

BioSeq Portable Veterinary Diagnostics Laboratory

A field deployable Rapid Testing and Instant Reporting system



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Director of global Sales & Marketing



Smiths Detection has true global presence

DIAGNOSTICS



Global HQ, Watford UK

CENTRAL TEAM:
45 (Technology/
Global IT/ Business
Development/
Projects/Admin)

COMPETENCE CENTRES:

Manufacturing /R&D

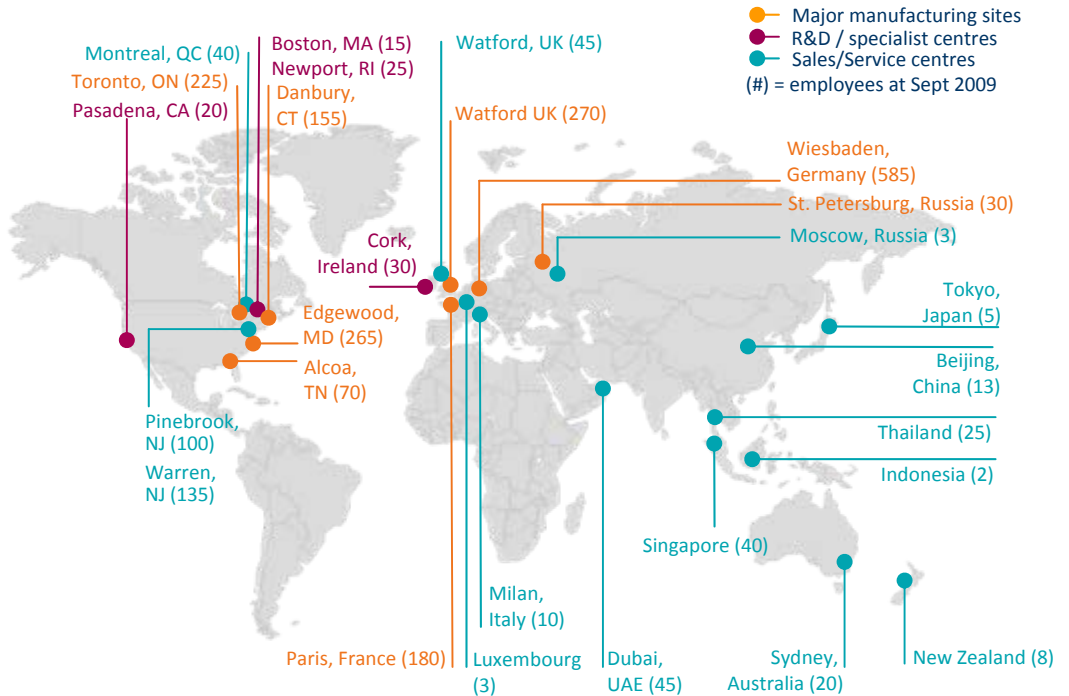
Wiesbaden: Imaging; explosives
Paris: Hi-energy X-ray
Watford: Chem/bio/diagnostics
Edgewood: Chem/bio/integration
Toronto: Explosives
Danbury: FT-IR

Manufacturing:

St Petersburg: X-ray
Alcoa: X-ray

R&D:

Pasadena: chemical
Boston: bio
Newport: sensor management
Cork: mm-wave



Total employees 2400 globally,
including > 500 R & D engineers

Rapid on-site disease diagnosis for vets

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The features of such a system

1. Simple sample preparation system for processing a wide range of samples in the field
2. Easy to use, robust and reliable PCR based system for pre-clinical/clinical diagnosis of a range of viral, bacterial and fungal pathogens
3. A diagnostics capability that is informative through disease assay panels (highly multiplexed PCR)
4. Can integrate in to outbreak management/targeted surveillance processes to give real time tracking and response

Golden rule - Any sample, any test, by anyone, anytime, anywhere

The evolution of sample preparation

Feature 1

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Manual Extraction
and PCR set up



Automated Extraction
and/or PCR set up



Automated Extraction
and PCR set up/analysis



10 years
ago

5 years
ago

Now

Sample preparation in the field

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- Purifies DNA or RNA from a wide range of sample types (Blood, Faecal, Nasal Swabs, Vesicular Tissue and Milk)
- Completely sealed unit that will isolate & contain any bio hazardous material and can be immersed for decontamination
- Simple, completely automated sample preparation and PCR/rtPCR, driven by the BioSeeq instrument
- All enzymes and additives as temperature stable beads
- Communicates with BioSeeq to download assay formats and conditions for latest assays

Portable PCR instrument

Feature 2

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- 4 colours for increased multiplexing
- Active Peltier cooling for strain level discrimination
- 5 independent analysis stations
- Automated sample preparation and analysis
- Rechargeable battery for field use
- Remote Wireless Communications
- Touch screen control
- GPS for integrated data analysis

- Sample to answer in as little as 120 minutes, depending on assay and sample type

Any sample ...

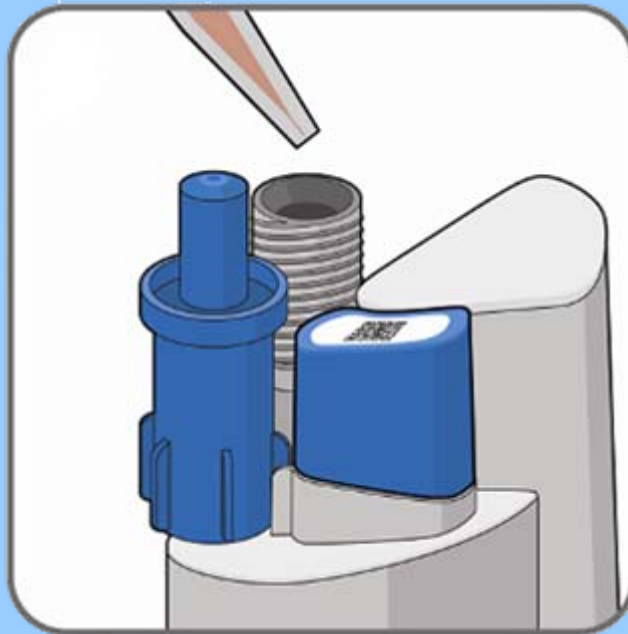
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Example sample types

Blood – ASF, FMD

Vesicular tissue - FMD

Swabs – Avian Influenza



Benefits

Only one SPU required:

Reduces stock holding requirement for the user

Improves cost benefits

Complete flexibility

any test ...



FMD Assay



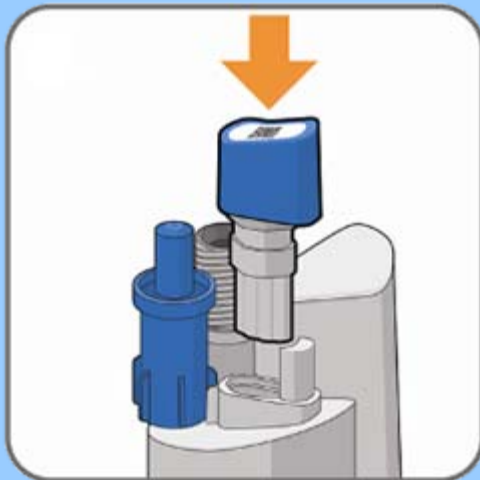
CSF Assay



Avian
Panel:-
AI/NDV



Vesicular Panel:-
FMD, VSV, SVD

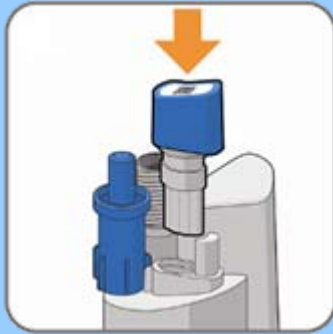


Selected reagent pack
is added to SPU to
create complete test

Benefits

- Only one assay format required:
- Rapid response to changing threats
- No need for training on each assay
- Easy introduction of new assays

by anyone.



Bar code transfers all assay information to instrument

Benefits

Allows tests to be run by non PCR experts

Facilitates introduction of new tests

Prevents running assays that are out of date

Decontamination



The instrument can be immersed in Virkon for disinfection (Virkon S tablets at 1% w/v)

Informative assays

Feature 3

Pan-FMD LATE-PCR Assay

- Two Fluorescent Colours
- 2 Different Probes in One Multiplex Reaction
- 2 Primer Pairs in Multiplex (including positive control)
- 6 oligonucleotides in 1 reaction
- Read at End-Point at 55°C
- 1 Tube but 2 different answers



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Identifies

All 7 serotypes of FMDV
Not FMDV



Verification of Pan-FMD assay on IAH isolates



FMDV Serotype	# of isolates tested	Positives Results by:		
		Culture	Real-time PCR	LATE-RT PCR
A	30	30	30	30
C	5	5	4	5
O	36	36	36	36
Asia 1	12	12	12	12
SAT 1	16	16	15	16
SAT 2	14	14	14	14
SAT 3	3	3	3	3
Asia 1 / O	1	1	1	1
o / SAT 2	1	1	1	1
FMDV	3	0	3	3
TOTAL	121	118	119	121
NON-FMDV negative control isolates : Tests for false positives				
SVDV	8	NA	0	0
VSV / VESV	2	NA	0	0
ERAV	2	NA	0	0
Uninfected epithelium / serum	16	NA	0	0
TOTAL	28	NA	0	0

Assays run on Stratgene instrument

Informative assays

Feature 3

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Poultry Notifiable LATE-PCR Assay Panel

- Four Fluorescent Colours
- Eight Different Probes in One Multiplex Reaction
- Seven Primer Pairs in Multiplex (including controls)
- 22 oligonucleotides in 1 reaction
- Read at End-Point at Temperatures 55°C and 35°C
- 1 Tube but 7 different answers



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Identifies

Influenza A

H5N1 Not LPAI

H5N1 LPAI

H7 Not LPAI

H7 LPAI

Newcastle Disease

Negative for above



Rapid Testing and Reporting Systems

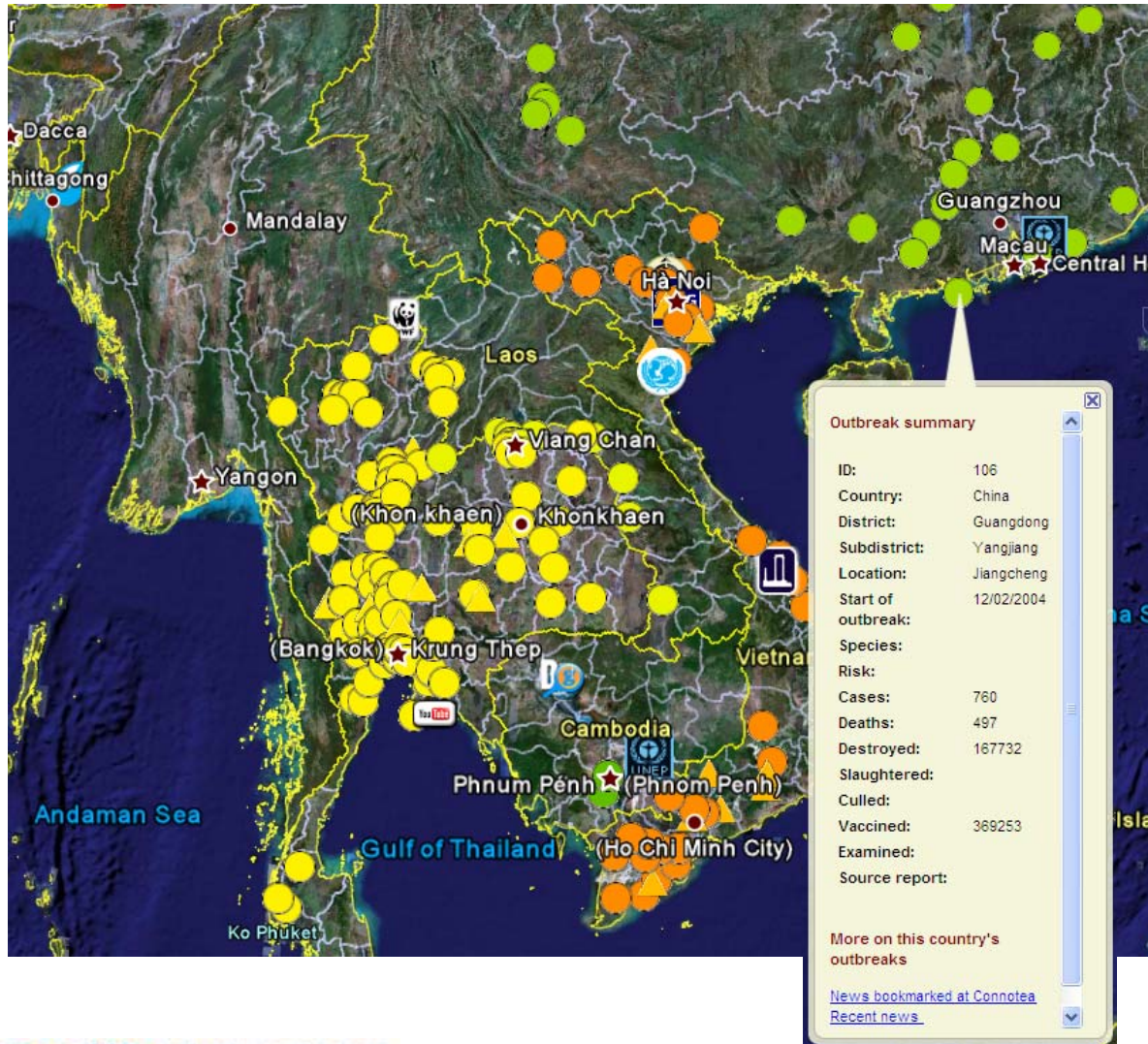
Feature 4

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The power of integration - GIS

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An example in Google Earth

From <http://declanbutler.info/Flumaps1/avianflu.html>

On the WEB

www.smithsdetection.com/vet

By E-mail

diagnostics.vet@smithsdetection.com

carmelo.volpe@smithsdetection.com