PATHWAYS FOR BROADER EXPLOITATION OF EO TECHNOLOGIES

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CEOI Industry Engagement Programme

Background

- Started in 2008
- Programme in its 5th Phase

Current Key Activities

Broadcast

- Technology Showcase
- Articles (CEOI website, other websites, trade journals, professional associations)
- Case Studies
- Social Media
- Mailings

Targeted

- Industry Club
- Industry Consultation Workshops
- Targeted mailings and promotion

Key Dynamic

- More CEOI technologies are moving up TRL levels from 3 to 6/9.

Pathways for Exploitation

PraxisUnico / Library House report identifies a framework for evaluating broader technology exploitation by Universities and pathways for exploitation.

Framework for Evaluation

- Mechanisms for Knowledge Transfer (Pathways)
- Measures of Quantity
- Measures of Quality

Pathways for Exploitation

- Networks
- Continuing Professional Development
- Consultancy
- Collaborative Research
- Contract Research
- Licencing
- Spin-outs
- Teaching
- Other Activities

Building the Journey to Exploitation

Pathways can often be stepping stones to the next pathway by building relationships and confidence in the partnership

Remote Sensing – An Evolving Landscape

Evolving Definition

In recent years the definition has been extended significantly as the range of applications has developed into new fields. Modalities now include:

- ***Space Based Remote Sensing***
  - Traditional stand-off active and passive modalities
- ***Terrestrial Based Remote Sensing***
  - Space based instruments now being deployed in ground based applications, e.g. for continuous monitoring of urban air quality or security threats.
- ***Remote Embedded Sensing***
  - Embedded Sensors to remotely sense and monitor structures and environments which are hazardous or difficult to access.
  - While the sensors are embedded at the point of interest, the data is transmitted to a central point for processing, analysis, and action.
  - The challenge being addressed is sensing / monitoring from a distance of environments which are difficult to access with conventional sensors / instruments due to distance, scale (1000 Kms), environment (temperature / radiation / pressure), etc.

Great Idea, But Where?

EO Technologies are niche. However, the *CEOI Industry Consultation Workshops* have identified a wide range of applications and markets where EO technologies have potential for exploitation:

Platforms

- Instrumentation
- Autonomous remote sensing
- Commercial small satellite constellations
- Unmanned aerial vehicles

Markets

- Environmental Monitoring
- Defence and Security
- Aerospace
- Process Control
- Life Sciences
- Healthcare
- Oil & Gas

Great Idea, But How?

Some Application Needs

- Remote sensing
  - Gas turbine combustion chambers and airframes
  - Flammable / hazardous areas
  - Water quantity and levels
  - Explosives and drugs
  - Vehicle exhausts for multiple target identification
- Through-wall imaging
- Fast parcel screening and interrogation
- Infrastructure construction and management
  - tunnels and viaducts
  - Ground settlement in tunnelling and mining
  - Rail and Road
- Autonomous Swarms
  - Ships and maritime vessels
  - Land vehicles

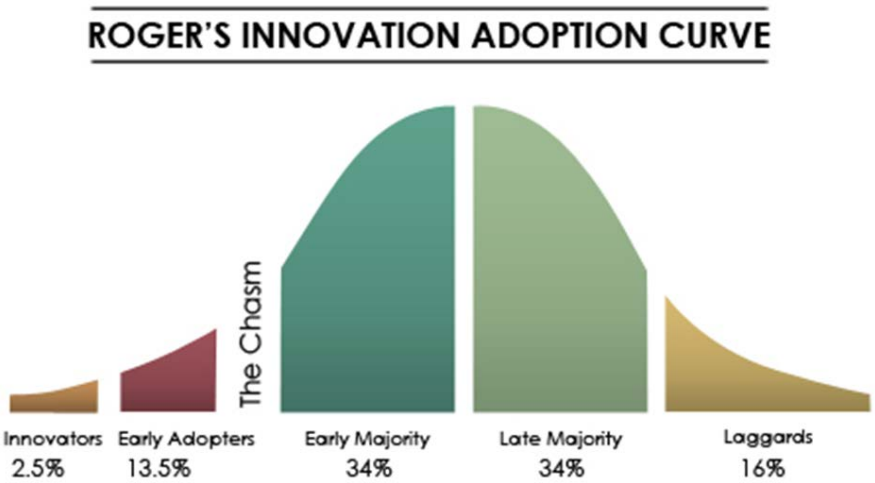
Great Idea, But What?

Industry Technical Requirements

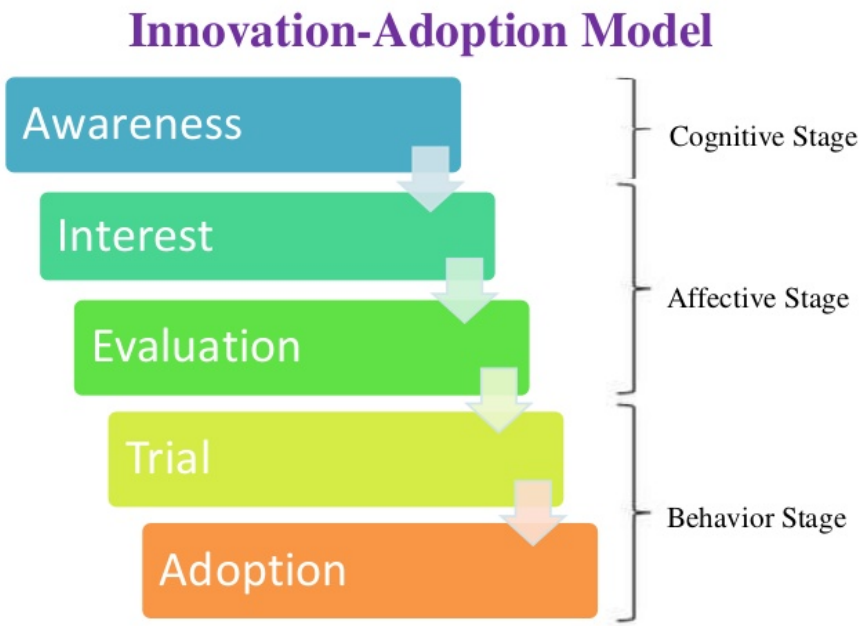
1. Reduction in:
    1. size
    2. Weight
    3. Cost
2. Power consumption of instruments
3. Power harvesting / scavenging
4. Calibration and ground-truth referencing of instruments
5. Data formats, quality, and meta-data from instruments
6. Rare events in very large data sets
7. Techniques for the synthesis, analysis and interpretation of hyperspectral imaging data for deployment in a wide range of commercial applications.

Who to Engage With and How

It's a People Game



Trying to convince the mass of a new idea is *useless*.
Convince *innovators* and *early adopters* first.



An Industry Perspective – Dealing With Reality

Industry Realpolitik

- Company technology / product programmes mapped into the future (3 years)
- Budgets are limited
- Pressures to eliminate technology and project risk
- Usually will only consider adopting technologies at TRL > 6

The People

- Adoption of technology innovation often but not always led by R&D team
- R&D teams show full spectrum of adoption behaviour from Innovators to Laggards
- ***Innovation Adoption Process***:
  - Regularly review technology innovation / progress, identifying those of interest
  - Maintain watching brief on specific academics, programmes, organisations (**Shadowing**)
  - Seek evidence of credibility of technology innovation and team behind it
  - Often ONLY engage with people / programmes when their need, programme planning, and TRL of technology intersect – "Window of Opportunity"

The Challenge

- To build a community of "**Shadows**" and encourage increasing discussion / engagement.

Pathways for Exploitation

Which brings us back to:

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