



The Royal Academy
of Engineering

Visiting Professors Conference 2009

Integrating the VP Schemes

Visiting Professors in Innovation

Geoff Kirk

Thursday 17th September

Presentation Objectives

- To outline the rationale for the scheme
- To establish a common understanding of Innovation
- To outline the Visiting Professor role

Innovation is a National Priority

- There are numerous ground breaking British inventions – television, jet engines, hovercraft, penicillin.....
- However others have taken the benefit by exploiting the market
- Economic prosperity depends upon business innovation which is unlocked by design - *Design Council*
- Quality of Life depends upon public services that can be enhanced through innovation. The UK must unlock the talent of all its people and become an Innovation Nation. *'Innovation Nation' published by DIUS March 2008*
- The word 'Innovation' is used a great deal by Government!!

Innovation is an Educational Priority

- Innovation needed in Engineering Education to ensure that graduates are equipped to meet future challenges - *Educating Engineers for the 21st Century, Royal Academy of Engineering*
- The report also recognised the formative role that the RAEng Visiting Professor schemes has had in embodying current industrial practice into university courses
- The aim of Engineering courses is not primarily to create entrepreneurs but the modern engineer should be aware of business and opportunities
- Hence the initiative to form The Visiting Professors Scheme in Innovation

Innovation - A Definition - Cox Report

- **Innovation**

Innovation is the successful exploitation of new ideas. It is the process that carries them through to new products, new services and new ways of running the business or even new ways of doing business.

To deliver the optimum artefact, component, system, or process to satisfy customer needs

- **Design**

Design links creativity and innovation. It shapes ideas to become practical and attractive propositions for users or customers. Design may be described as creativity deployed to a specific end.

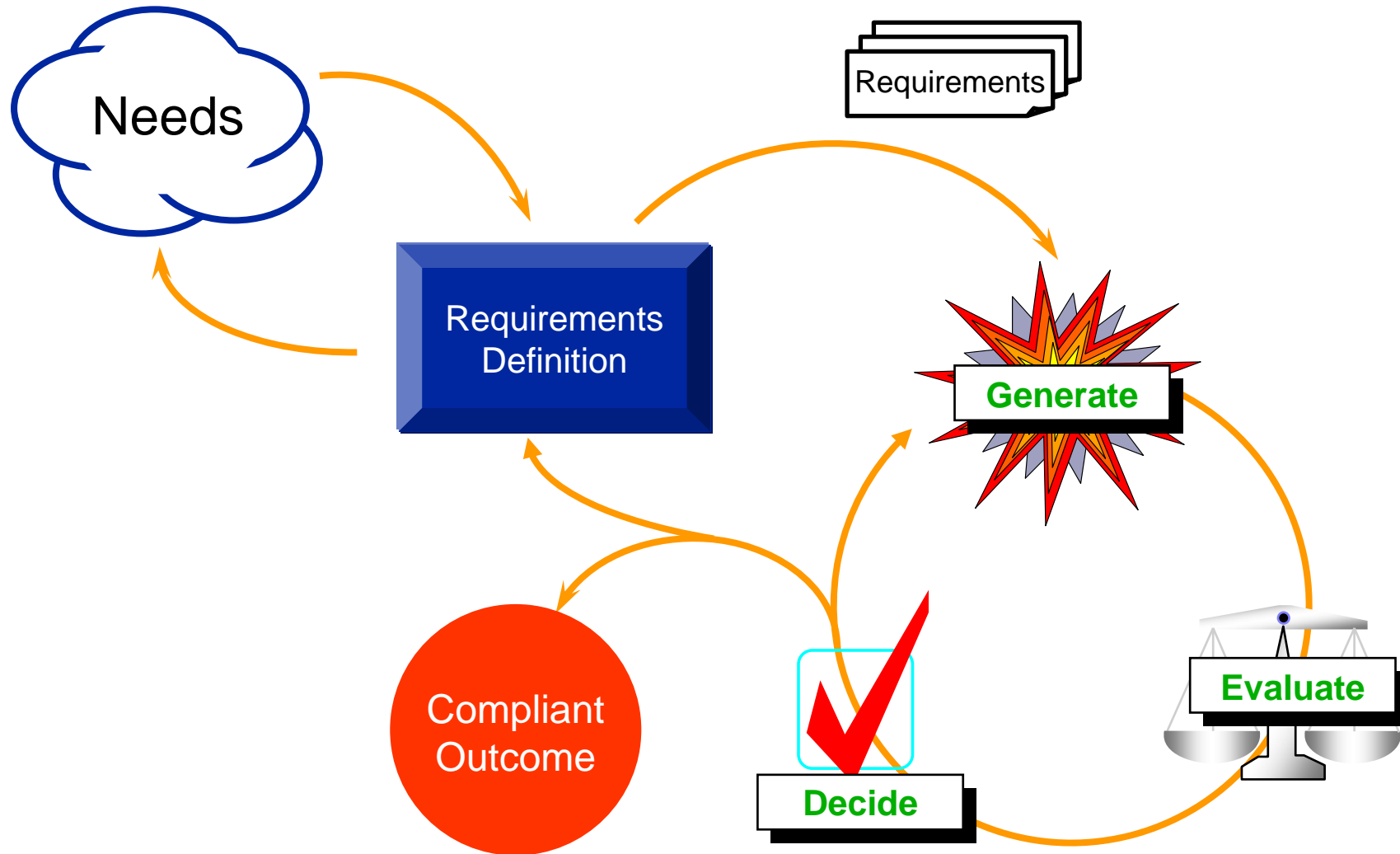
To devise the optimum artefact, component, system, or process to satisfy customer needs

- **Creativity**

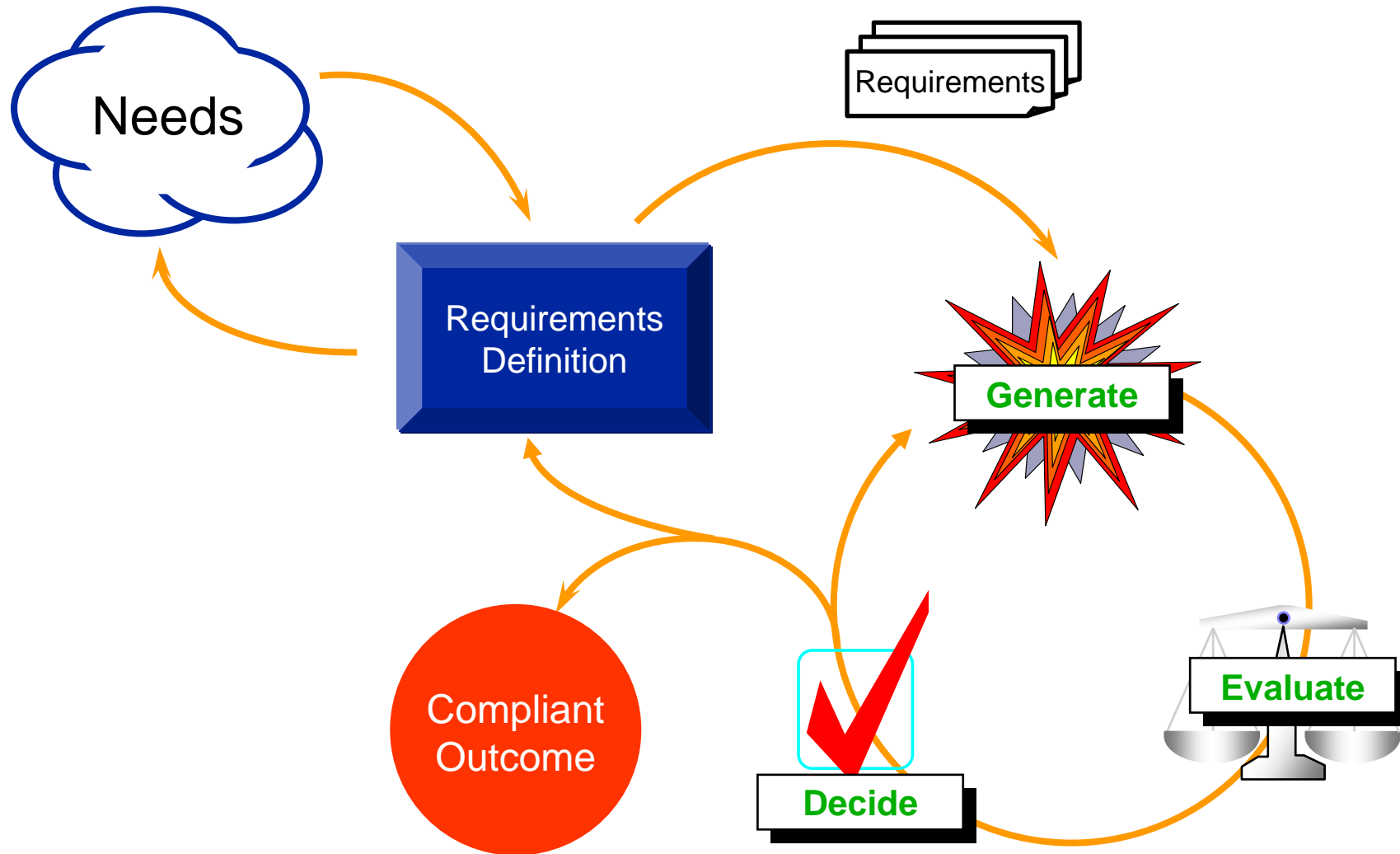
The generation of new ideas – either new ways of looking at existing problems, or of seeing new opportunities, perhaps by exploiting emerging technologies or changes in markets.

To generate ideas to devise the optimum artefact, component, system, or process to satisfy customer needs

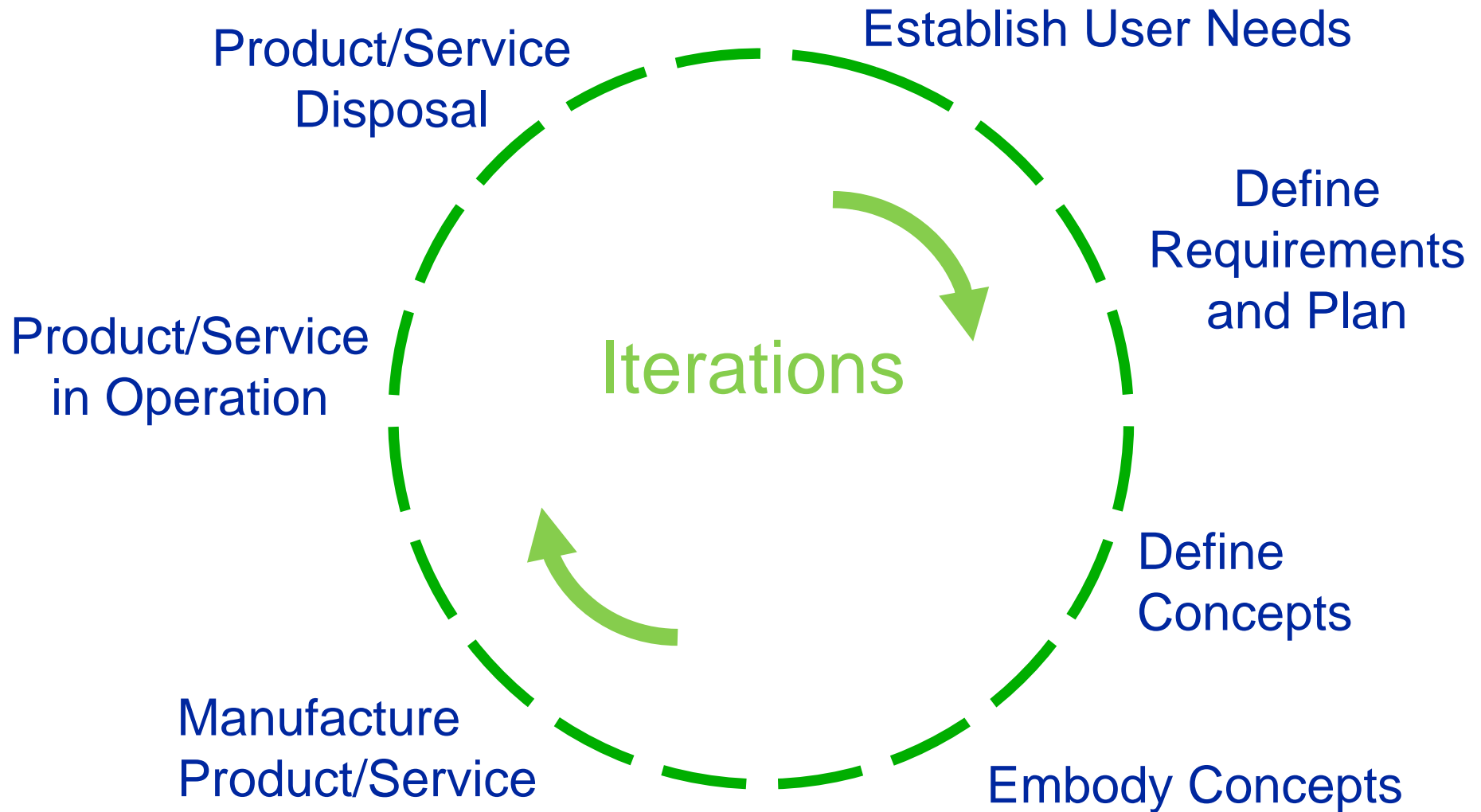
A Generic Process Model



A Generic Process Model

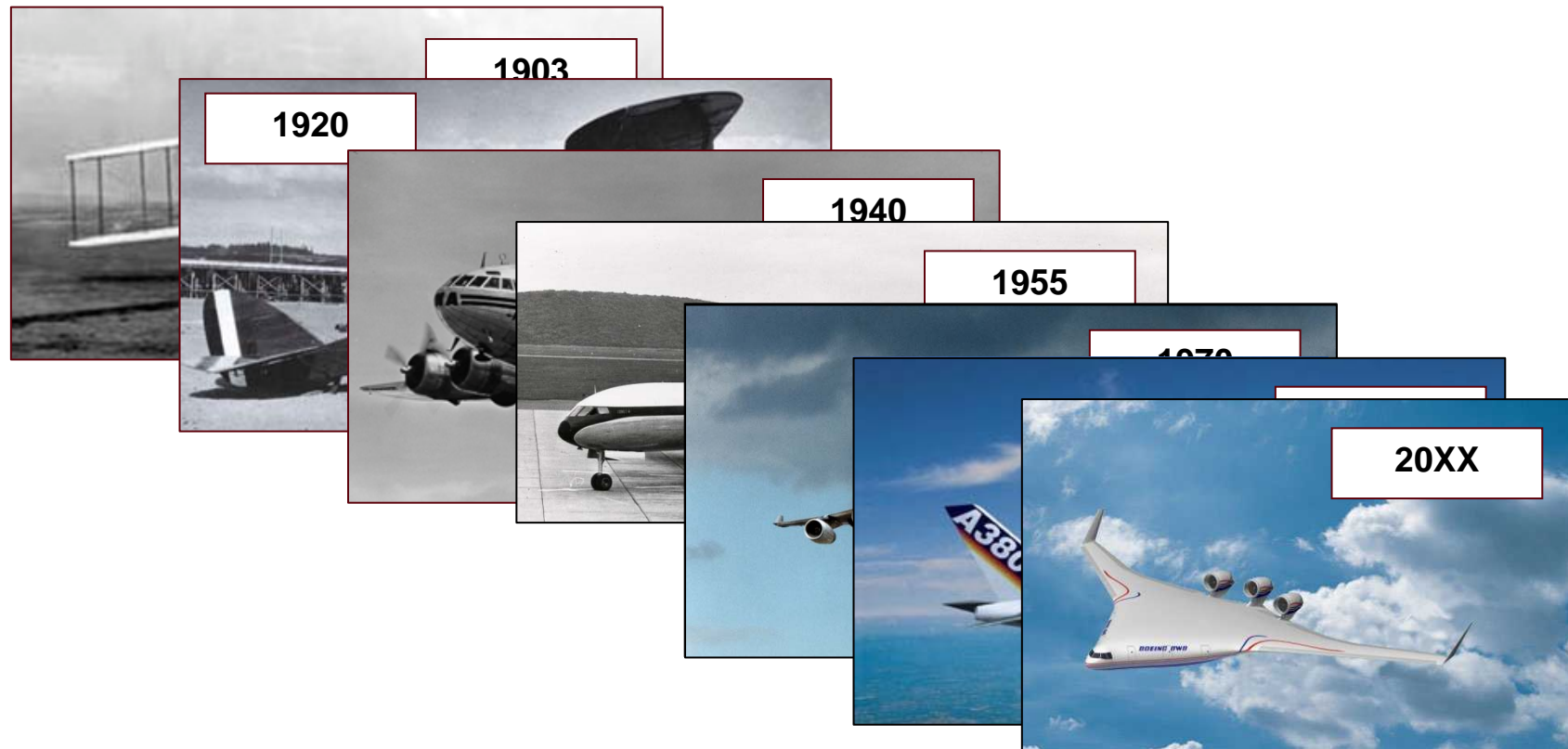


The Seven Ages of a Product/Service after Shakespeare



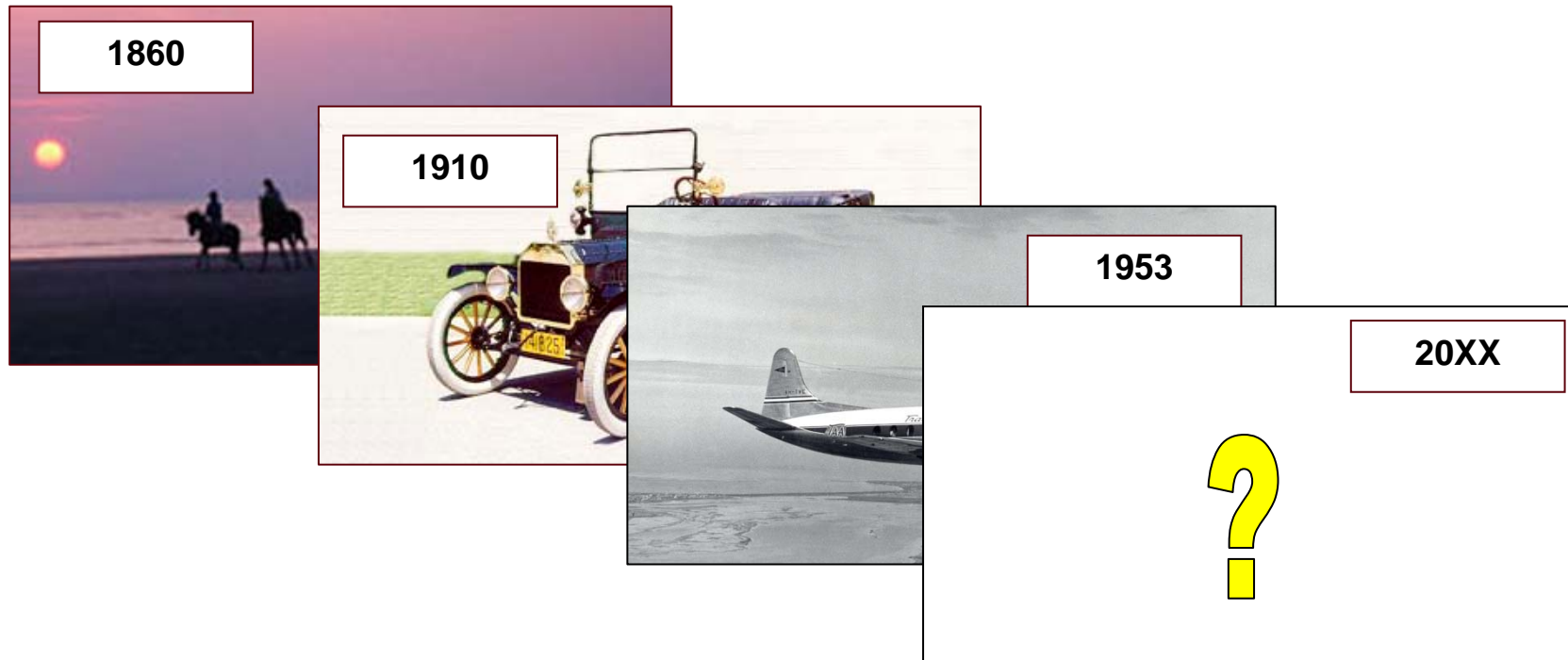
The Generic Process Model can be used during any age of a product

Degrees of Innovation - Continuous



- Responsive to problems, opportunities or trends
- Maintains or enhances competitive position
- Lower risk
- Most common form of innovation

Degrees of Innovation - Discontinuous



- Creative thinking that challenges paradigms
- Higher risk but required for the long term
- Goes beyond competitive positioning
- Potential to significantly impact the way the world operates
- Less common

'Creative destruction' - Schumpeter

Degrees of Innovation – How New, How Useful?



New concept. Voted the winner in the BBC Great British Design Quest, 16 went into service, now out of production

Incremental concept. Failed original objective, but over 1500 in service. Still being developed and in production



Some More Products



WWW



Mobile phone

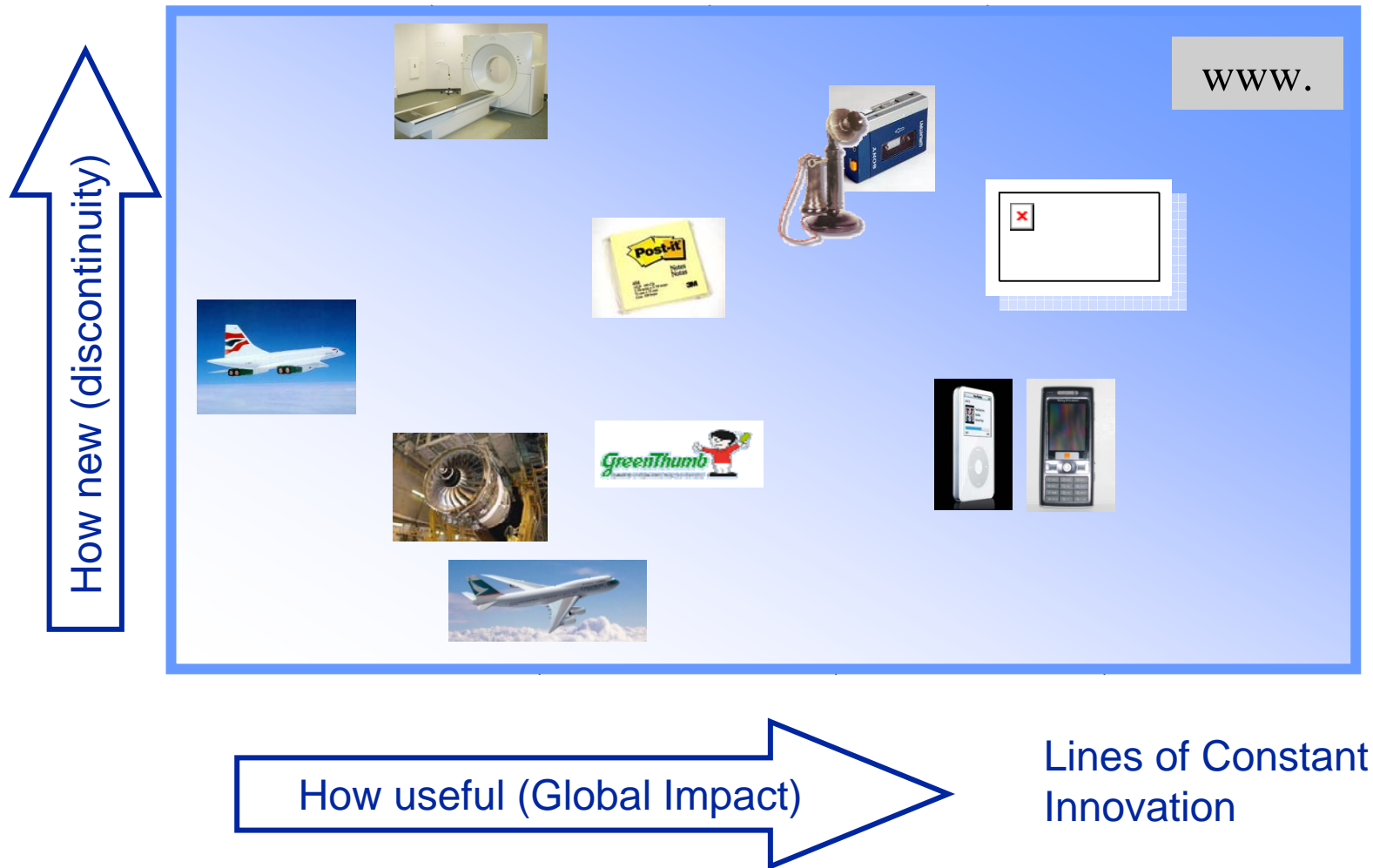


Apple iPod



Novelty and Usefulness

How new x How useful



Types of Innovation

- Product Innovation – changes in products or services that an organisation offers
- Process Innovation - changes in the way that products or services are created and delivered
- Position Innovation - changes in the context in which products or services are introduced
- Paradigm Innovation - changes in the underlying mental models which frame organisations activities



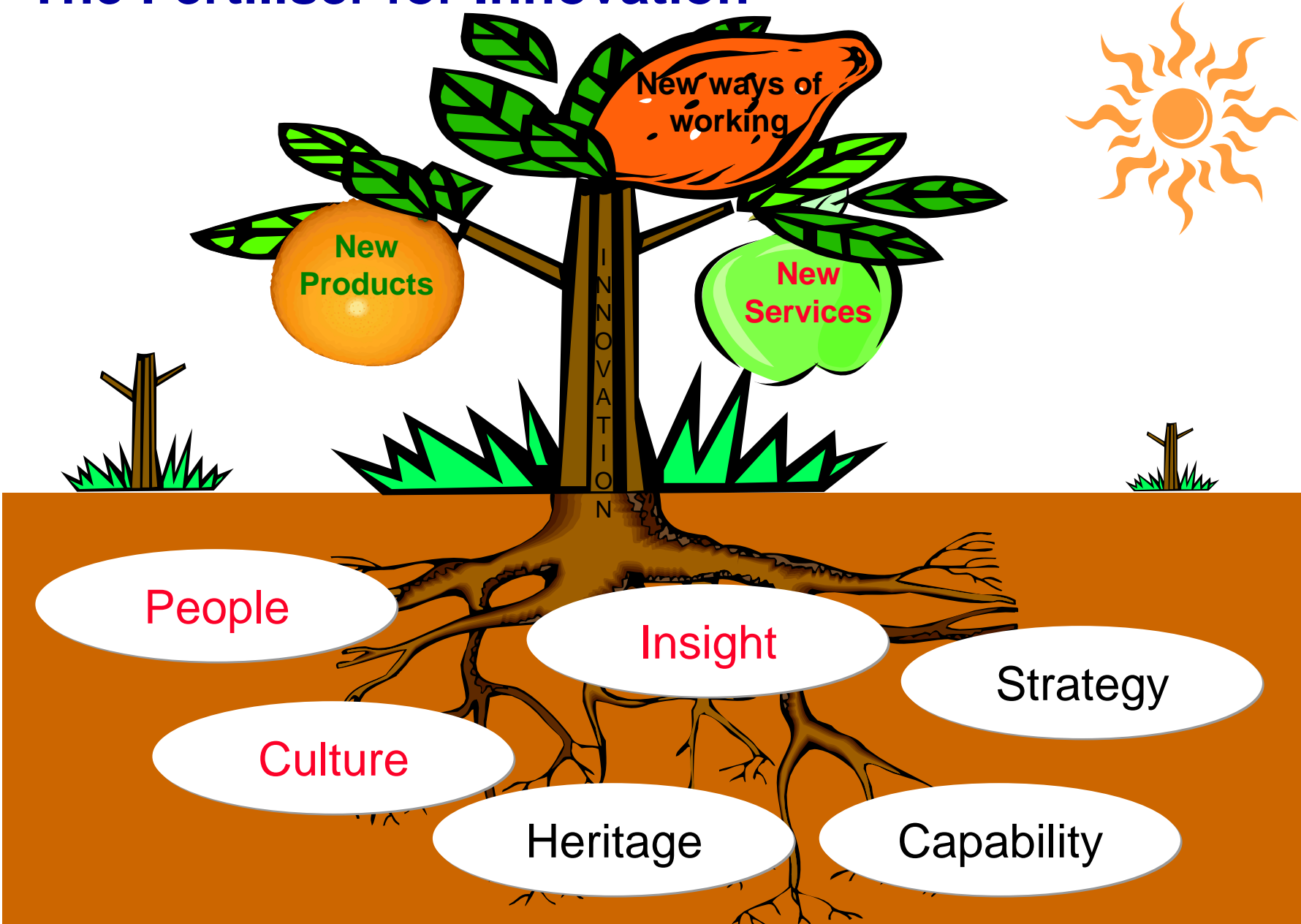
Rolls-Royce



Sir Henry Royce Awards
for Technical Innovation 2006



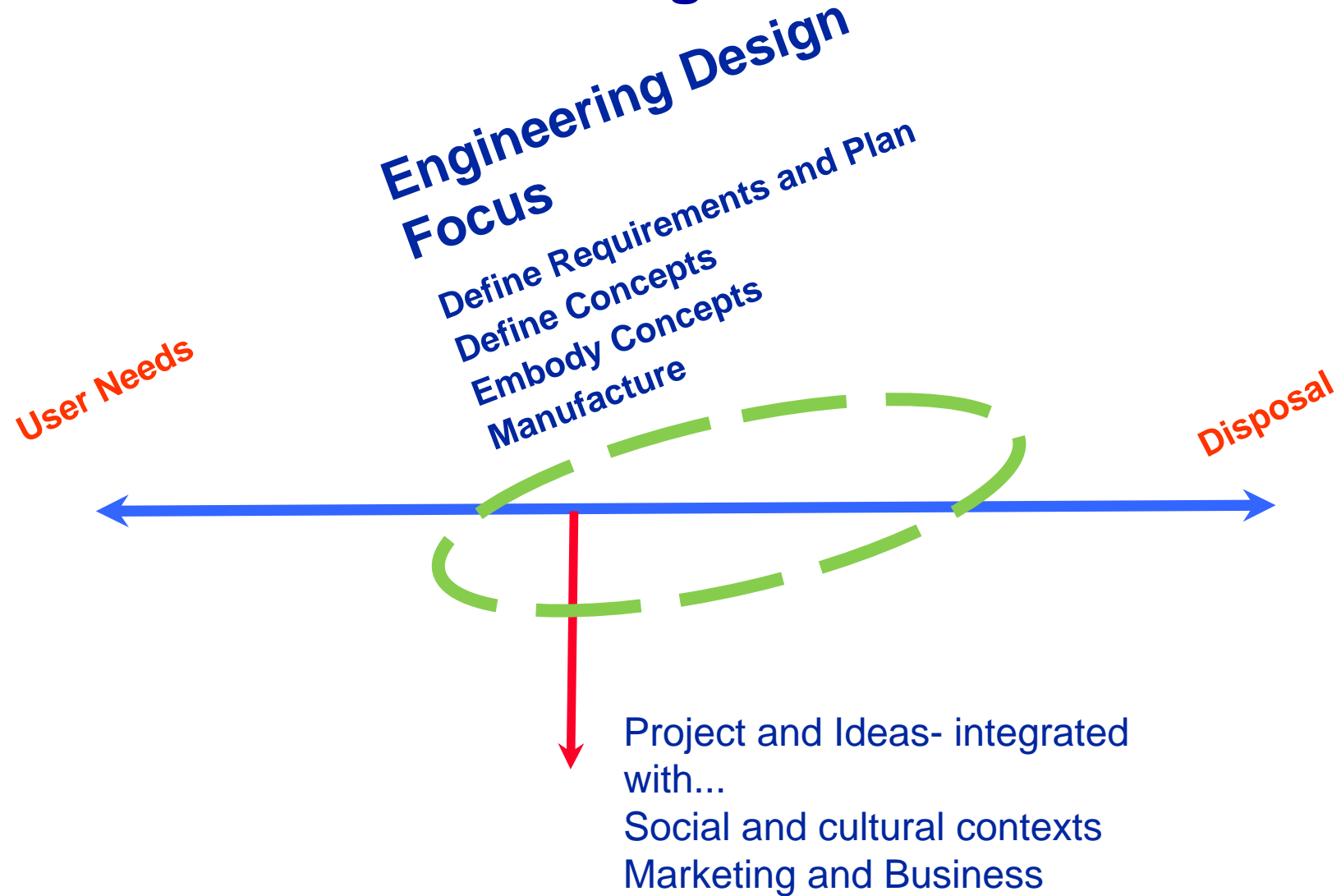
The Fertiliser for Innovation



The Need for Innovation in Education

- For a University Engineering culture, we are notorious for developing (and defending):
 - Unattractive
 - Over-structured
 - Over-stuffed
 - Over-examined
 - Overly punitive
 - Overly deterministic
 - Overly academic... join-the-dots rituals
- And we do it rigorously!

Innovation – Extending the Focus



Bridging Design, Sustainability and Systems

The VP Scheme in Innovation : Objectives

- Enhance the innovation content in undergraduate teaching
- Develop a better understanding of the innovation process in business contexts - need to understand Innovation
- Encourage inter-disciplinary design activity - arts, social sciences
- Develop greater awareness of, and contact with, industry and business - real life projects
- Encourage undergraduate endeavour in developing creative, innovative design proposals (open fronted projects)

富王

I hear and
I forget

I see and I
remember

I do and I understand



Do I hear?

- 'We do some... much... most... of this already'!
- Happily- yes, we do- so we don't need to re-invent the wheel.
- but we can just check that the wheels are connected and all rolling in the same direction....
- ... and show just how good we all are at steering

Summary

- Innovation in Industry and Public Services is needed
- Innovation in Engineering Education is needed
- The Visiting Professors in Innovation is a timely response to these needs
- The programme has been well received and oversubscribed
- Some things done so far
 - Seminar for Visiting Professors in March 2009
 - Innovation the keynoter topic in the RAEng Summer School for University Lecturers
 - Draft framework document available



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Customers and needs

- Customers (anyone who has an interest in the outcome)
 - Individuals
 - Groups
 - Corporate bodies
 - Socio-Economic Groups
 - The environment
- Needs
 - Specific
 - Implied
 - Latent