Biological Sensor Fusion Use Case: Provide Biological Detection Sensor Network

1. Characteristic Information

Goal In Context: The goal in context of BSF is to detect biological threats in a high-population density urban environment through the application of a fast response Bio Agent Sensor Detection system.

Scope: Provide a sensor-technology related data fusion capability to minimize the potential loss of lives from a biological outbreak in an urban environment.

Level: Tactical level

Pre-Condition: A biological agent/threat is detected by a pre-deployed sensor system, a hospital or medical alert, or through 911-emergency response information.

Success End Condition: The biological detection sensor network provides geo-location of all infected areas to establish a cordon around the threat, to aid in identifying those people in immediate need of treatment or vaccination and point emergency responders to locations where clean up actions are necessary.

Minimal Guarantees: Successful, timely and accurate detection of a biological agent, prevention of an outbreak of

epidemic or catastrophic proportion, minimization of false positives.

Primary Actor: DHS Operations Centers, Operations Centers Metropolitan Operations Center Commander (MOCC), First Responders, CDC and WHO Headquarters

Trigger Event: Indication of a suspected biological agent in the air by at least one sensor; information gathered from 911 tips/calls.

2. Main Success Scenario

Step	**Actor**	**Action Description**
1	Pre-deployed Sensor Network (Tier I and Tier II)	Detect Bio-Terrorist Attack
2	DHS Operations Centers	Receive Initial Bio Threat Report
2.1	DHS Operations Centers	Fuse Sensor Data
2.2	DHS Operations Centers	Geo-locate the Contaminated Area
3	DHS Operations Centers	Analyze Collected Data
3.1	DHS Operations Centers	Deploy Bio Threat Confirmation Teams with additional sensors (Tier II)
4	First Responders	Implement Specific Cordon Within District

4.1	First Responders	Deploy additional Mobile and Stationary Ad Hoc Sensors as needed to characterize threat boundaries (Tier 3)
4.2	Total Sensor Network (Tier I , Tier II, and Tier III)	Collect And Send Data to DHS Operations Center
4.2.1	First Responders	Confirm Existing Sensor Data
4.2.2	DHS Operations Centers	Fuse Sensor Data
4.3	DHS Operations Centers	Implement District Level Vaccination, Treatment, and Evacuation Plans as needed
4.4	DHS Operations Centers	Finalize Containment Cordon
4.4.1	First Responders	Implement Containment and Cleanup Actions
4.5	First Responders	Process Exposed People for Treatment and Vaccinations

3. Scenario Extensions

Step	**Condition**	**Action Description**
4.3a	DHS Operations Center Orders	Issue Marshall law within infected District
4.5a	First Responders	Isolate infected people as needed.

4. Scenario Variations

Step	**Variable**	**Action Description**
1a	911 Emergency Call Tip/Information	Detect Bio threat

1b	Hospital/ Medical alert Issued	Detect Bio threat

5. Related Information

Schedule: <1 day

Priority: Must

Performance Target: The system should be able to successfully detect a bio threat in a timely and accurate manner; thereby helping DHS deploy a first response cordon that limits the number of subsequent exposures and allows for immediate response actions (treatment, vaccination, cleanup)

Frequency: Whenever there is a biological threat

Super Use Case: No Parent Use Case

Sub Use Case(s): No

Channel To Primary Actor: Deployment of a Bio-Terrorist Attack within the busy streets of Chicago Police District 1

Secondary Actor(s): First Responders

Channel(s) To Secondary Actor(s): Alert by the sensors

6. Open Issues

Issue ID	Issue Description
1	Exact mechanisms used for employment of Bioterrorist attacks will not be researched due to their sensitive nature. Only possible generic scenarios will be presented.
2	Different biological threats require different response timelines. For this reason, less than 1 day was chosen for schedule, although response in a few hours might be warranted based on the nature and magnitude of the threat.