



Australian Government

Department of Defence

Defence Science and Technology Group

Modelling, Analysis and Physical Sciences (MAPS)

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Defending Australia and its National Interests
www.defence.gov.au



OFFICIAL

MAPS STC - Radiological and Nuclear Defence Capability

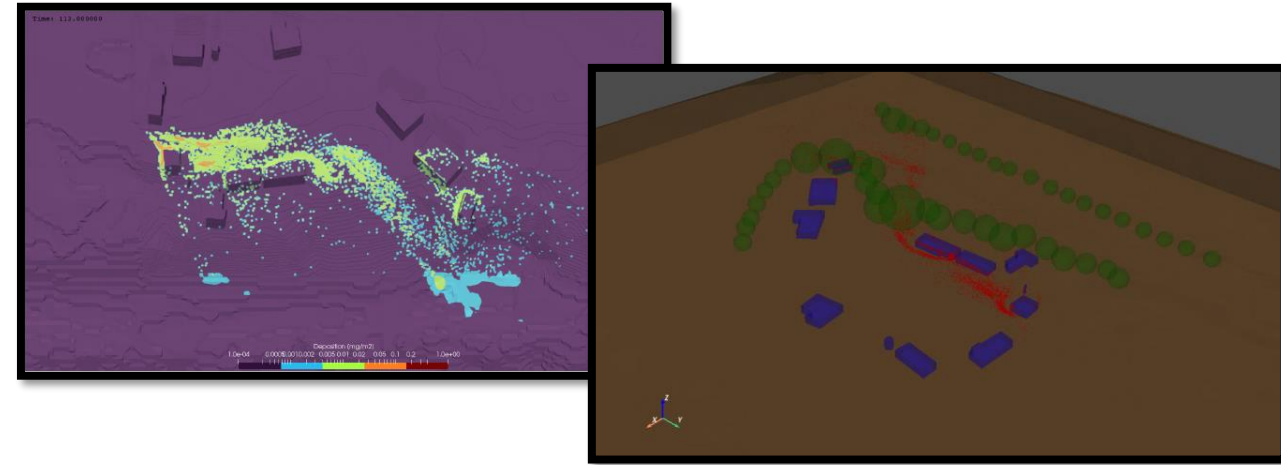
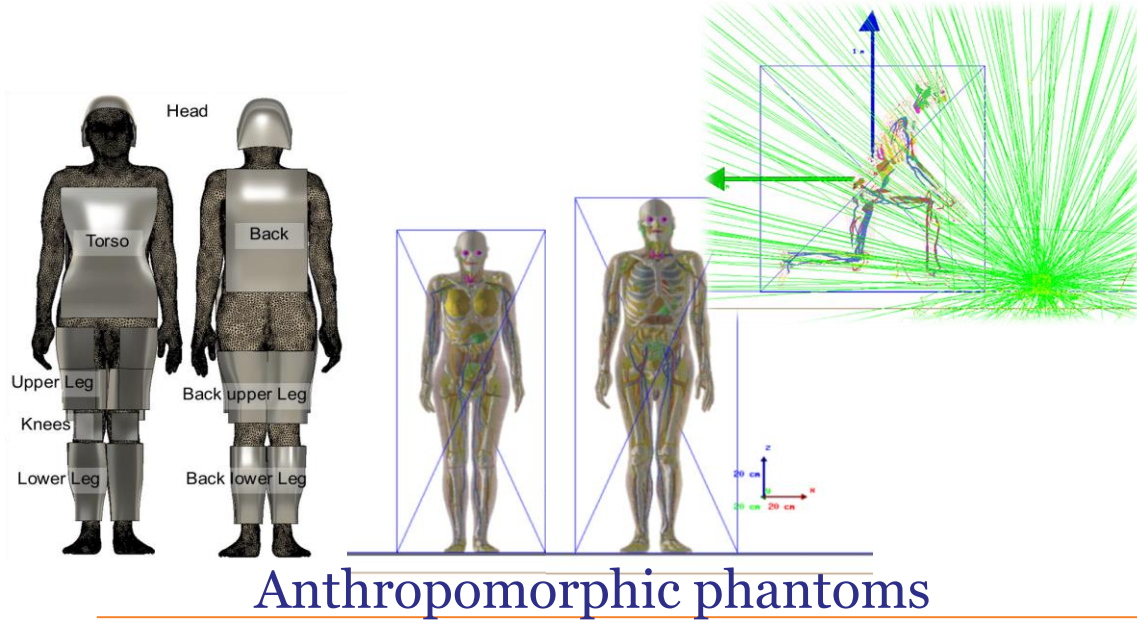
Science team that provides to ADF

- Training in source search and survey including live agent training
- Advice and support including
 - Direct support to training, exercises and operations
 - Reachback advice
- Support to Defence acquisitions
 - Advice to support requirements for equipment
 - Test & Evaluation
- R&D



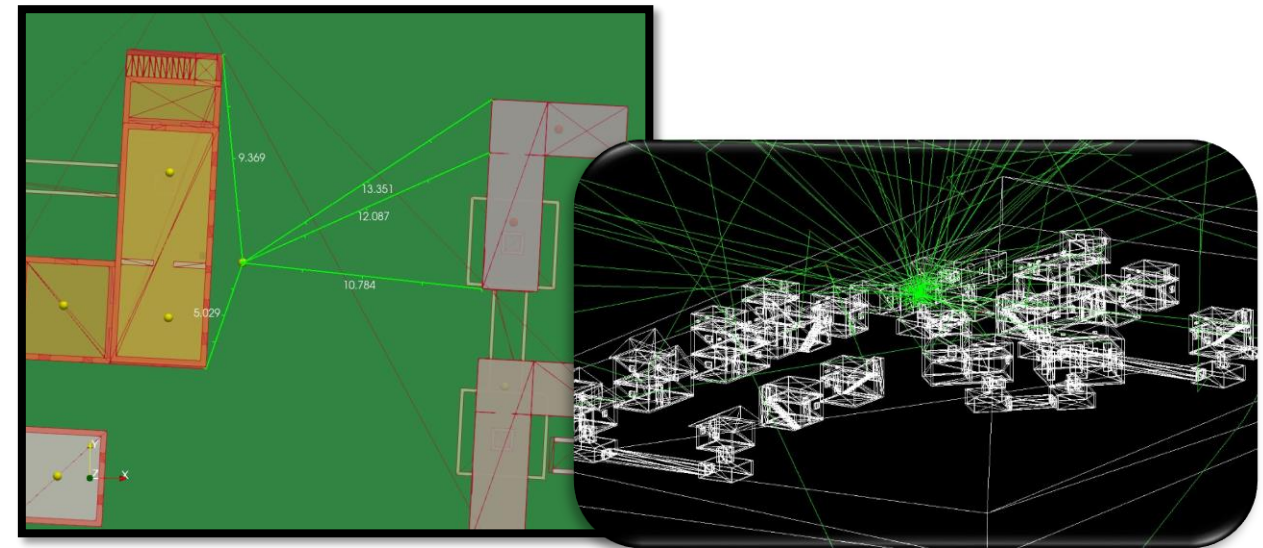
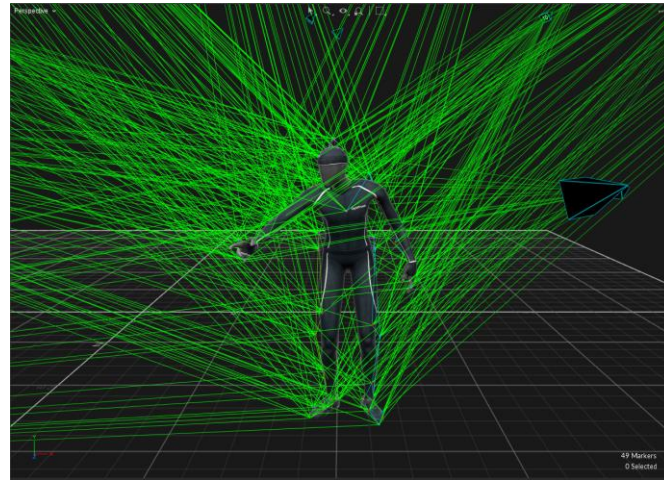
- Radiation Laboratory at DSTG Fishermans Bend site
 - Various industrial radioisotopes
 - Cs-137 kBq -> TBq
 - Co-60 kBq -> GBq
 - Am-241/Be GBq
 - Ba133, Co57 MBq
 - Gamma Castle and XYZR positioning table
 - Remote handling tower
 - RANDO Phantom

MAPS STC - Radiological and Nuclear Defence Capability – synthetic capabilities

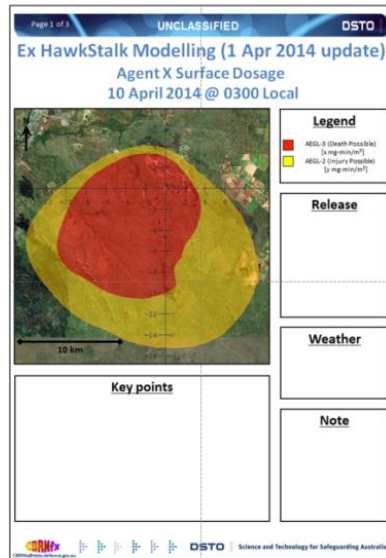


Simulation of complex radiation environments

Dose in motion



MAPS STC – CBRNfx capability



Reachback Modelling in Support of Operations

Support to Defence Force Elements and Intelligence.

R&D Future Program of Work

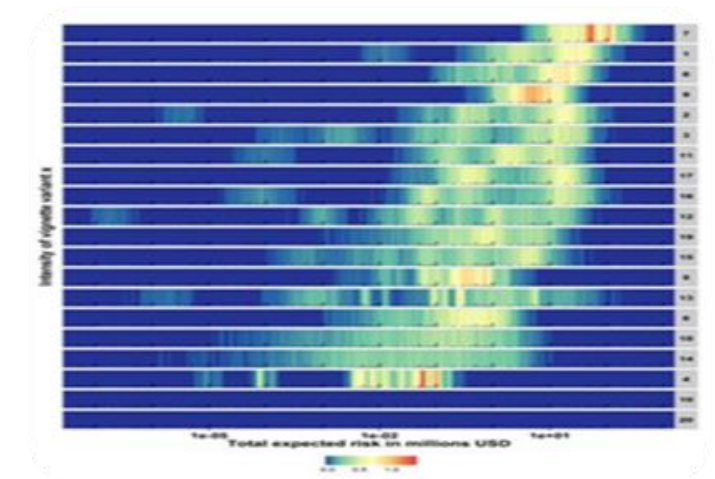
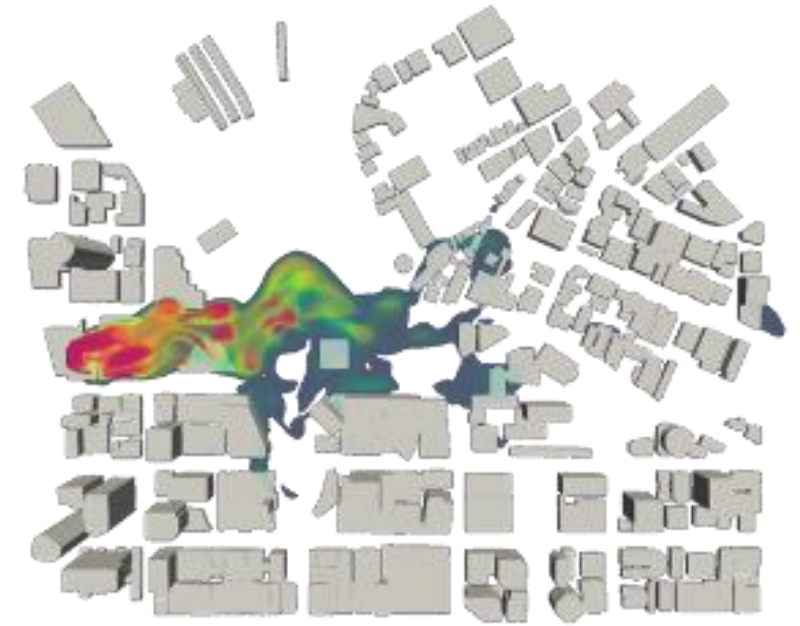
Understanding and addressing CBRNfx capability gaps;

Engage with international partners and local research organisations to deliver innovative and effective S&T solutions

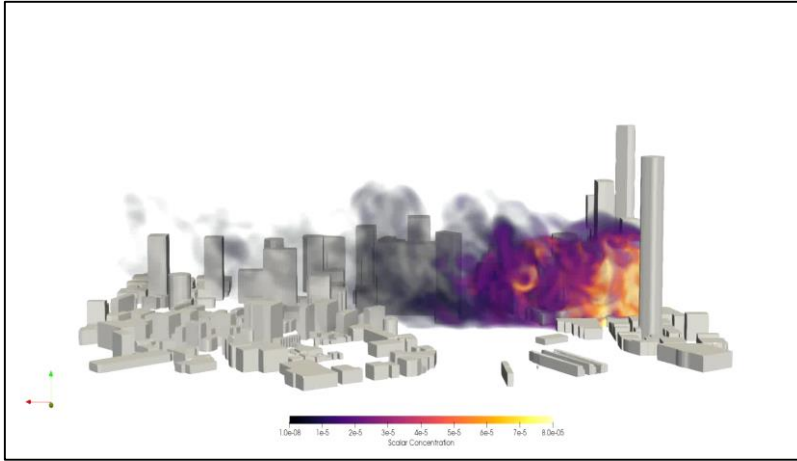
Simulation and Analysis Studies

Support to Defence, National Security and DSTG;

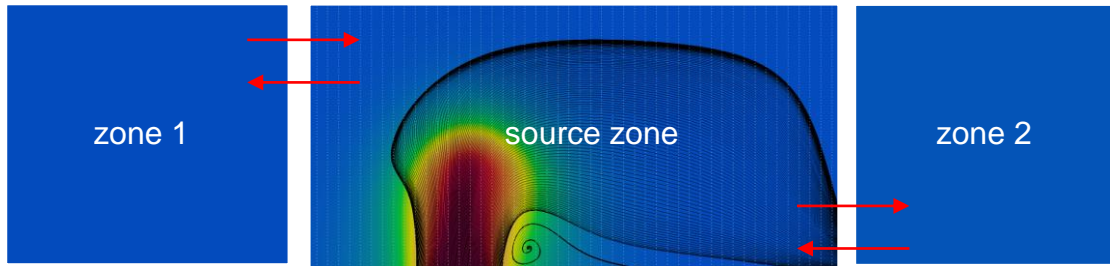
Balance of investment studies, concept exploration, risk analysis.



MAPS STC – CBRNfx capability

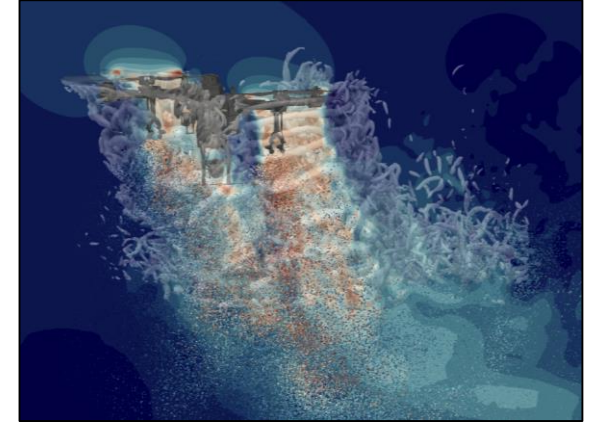


Near real-time, high-resolution Urban dispersion Models

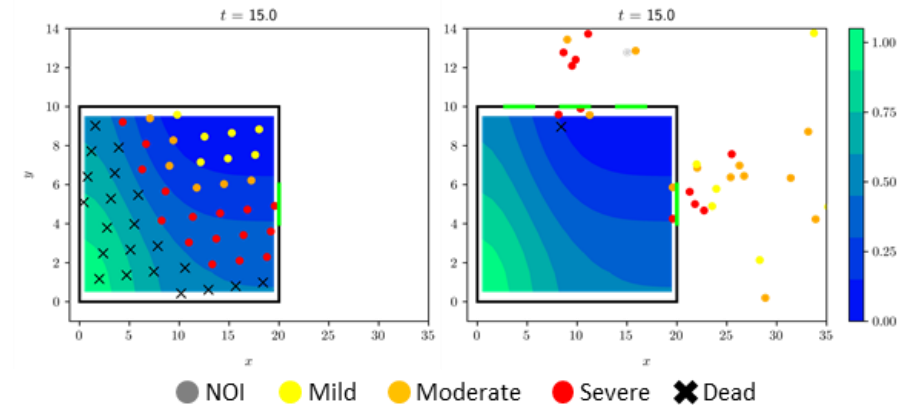


Indoor dispersion model development

R&D programs



UAV multi-rotor downwash modelling



Agent based modelling for CBRN incidents

MAPS STC – Aerosol Defence capability

Protection

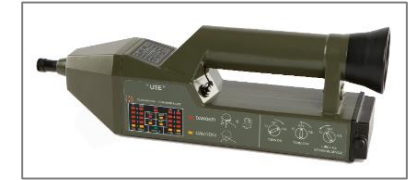
- Advice and solutions to counteract dermal and respiratory hazards
- Developed Aerosol IPE Systems Test Method (FAST)

Detection (DECOI)

- DIM of CBR materials using in-service, COTS and new technologies (LAMP, Minion, CRDS, Tac-7)

T&E

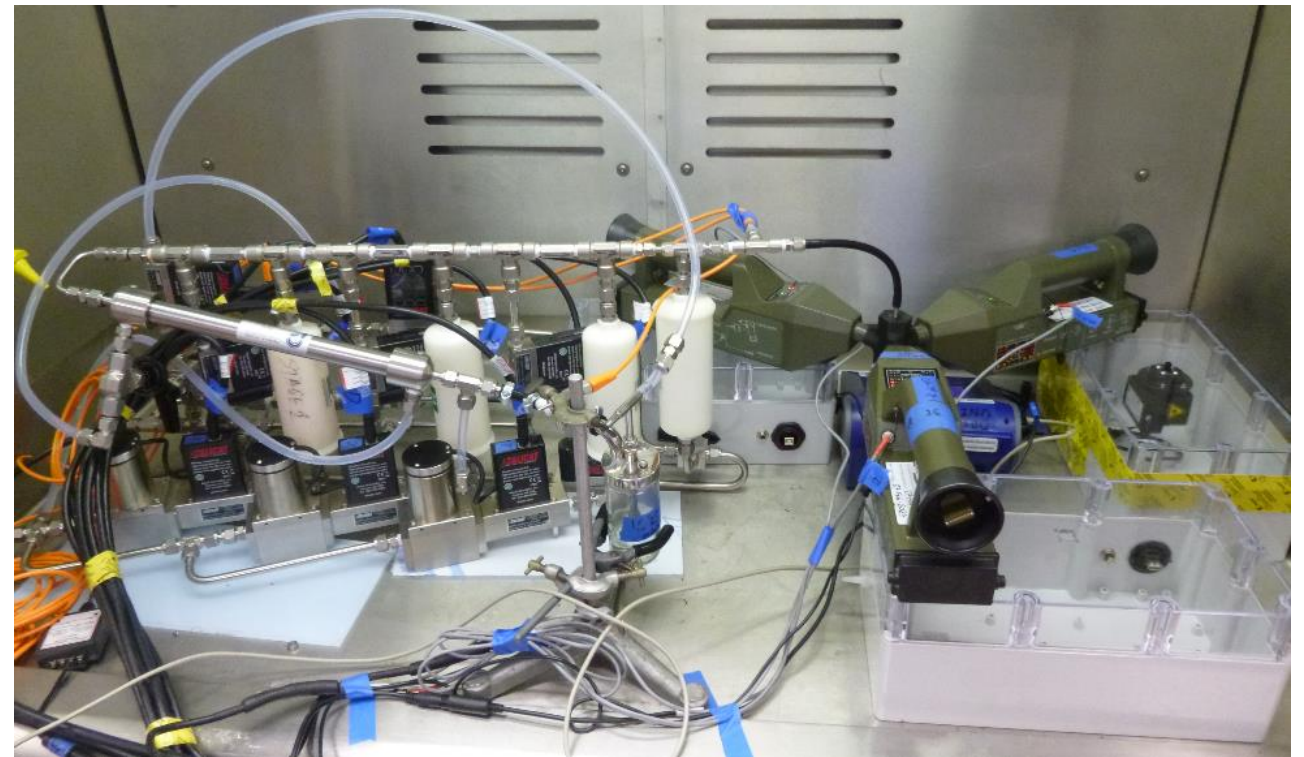
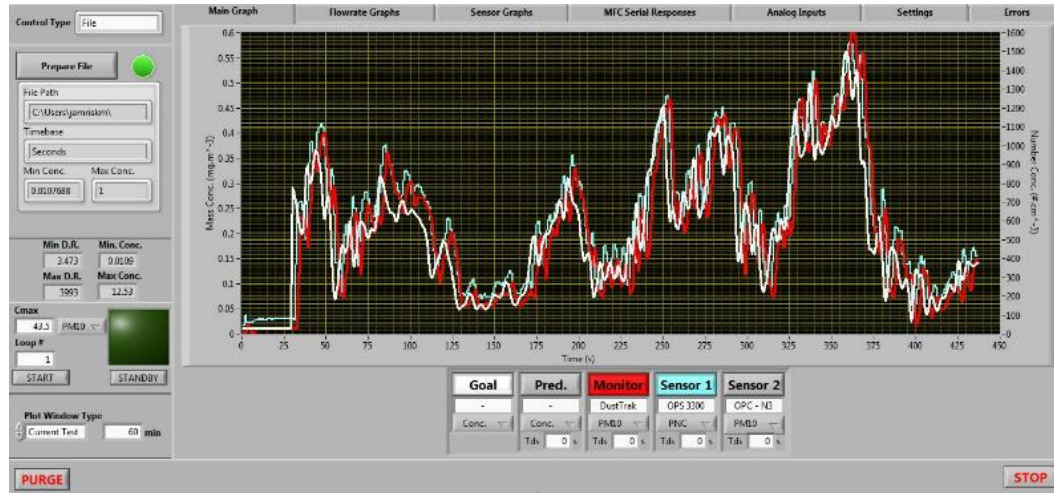
- Laboratory assessment of CB sensors & detectors performance under complex dynamic test conditions mimicking real world operational scenarios



MAPS STC – Aerosol Defence capability – R&D programs

Dynamic Sensor T&E capability (DSTEP) – replicate complex, highly time variable challenges for T&E of detectors

- Aerosol DSTEP completed
- Gas/Vapour - DSTEP in development



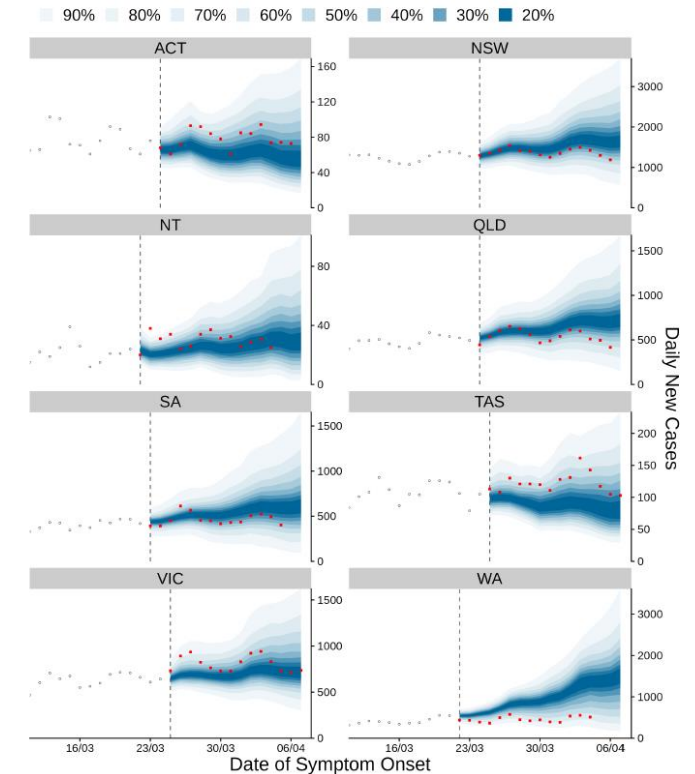
MAPS STC – Bioterrorism Preparedness Capability

Epidemic Modelling Team

- Pre event modelling
- Global spread modelling
- Early detection of biological attack systems
- Characterisation of spread and impact new and ongoing disease outbreaks
- Decision support on proportional outbreak countermeasures
- Respiratory disease forecasting

Team played a large part in the national Situational Assessment Team for COVID-19, which forecast COVID for the peak body of state and federal Chief Health Officers

Figure 6: 14-day evaluation of forecasts of new daily local cases from two weeks ago. Forecasts are overlaid with the most recent 14 days of case data by inferred date of symptom onset (red dots).



[National Situational Assessment COVID Reports 2020-2023
https://doi.org/10.26188/24845328.v2](https://doi.org/10.26188/24845328.v2)

MAPS STC – Bioterrorism Preparedness Capability – R&D programs

Biosurveillance Decision Support System

- Uses many sources of epi data to infer key characteristics (transmissibility, severity, incubation time, infectiousness onset before or after symptom onset, etc) of an evolving epidemic.
- Feeds into a model that provides proportional countermeasure advice on the control of the epidemic.

EpiDefend

- For detecting early warning signs of a bio attack before first diagnosis
- Focus on low false alarm rates

