



CATAPULT
High Value Manufacturing

From process analytics to trickle-down technologies

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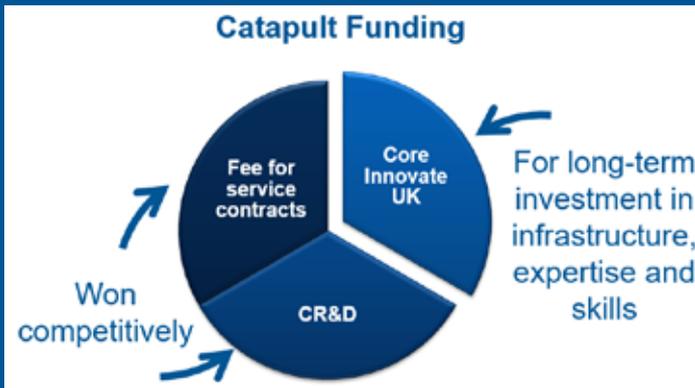
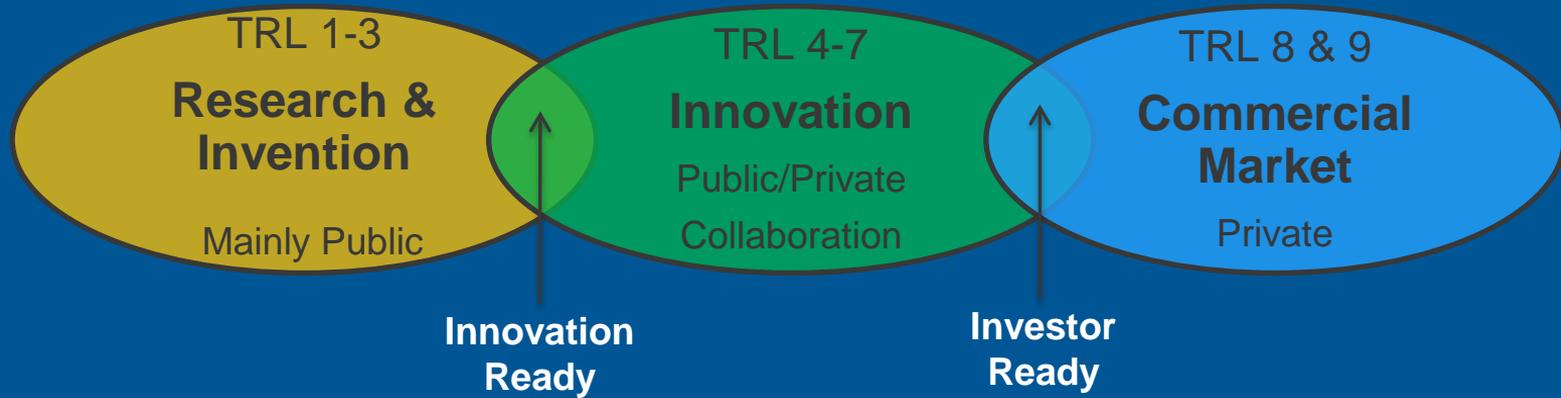
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Centre for Process Innovation – National Formulation



- Integrate and Translate to support companies crossing the gap to commercialisation (de-risking).



Funding

- Core Initiation grants
- ERDF grants
- Innovate UK (strategy challenge fund etc.)
- Horizon 2020
- Commercial Work

National Formulation Centre – Complex Powders



(Prospect CP)
Twin screw wet granulator

(Prospect P& F)
Powder conveying, packing
and filling

Continuous mixing and
conveying

Themes

- Process analytics
- Batch to continuous
- Process modelling
- I4.0 & IoT

Industry Sectors

- Pharma
- Agrochemicals
- Pigments
- Detergents
- Food manufacturing



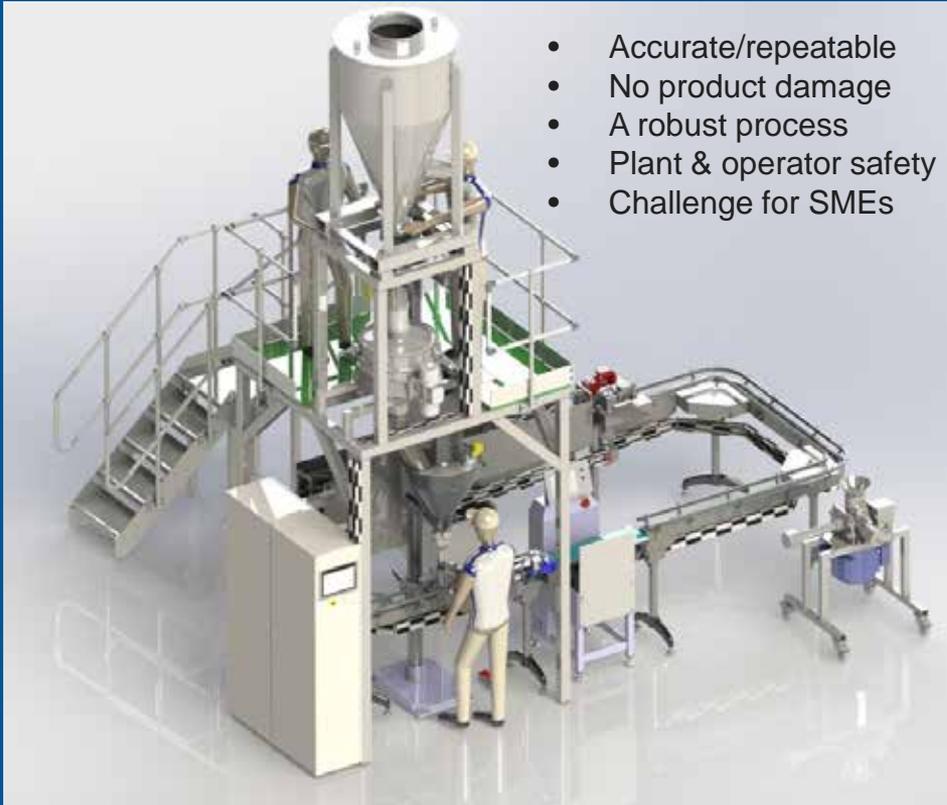
- New 275 m² powder handling/technology lab
- Initial research grants for demonstrations and showcases last for 2 years
- During initial period we are building our capability and collaborative network

High Throughput Powder Processing & Scale-up



- 100 - 2000 kg/h throughput
 - Screw feeders
 - Powder Augers/conveyors
 - Mixing/Agglomeration
- Highly modular & bespoke
- Minimum PAT (at present) but flexible
- Capability & Potential:
 - Process scale-up
 - Batch to continuous
 - Production simulation

Pack and Fill – Prospect P&F



- Accurate/repeatable
- No product damage
- A robust process
- Plant & operator safety
- Challenge for SMEs



Powder storage bin (1000kg scale)

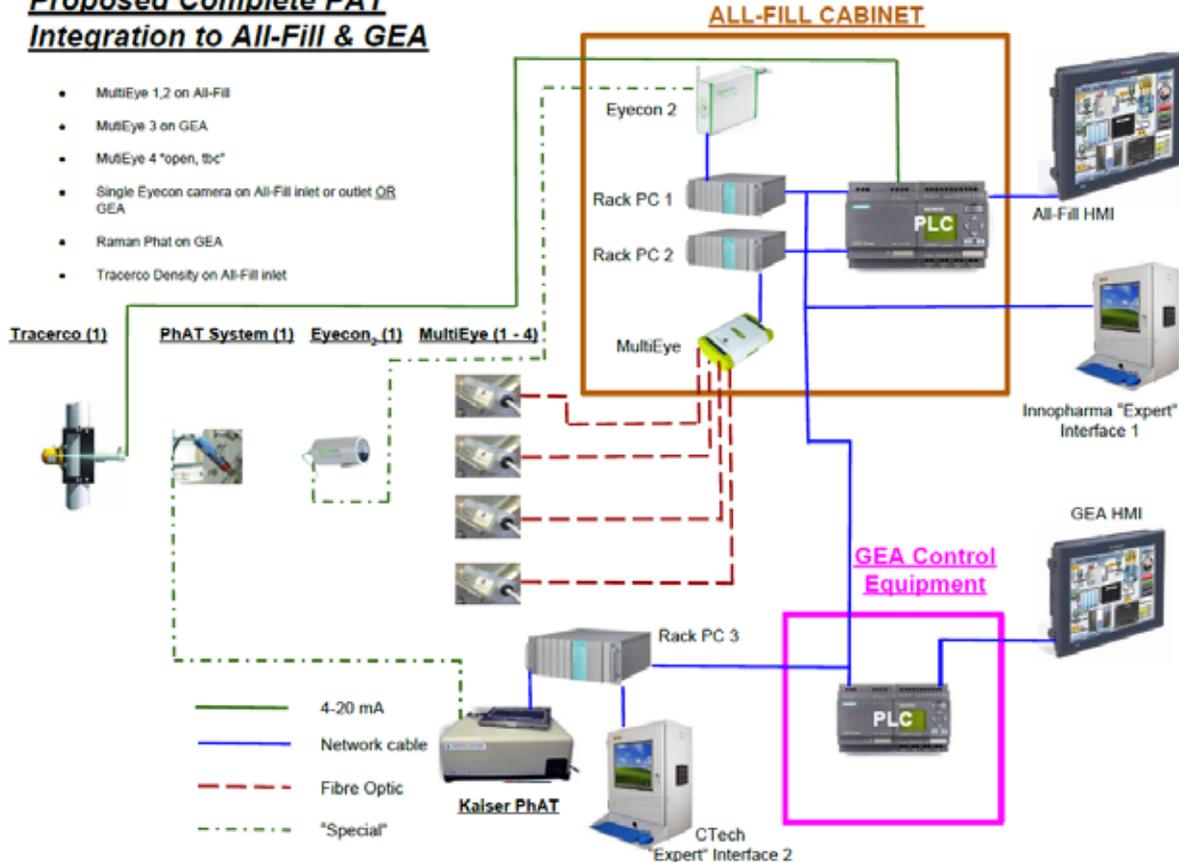
Able to handle free flow & cohesive powders
Fine to large particulates 50 μm to $\approx 2\text{ cm}$
Full system set up with modular “plug & play”

- 150 cross feed auger
- Powder sifter
- Check weigher
(Filling weight 1g to $\approx 10\text{ kg}$)
- Rinser to recycle

Process Analytics Integration

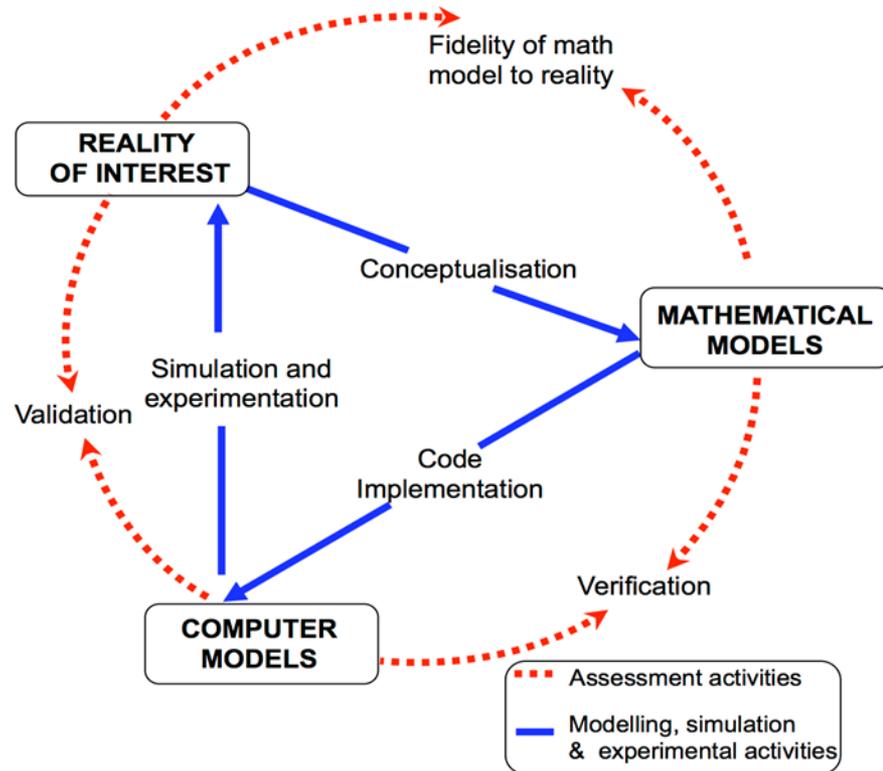
Proposed Complete PAT Integration to All-Fill & GEA

- MultiEye 1,2 on All-Fill
- MultiEye 3 on GEA
- MultiEye 4 "open, tbc"
- Single Eyecon camera on All-Fill inlet or outlet OR GEA
- Raman Phat on GEA
- Tracerco Density on All-Fill inlet



- Flexible laboratory
 - Modular equipment
 - Multiple sensor positions
- Full ELN Integration
 - Data logging
 - Cloud uploads/backups
 - Partner sharing
- Off-line characterisation
 - Analytical powder lab.
 - QA/QC checks for tablets
- Supporting modelling
 - DEM/PBM coupling

Models MPP- Integrating DE and population balance models



- Generic framework for translating particle models of industrial relevance into industrial practice
- Twin-screw wet granulation as exemplar
- Two-way coupling of multiscale models
- Decision support methodology/tool for commercial exploitation accessible by UK plc
- Prototype and production ready granulation models

Final Points



- The complex particles group within NFC are looking to collaborate with industry and academia.
 - Exploratory work with academics & SMEs (in-kind contributions ok)
 - Medium and Large collaborative projects
 - Commercial work
- CPI's Strengths in particle technology and handling:
 - Containment & active handling
 - Process Analytics with a flexible work area and scale up to 2000 kg/h
 - Data collection & backup + sharing
- Fully commissioned by August 2018 – Please arrange a visit.
- 'Powder Process Control' event, 16th January 2019, Sedgefield, UK.

Thank you...

For more information visit www.uk-cpi.com

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