Q-linea AB – Aquila 1000



GENERAL DESCRIPTION:

The Aquila 1000, an evolution of a demonstrator originally developed for the French Armed forces, delivers 24/7 on-site, autonomous same sample DNA and Protein identification of airborne biothreat agents. The system automatically analyses a new sample down to every 5th minute, in a random access manner as opposed to a batch analysis, and delivers answer within 60 minutes at state-of-the art sensitivity. The system is designed for indoor and outdoor



operation, depending on operational scenario.

The proprietary technology platform, not PCR (Polymerase Chain Reaction), has an excellent selectivity, enabling separation of target agents from near neighbors, and offers multiplexing capabilities of 100+ agents in multiplex. The core instrumentation is currently in TRL7 and has been developed towards MIL and NATO standards.

The Aquila 1000 was field tested in 2013 tested in the Prague metro, proving on-site identification of airborne simulant agent spores in a highly challenging environment. In May 2015 the Aquila 1000 was evaluated by the Dutch TNO institute as part of the European Defence Agency project IPODS. ROC curve of the systems can be made available upon request.

TECHNICAL DESCRIPTION:

Identification of nucleic acids is enabled by the PadLock Probe (PLP) technology, which combines high selectivity with quantitative response even in a high background of irrelevant nucleic acids. These virtues together with its ability to enable highly multiplexed analyses, 100+ agents, and with a limit of detection similar to that of PCR (Polymerase Chain Reaction), makes it a powerful molecular tool compared to competing technologies.

Protein detection is enabled by the Proximity Ligation Assay (PLA) technology, which is related to the PLP technology since it is based on a chain of events that each contributing to high selectivity. The PLA technology has a sensitivity that is between 10-1000 times better than ELISA (Enzyme-Linked Immunosorbent Assay). The PLA technology enables multiplexing capabilities of 90+ agents.

For signal amplification, the system utilizes Rolling Circle Amplification (RCA) and Circle-To-Circle Amplification (C2CA). In RCA a circular target is continuously copied using a polymerase, resulting in a several kilo bases long concatenated RCA Product (RCP). The product collapses into an amorphous blob of DNA, creating its own compartment. If a specific sequence element is encoded in the circular target molecule, it enables subsequent labeling of the RCP with fluorescent oligonucleotides.

CONTACT INFORMATION

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COST

- N/A/system
- N/A/analysis

Tier Selection



Survey Source

Vendor Supplied Information

Scoring Analysis

System scores are compared across the four scenarios and ranked from highest to lowest.



Impact Chart

The Impact Chart is a spider graph representing specific categories and designed to give the reader a visual depiction of how a particular system is expected to operate across the four different scenarios. The score for each of the seven categories is presented as the percentage of the total possible score. Higher category scores extend the spokes of a graphic toward the outer edge of the chart. The area graphed for each of the four scenarios relates to how well the system performed in that scenario. Graphics for each of the four scenarios are super-imposed for ease of comparison.



Evaluation Criteria

Throughput:

- Between 30 and 60 minutes for detection
- Continuous operation with no defined runs
- System is continuous and provides real time analysis with no defined tests/samples
- The system or device is currently fully automated
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 2 components
- . Less than 5 minutes is required for set-up
- Automatic detection

Logistics:

- An afternoon of training and some technical skills required
- Approximately the size of a home dishwasher
- Between 5 and 25 kg
- Wireless and wired connections are available
- System or device has 110V electrical requirement
- 4–8 hours battery life



Operations:

- Can be used from -21°C to 41°C
- Components must be stored at room temperature (27 ° C)
- No, performance is not influenced by relative humidity
- Between 1 to 3 years shelf life
- Greater than 10 years expected life
- Results can be viewed in real-time
- The system or device is currently fully autonomous
- The system software is open and available for modification
- The system hardware is open and available for modification

Detection:

- Possible the system could receive 510K clearance, no current efforts at this time
- Possible the system could receive FDA approval, no current efforts at this time
- Less than 50 µl
- Superior specificity. System has a false alarm rate approaching zero (~0%)
- 1-100 CFU per mL
- 1-100 PFU per mL
- Less than 1 ng per mL
- Spore lysis not necessary for detection by system