)
- Sub-license

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## 5 Stages in Licensing



1. Strategy and preparation
2. Marketing to licensees
3. Valuation and pricing
4. Negotiating the terms
5. Signing and living with the deal

**Licensing revenues provide strong incentives for researchers to explore commercial applications for research**

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# Stage 1: Strategy and Preparation

- Understand the 'buyer'
  - How license fits into licensee's business strategy
  - Understanding how licensee views the licensing transaction lays groundwork for licensing success



- In developing licensing strategies, important to realize:
  - Licensing is a long-term relationship, not a one-off deal
  - Success depends on whether the licensor understands the licensee's objectives, concerns and problems

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# Stage 2: Marketing to Licensees

- Disclosure of information during marketing must be carefully handled - many types of intellectual property, especially patents and designs, are very sensitive to disclosure
- Minimize disclosure of confidential information and take necessary measures – NDAs/MTAs/Option Agreements
- If unsure about what is confidential or how to protect your valuable trade secrets, consult your lawyer



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## Stage 3: Valuation & Pricing the Deal



What is the value of the licensed intellectual property to the licensee?

- This, rather than the licensor's cost, should be the starting point of a valuation exercise for licensing

Important factors for valuation include:

- Type of intellectual property
- Level of perceived risk
- Intellectual property strength, and
- total costs of bringing the intellectual property to market

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## Stage 4: Negotiating the Terms

Before negotiating the terms, a licensor should consider these business points:

- Understand licensee's interests - investment risk, potential liabilities etc
- Know options as to exclusivity- an exclusive licence, sole licence and non-exclusive license all mean different things
- Be realistic in royalty expectations - in a competitive marketplace, an overly high royalty rate may spell the difference between profit and loss for a licensee



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## Stage 5: Signing & Living With the Deal



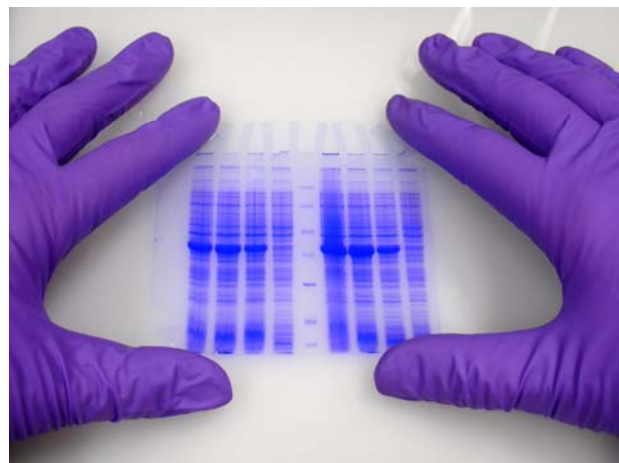
- On the one hand, license agreement is definitive rule-book that sets forth terms of your licensing relationship
- On the other hand, signing agreement is not conclusion of a business deal, but beginning of a business relationship
- As in all things, however, balance is necessary - not to sacrifice long-term value of your intellectual asset in the name of 'relationship'

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## Licensing Snapshot of PROs

- Two-thirds of PROs negotiate less than 10 licenses per year
- Many licenses are for copyright and other non-patented IP
- PROs tend to license early-stage technologies requiring further development by companies



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Source: OECD extract





# Licensing Snapshot of PROs



- Licensing revenues varies greatly across PROs and countries
- Licensing revenues are highly skewed, with a few licenses generating most of revenue
  - Large percentage of licenses never generate any income
  - Only small percentage earn high income

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Source: OECD extract



## An Example From Stanford

1971- FM Sound Synthesis (\$22.9M)  
1974 – Recombinant DNA (\$255M)\*  
1981 – Fiber Optic Amplifier (\$26.5M)  
1982 – Amplification of Genes (\$18.5M)  
1984 – Functional Antibodies (\$61M)  
1986 – CHEF Electrophoresis (\$2M)  
1990-1992 – DSL (\$17.9M)  
1996 – Improved Hypertext Searching (Google™) - \$ not disclosed yet

### Sobering Statistics

- 2 out of 5700 (of which 2600 licenses executed) were BIG winners – generated more than \$50M
- 13 cases generated \$5M or more
- 43 cases generated \$1M or more in cumulative royalties

\* shared with UC Berkeley

Source: Extract from Stanford OTL; all in USD

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# Licensing Strategies of PROs

- Small firms obtain slightly more licenses than larger ones
- In Germany, Korea and Switzerland, non-university PROs tend to license to small firms
- In Belgium and Japan, most licensees are large firms
- 80% of Swiss PRO licenses are to foreign firms; Dutch tend to license overseas too
  - **International nature of research**
  - **Limited national market for IP**



Source: OECD extract

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# Licensing Strategies of PROs

- In general, PROs prefer to license to existing companies but they may also license IP to a spin-off or start-up company
- Though phenomenon is widespread, number of new spin-off companies created to commercialize inventions is small
  - **Most PROs - less than 1 spin-off a year**
  - **Except US where it was 2 per year**
- PROs often licence their technology to a spin-off to retain greater control and access to the IP



Source: OECD extract

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# Licensing Strategies of PROs

- PROs can include clauses in agreements which require licensees to make good-faith efforts to exploit inventions
- Licenses often include some form of limited exclusivity (eg by territory or field) so that technology may be used by more than one firm
- Less common but still important are licenses that grant PRO rights to future inventions



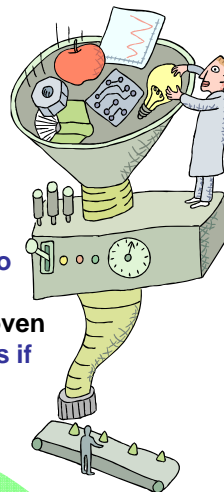
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Source: **extract**

# COT – Helpline for local SMEs



Exploit Technologies invests upfront and takes development risks



Project managed by Exploit Technologies with requirements from potential licensee(s)

SME has option to license when technology is proven but no obligations if the project fails



Companies that license technologies need to invest less upfront and pay royalties only as they generate revenue

Examples of COT leading to formation of start-ups:

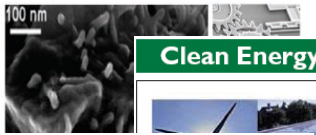
- Curiox (Bioassaying)
- Aksaas (Text analytics)

Examples of COT leading to licences with local start-ups / SMEs:

- Veredus (Avian flu kit)
- Commontown (Language learning – repeat customer)
- Aksaas (Document security SDK – repeat customer)
- Haruna (TiO<sub>2</sub>)
- Eucharist-Tech, Cybersite (B2Bi Gateway)
- Fosta (Fibre optic sensor)

# Flagship Program

## Nanotechnology



## Clean Energy



## Ambient Intelligence



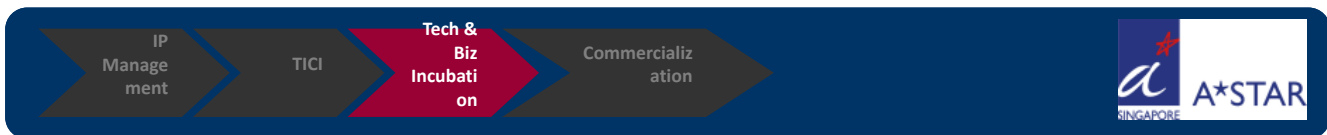
## Plastic Electronics



- Sensors & sensors
- Wireless technologies
- Video analytics
- Artificial intelligence
- Flexible displays
- Computational

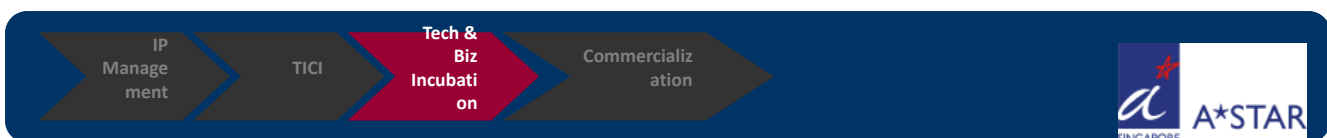
- Printed electronics
- Barrier substrates
- Applications (photovoltaics, sensors, RFID)

- Identify novel technologies earlier in the research value chain for larger and more impactful outcome through:
  - building strong patent portfolio
  - infusing commercial focus earlier in R&D
  - inter-RIs and cross-council collaborations
- Typically up to S\$5m
- Dedicated program/project managers
- Early interactions with industry: roundtables, industry forums

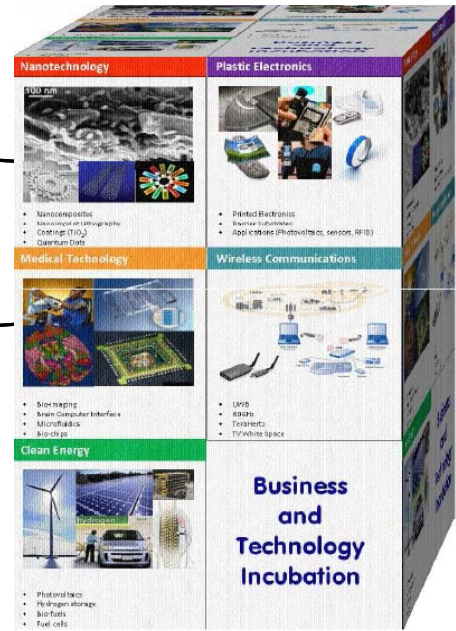
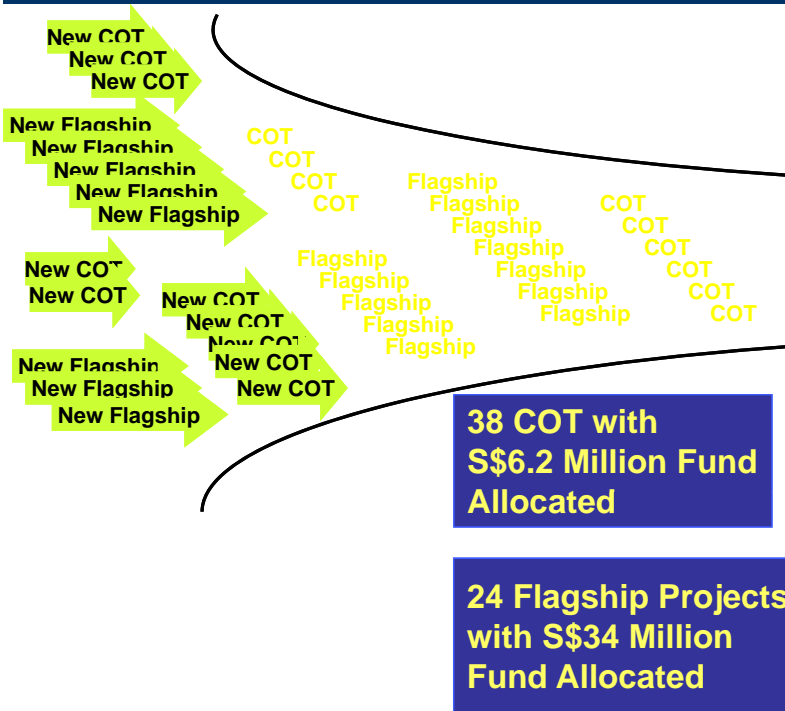


# Flagship Program

- Emerging technologies funded and developed to near commercial readiness; significant reduction in technical risks through beta trials and validations
- Desired Outcome:
  - More & stronger licenses
  - Spawn new and sustainable local technology-based industries and promote technology start-ups



# COT and Flagship Pipeline



## Conclusions

- In most OECD countries, some sort of legal action has been necessary to stimulate the “transfer” of publicly funded research
- Legal instruments are not sufficient, in many countries a change in the culture and mindset of researchers is also needed
- TTOs need to be free to hire high-quality technology transfer specialists with industry experience



# Conclusions



1. There is no one TTO model - individual countries and organizations are still learning about costs and benefits of various approaches and some are experimenting with regional TTOs
2. Close relationships with inventors and labs are necessary to tech transfer process
3. Few TTOs are likely to generate positive net revenues, at least in their early years
4. The licensing strategies of PROs should ensure continued access to IP so that it is not lost should, for example, a “spin-off” company fail

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# Investment and Spin-off Management

- Grooms researchers into successful technopreneurs
- Takes a proactive role in strategic planning to building business network
- Provides business support such as marketing, business development and networking
- Guides and develops start-ups to attract venture capitalists and angel investors

Fundraising 2006		Fundraising 2007		Fundraising 2008	
EDS Lab		Aksaas		MicroPoint	
BuzzCity		Singular ID		SgMD	
Singular ID		Pro-T		Hotcard	
Hotcard		Curiox		Muvee	
		D-SIMLAB		BuzzCity	
S\$4.45m		S\$6.11m		S\$19.9m	

IP Management

TICI

Tech and Biz Incubation

Commercialization



# Challenges faced by Spin-offs



1. Strength of IP
2. Avenues to generate more IP
3. Avenues to raise more funds
4. Conflict of interest
5. Management team
6. Consultancy
7. Exit strategy

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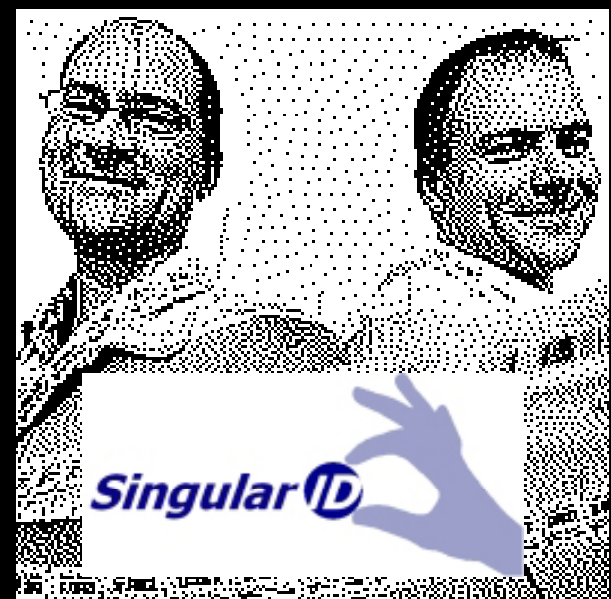


## Those who made it

- Sold in Dec 07 for \$19.58m
  - Exploit backed the management team
  - Exploit facilitated the acquisition

Bilcare buys nanotech firm for \$19.58m

Acquisition one of the biggest buyouts of an A\*Star spin-off



IP  
Management

TICI

Tech  
and Biz  
Incubation

Commercialization



# Those who made it



**Sold in 2002 for US\$9M**



**Sold in 2005 for US\$3.4M**

IP  
Management

TICI

Tech  
and Biz  
Incubation

Commercialization



# Our Alumni



- Since our inception in 2002, we have trained for the industry some 100 tech transfer professionals
- Business revenue generated from licensed A\*STAR's technologies over S\$500M
- Total market value of our startups S\$75M





Thank you

*Questions?*

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Thank you!



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