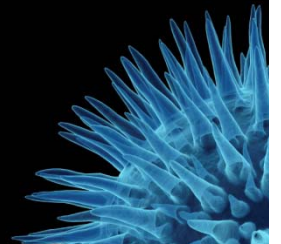
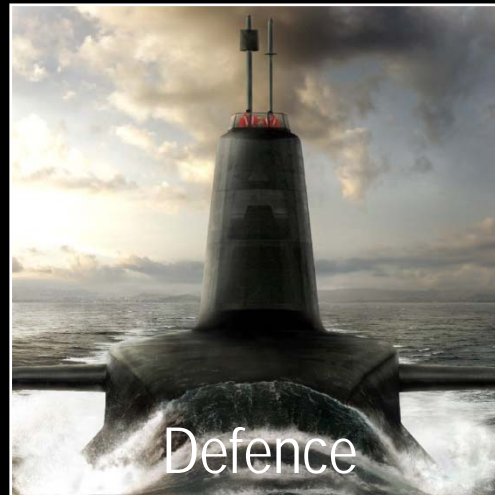
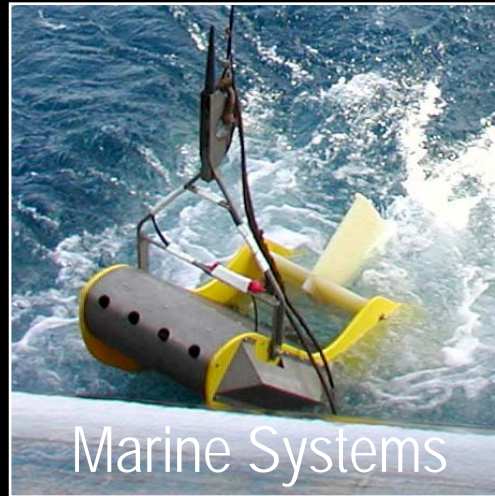


# Contrasting approaches to government support for innovation in SMEs

Dr John Attridge

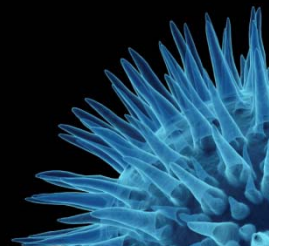
Technical Director, Chelsea Technologies Group

# Chelsea Technologies Group



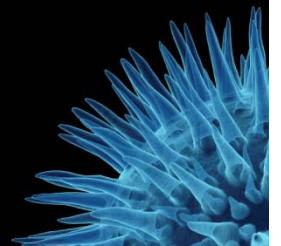
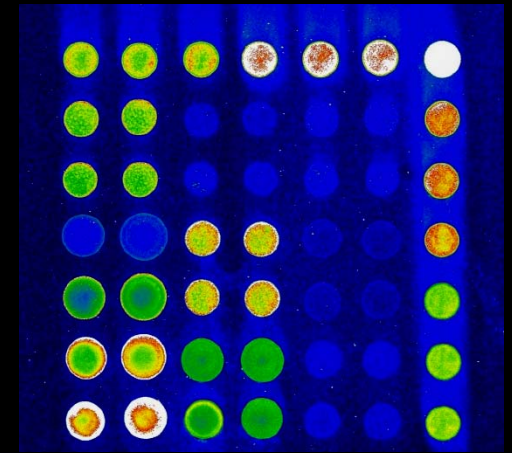
# Quick look at two projects

- Portable pathogen detection system
  - Home Office CBRN collaborative project
  - Generic multi-analyte test platform
  - Successfully completed feasibility but have now entered funding 'death valley'
- Realtime water contamination sensor
  - CPNI funded programme
  - Based on core fluorescence technology
  - Joint UK/USA funding
  - Ongoing programme



# Project 1: Pathogen detection

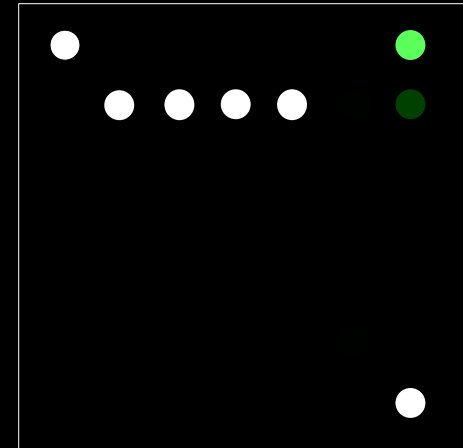
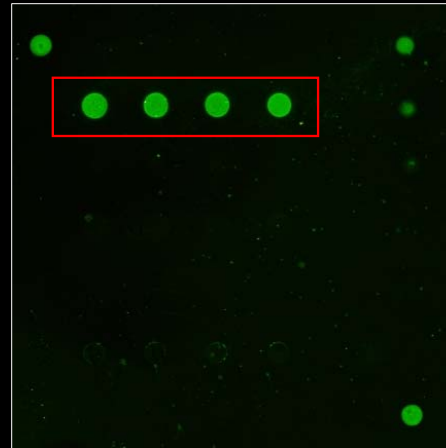
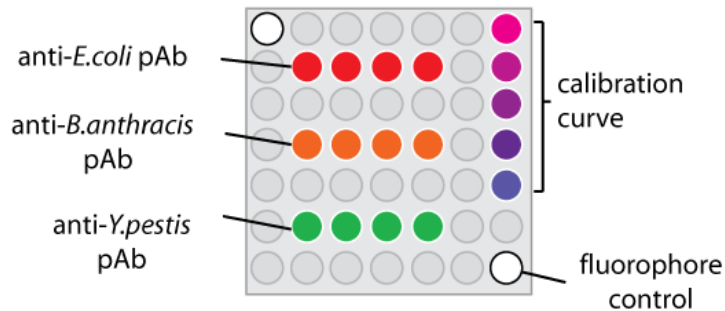
- Protein microarray technology
  - From lab to field operation
- Develop a portable generic platform
  - Antibody/antigen based immunoassay
  - Range of potential applications
- Target scenario
  - Initially aimed at hospital environment
  - On-site screening in event of a cluster of illness or fatality
- Pragmatic approach
  - Proof of principle using available technology



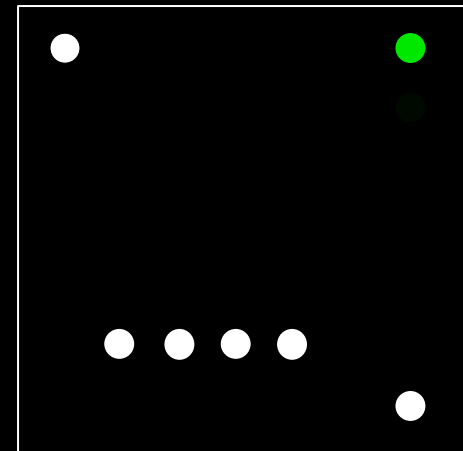
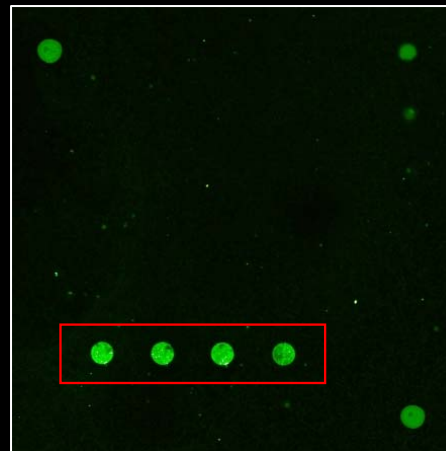
# Demonstrated proof of principle

*E.Coli 0157*

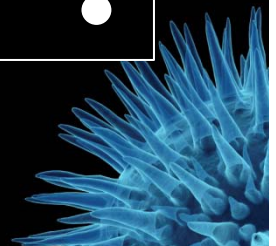
## Printing Scheme:



*Yersinia pestis*

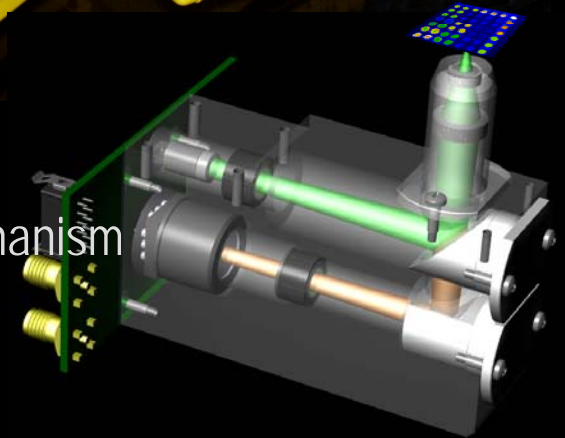


- Prototype system tested successfully at the HPA
- No clear mechanism to support further development beyond TRL4/5
- Proof of principle is only 20% of the work



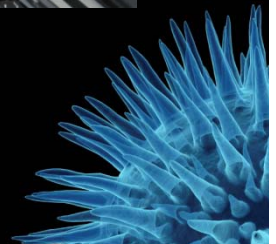
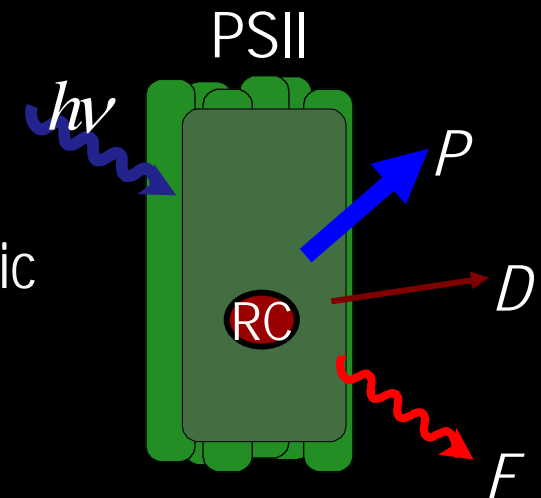
# Challenges for SMEs in security market

- Highly multidisciplinary field
  - Often not core to business, not all skills in-house
  - Need to maintain collaborations
- Access to information and facilities
  - Detection limits & operational requirements
  - Good quality reagents
  - Poorly defined market
- Limited exploitation opportunity
  - Currently appears to be no government procurement mechanism
  - Few UK based companies in sector to feed into
  - Established SMEs less likely to attract VC funding
  - Funding competitions become less attractive for SME beyond TRL4
  - Can look at spin-offs, but does not really address capability gap

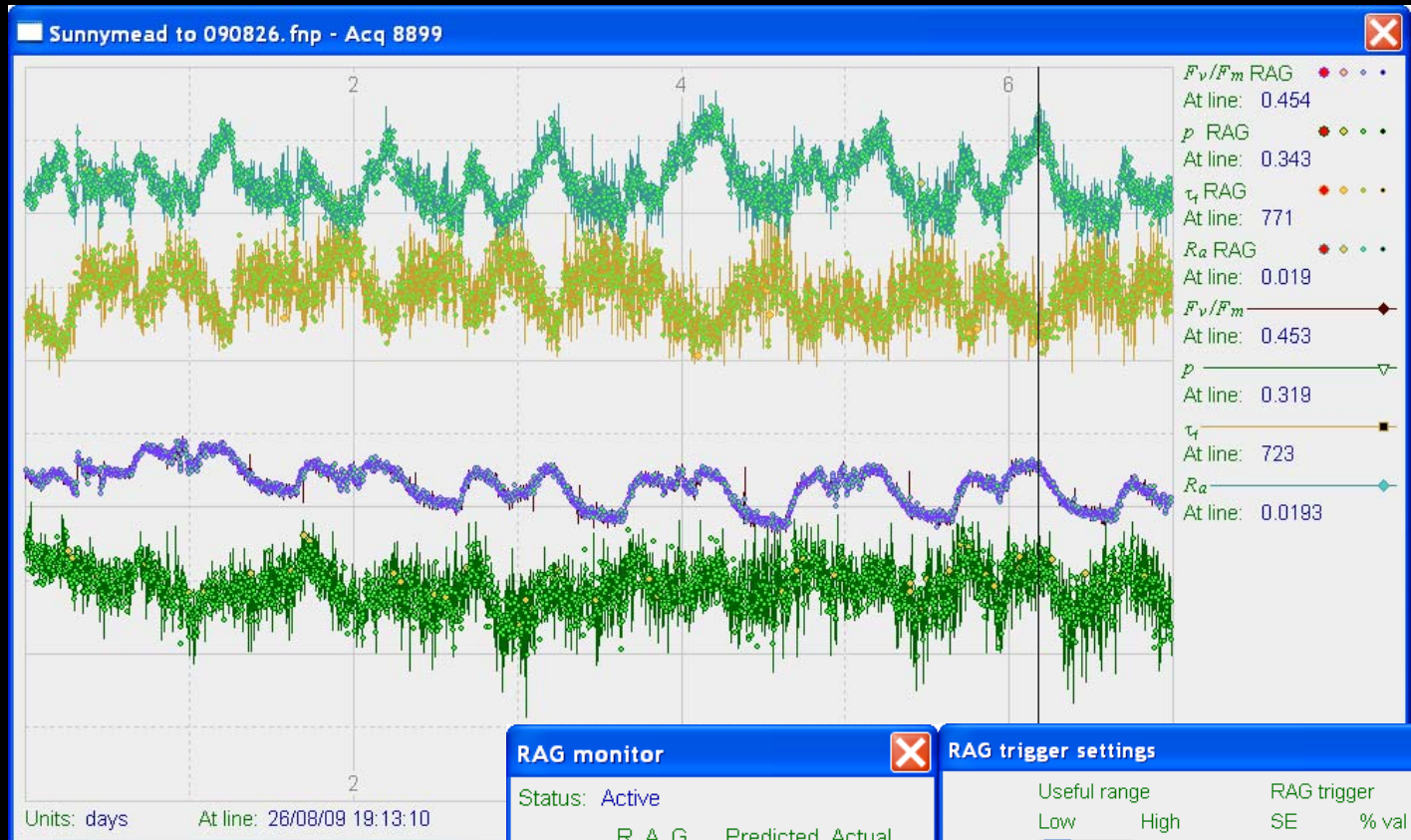


# Project 2: Realtime water toxicity monitor

- Based on technique for studying phytoplankton photosynthesis
  - Fast Repetition Rate Fluorimetry
- Toxins can disrupt algal physiology and photosynthetic pathways
  - Use natural algal population as transducer
  - Broad spectrum detection capability
  - Multi-parameter sensor
- Two phases of development
  - Water intake protection
  - Treated water/infrastructure protection



# 'RAG' alarm trigger algorithm



**RAG monitor**

Status: Active

	R	A	G	Predicted	Actual
$F_v/F_m$ :	●	●	●	0.393	0.373
$p$ :	●	●	●	0.334	0.155
$\tau_f$ :	●	●	●	1413	1026
$R_a$ :	●	●	●	0.0079	0.0075

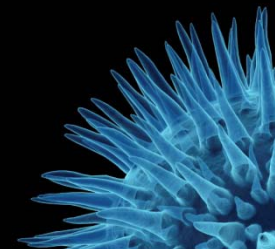
RAG countback: 2 to 6

**RAG trigger settings**

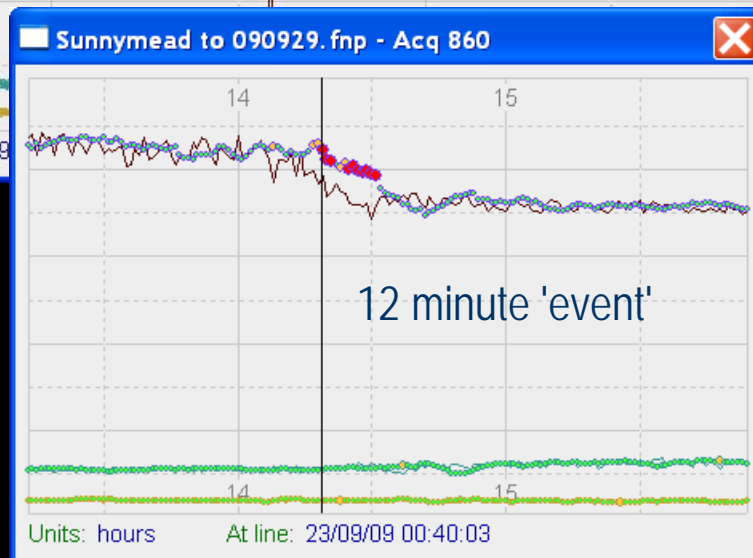
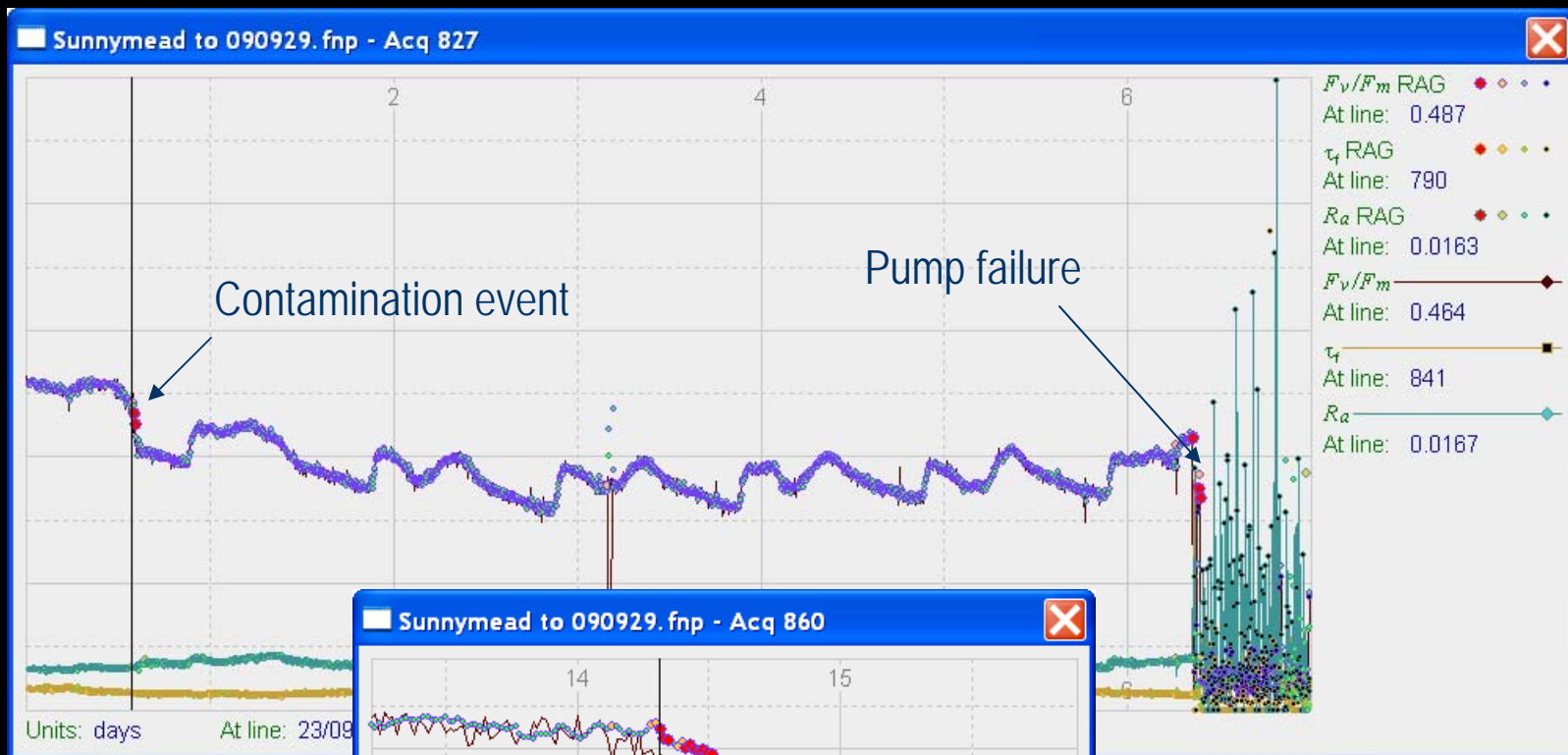
	Useful range		RAG trigger		
	Low	High	SE	% val	Reps
$F_v/F_m$ :	0.2	1	-1	4	3
$p$ :	0.12	1	-2.4	4	3
$\tau_f$ :	400	4000	2.4	6	3
$R_a$ :	0.002	0.12	-2.4	6	3
$R_{\sigma_{PSII}}$ :	0.008	0.2			
$F_m$ :	1000	30000			

RAG countback start: 3  
RAG countback end: 7

Save as default       



# Example of event detection



# FRRF spin-offs

- Core development
  - Water intake and treated water protection
- Opening opportunities in new markets
  - New laboratory techniques
  - Environmental monitoring
  - Coral health
  - Higher plants
  - 2<sup>nd</sup> generation bio-fuels
- Ongoing funding is leading to commercial systems
- Technology is now core to future business
- USA money has helped to provide technical requirement and political impetus for development



# Summary

- Niche market programmes are not always attractive to SMEs
  - Limited sales opportunities
  - Development really needs to be core to business
- Funding 'death valley' needs to be addressed
- Risk of jumping on successive funding bandwagons
  - Continue to generate good ideas but get little commercialized
- Continuity of funding gives SMEs the confidence to exploit full potential of technology

