New approaches for the early detection of tree health pests and pathogens

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The consortium

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University of Hertfordshire

UNIVERSITY OF OXFORD

The James Hutton Institute

Science connecting land and people

CEH Centre for Ecology & Hydrology

NATURAL ENVIRONMENT RESEARCH COUNCIL

Natural Resources Institute

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RAL Space

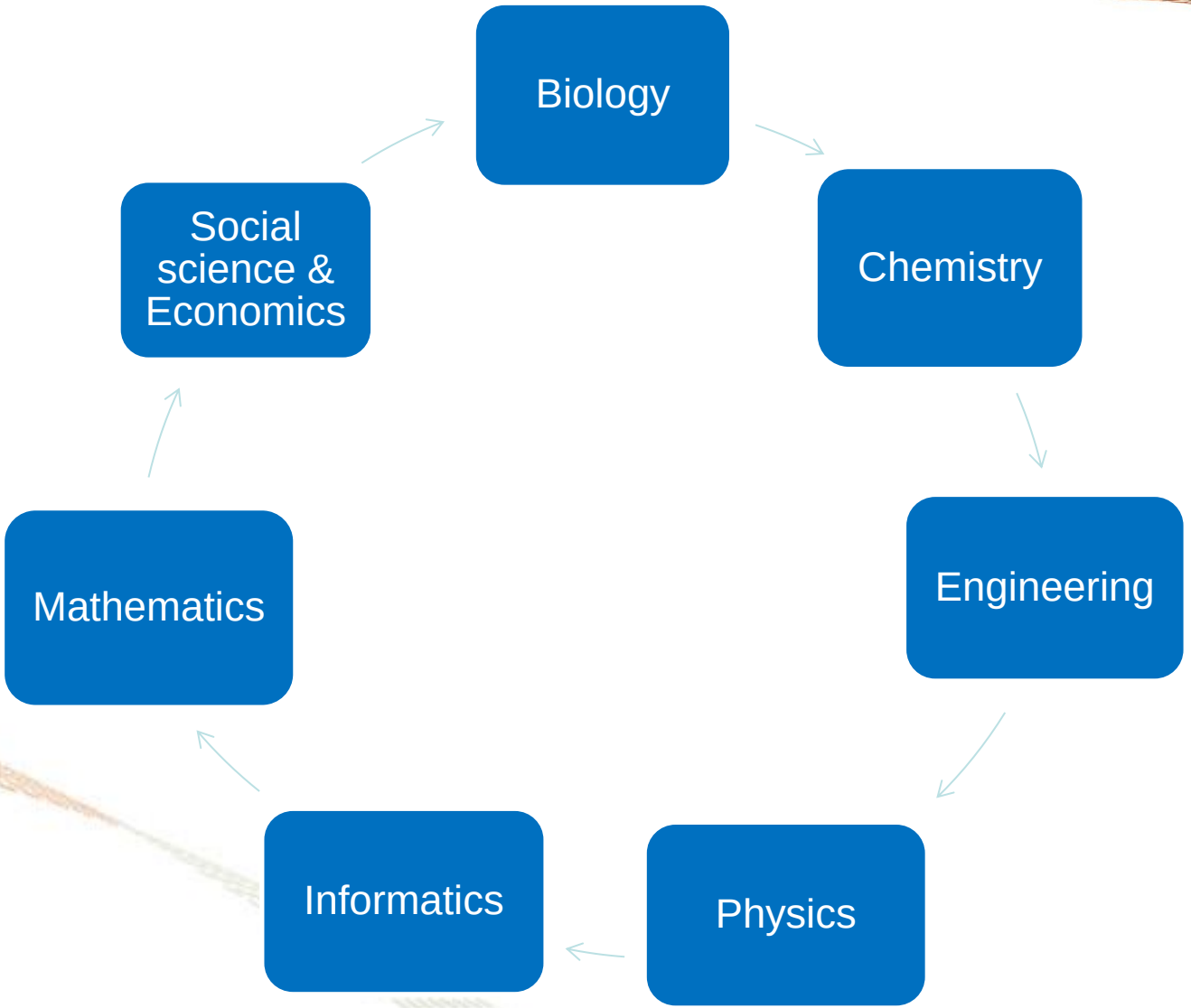
University of St Andrews

Forest Research

Key Objectives

1. Develop improved, cost-effective tools for the early detection, surveillance & monitoring of alien pests and pathogens of trees and other plants to improve the UK's biosecurity.
2. Exploit technical advances in fields such as genomics, bioinformatics, pest & disease detection, trapping and environmental sampling, including risk and social impact valuation to support the health and resilience of UK trees and woodlands.
3. Based on an interdisciplinary consortium bringing together natural science specialists in tree research and plant biosecurity with leading-edge scientists from the physical, engineering, social & economic science research communities to develop these tools.

An interdisciplinary approach



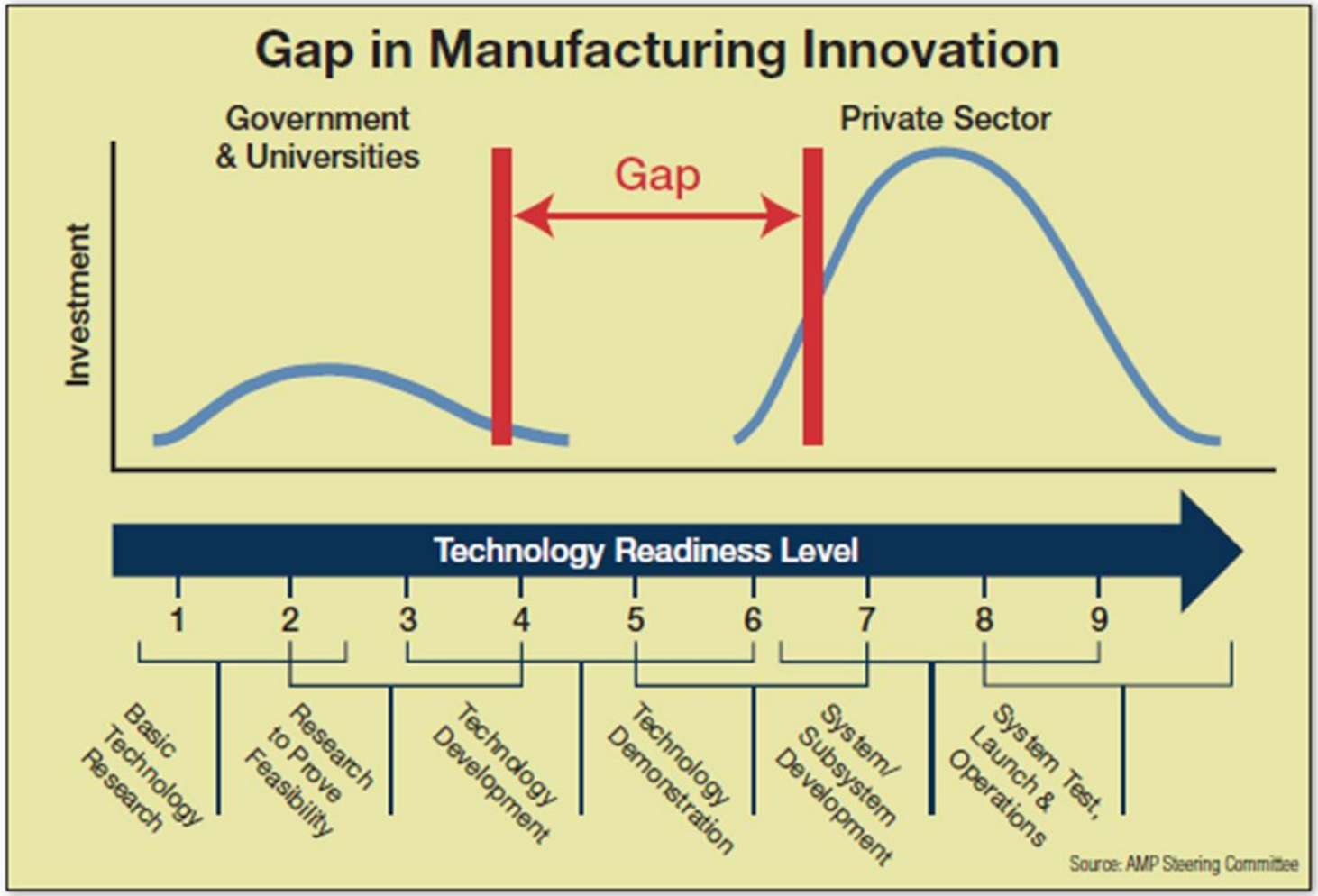
Our approach

1. To ensure that the tools developed are fit-for-purpose in the real-world: offer a genuine cost-efficiency benefit, are deployed based on risk and that there is positive uptake by end-users
2. To create tools that can be used in a range of inspection contexts
3. To add to our national capabilities in plant health
4. Create generic tools that can be used beyond tree health surveillance and monitoring

Six work packages

WORKPACKAGES:					
1	2	3	4	5	6
Lead: Mariella Marzano, FR	Lead: Steve Woodward, Aberdeen	Lead: Hugh Mortimer, RAL	Lead: Neil Boonham, Fera	Lead: David Hall, NRI	Lead: David Cooke, JHI
Interdisciplinary approaches (‘The Learning Platform’)	Volatiles Detection	Multispectral Imaging	Spore trapping	Pest Trapping	Water surveillance

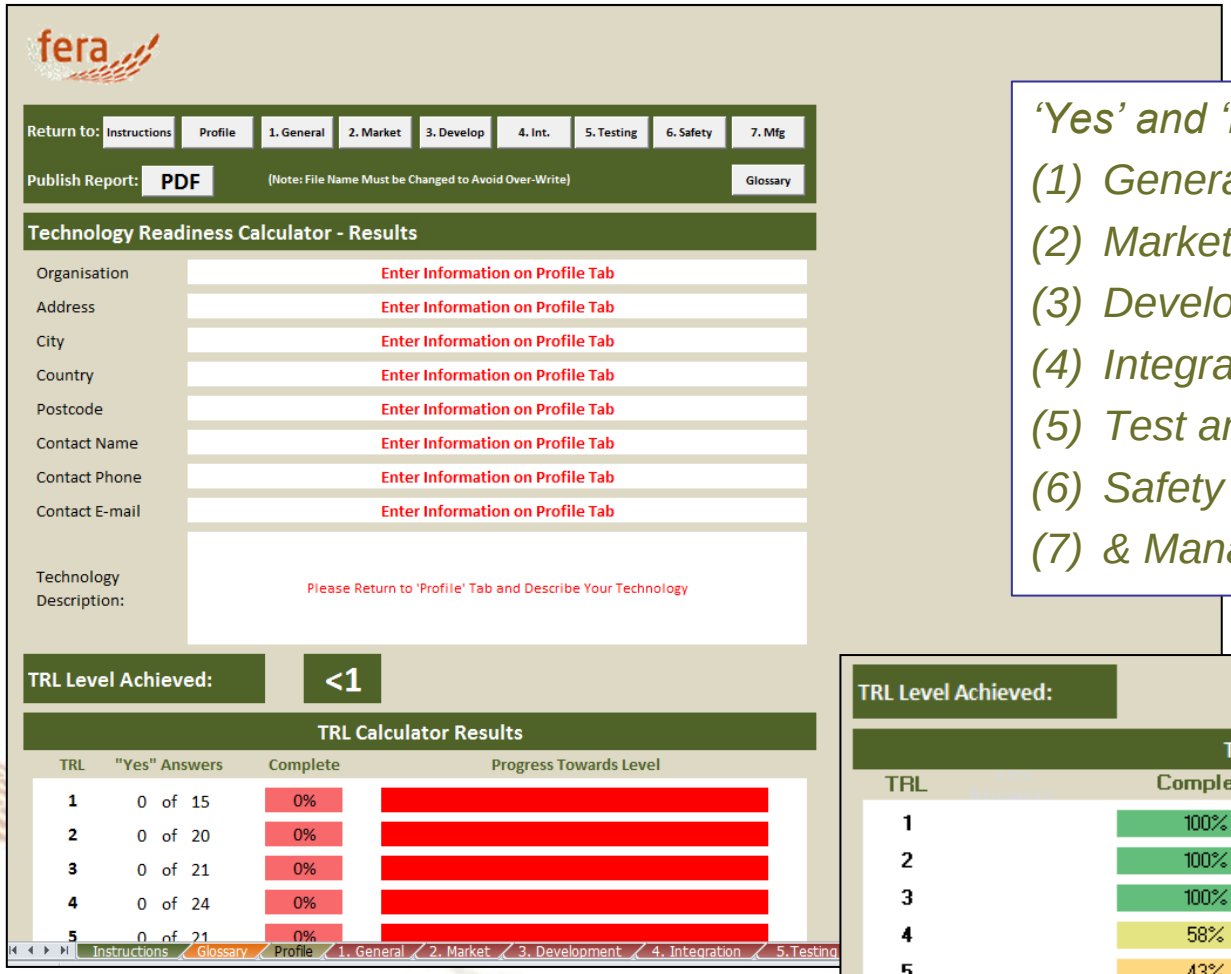
Understanding the innovation process



Why might we need TRLs?

- Evaluating impact (measuring progress)
- Objective approach to assessing where a technology sits in the ‘deployment pipeline’ (better indication of effort required)
- Easier approach for understanding the different investment/resources required for technologies at different levels of maturity
- Means of assessing likelihood of success given finite resource (prioritisation tool)

TRL Calculator (developed by Elena Fesenko)



'Yes' and 'No' questions grouped as:

(1) General

(2) Market

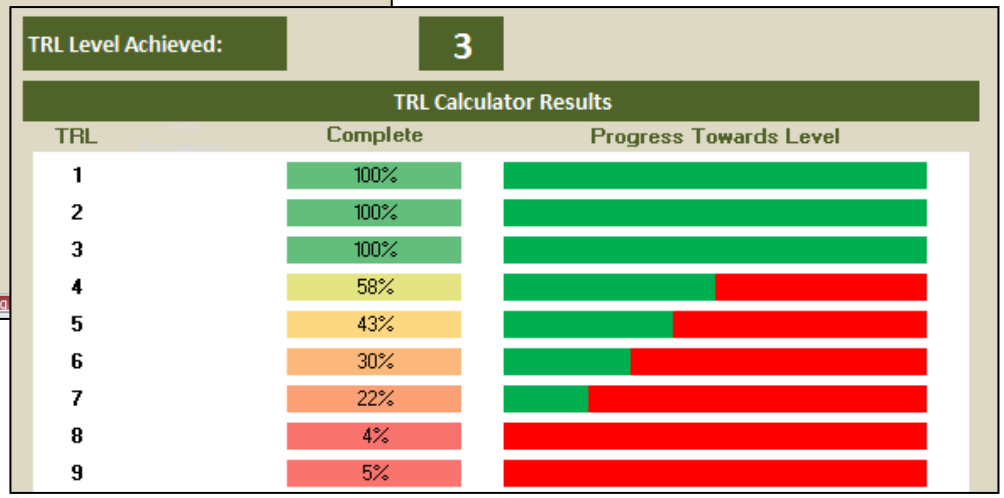
(3) Development

(4) Integration,

(5) Test and validation

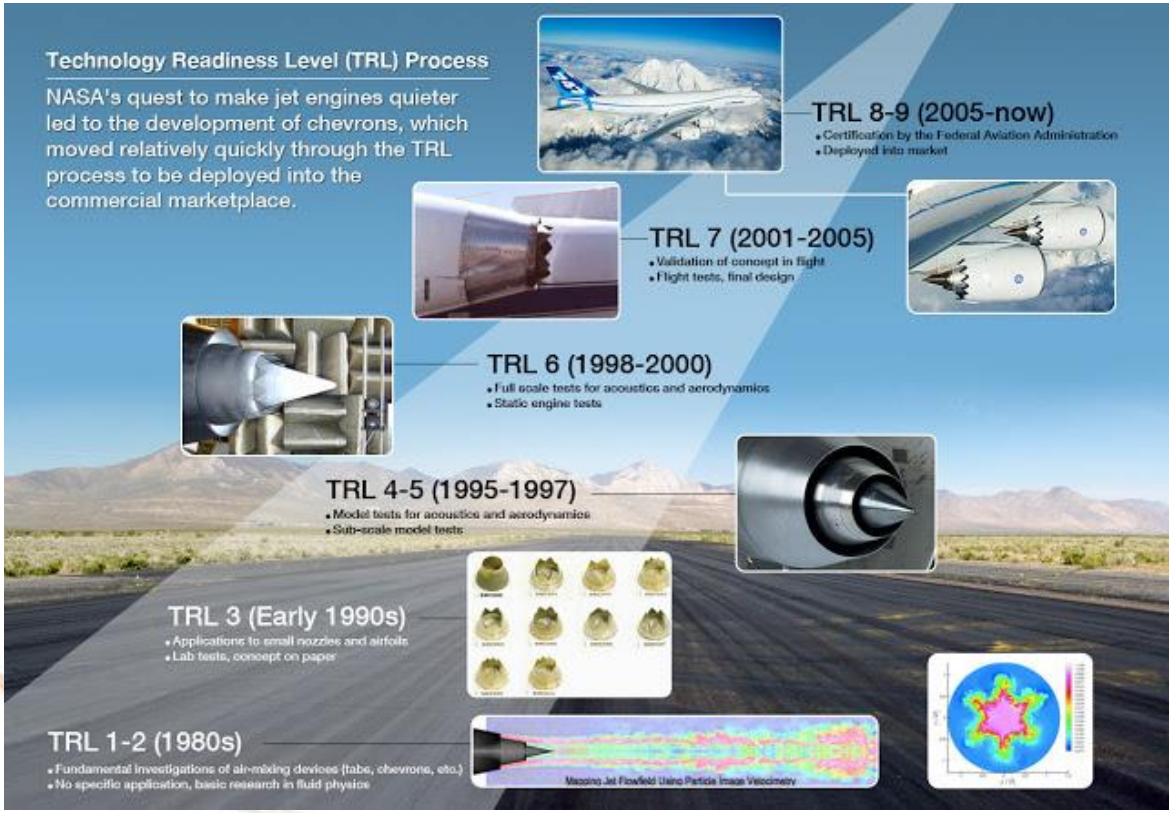
(6) Safety

(7) & Management categories



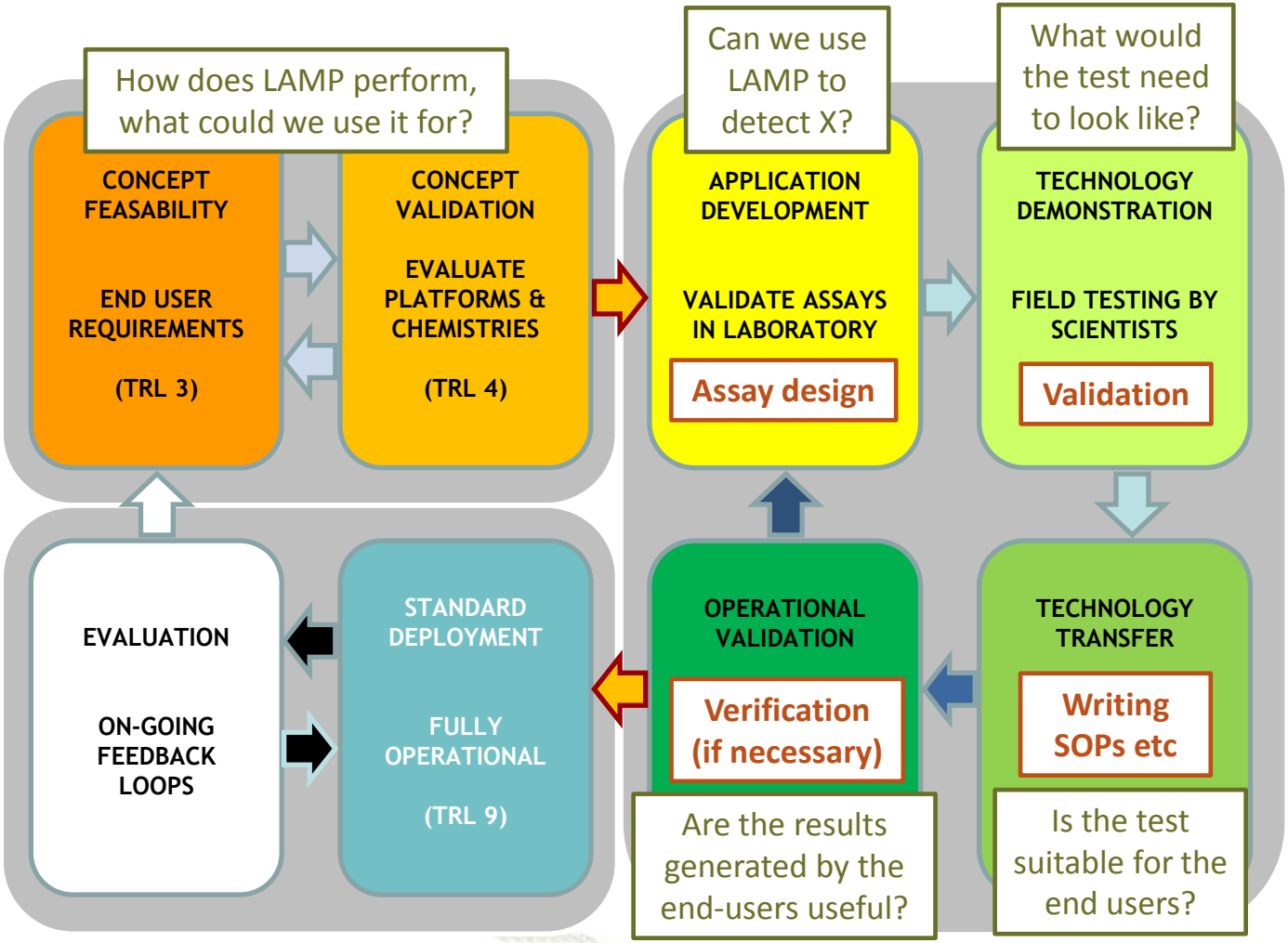
Using the right language

e.g. translating from ‘engineering speak’ to life ‘sciences speak

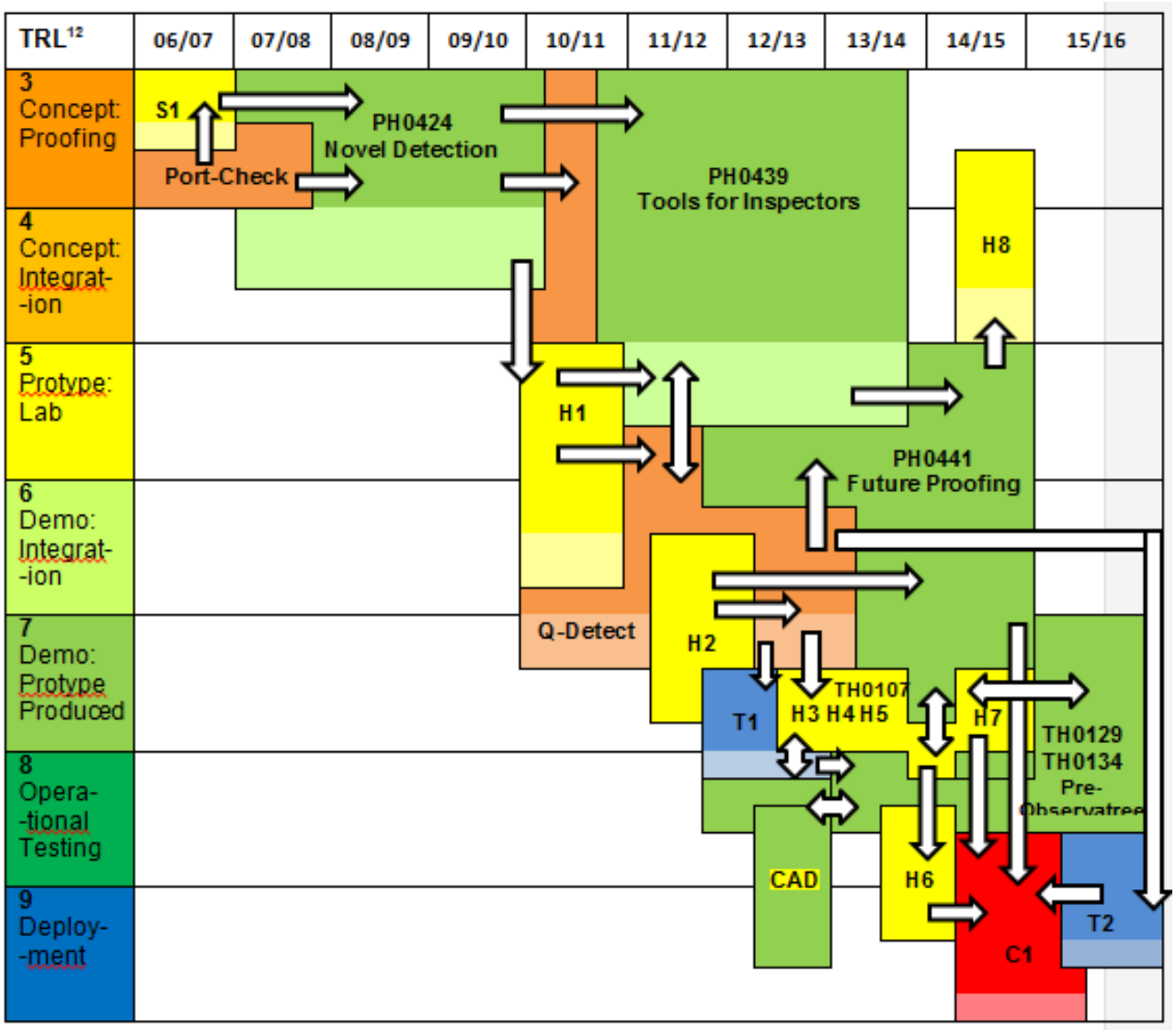


Taken from Jim Banke, Technology Readiness Levels Demystified 08.20.10
http://bubba-lifeisgreat.blogspot.co.uk/2010/12/technology-readiness-levels-demystified.html

Development of LAMP and Genie technology for on-site use by inspectors related to Technology Readiness Levels (TRLs)

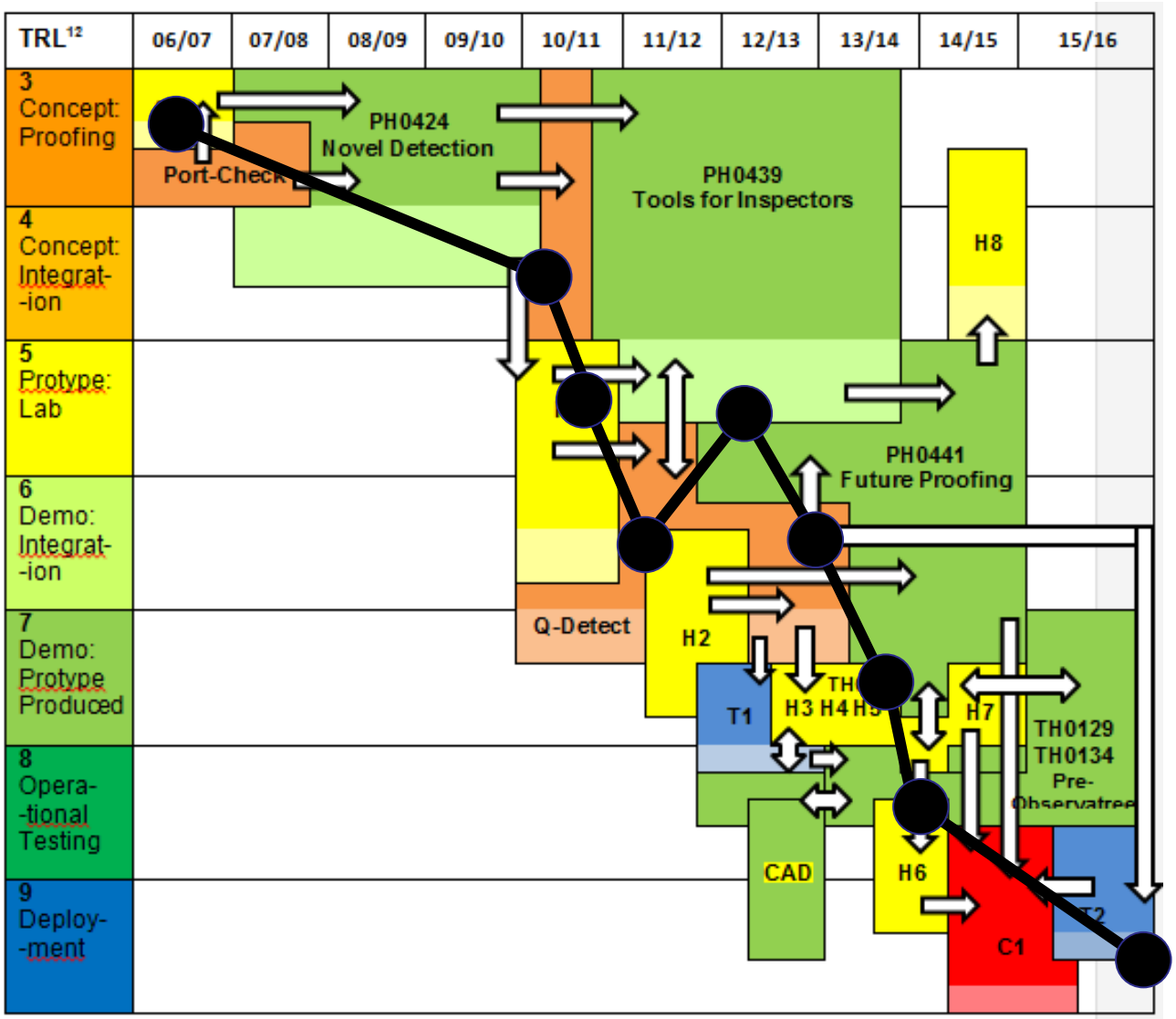


Translating R&D into solutions



Field deployment of LAMP DNA testing technology at Heathrow 2016

Not always a linear process



Points to consider

- Need to use the right language and ask the right questions
- Accept that the timescales involved can be long and are unlikely to be solved in a single project
- Need to stop thinking of innovation as a linear process
- Could TRLs be a simple tool to describe complex process and demonstrate progress