GENERAL DESCRIPTION:
The ViriChip System is a technology platform for direct detection and characterization of viral particles rather than nucleic acid or antigens. The affinity substrate used is termed the ‘ViriChip’. The ViriChip contains type-specific antibody or ligand domains capable of capturing intact infectious viruses. The integration of AFM with the ViriChip has resulted in the development of an atomic force microscopy–immunoassay (AFMIA). The AFMIA combines two key features: specificity determined by antibody capture, and a label-free AFM readout that offers the additional benefit of providing topographical/morphological information to corroborate affinity-based virus identification. Principal benefits of AFM readout include size of apparatus (hand held) and multiplexing for multiple viruses on single ViriChips. The ViriChip System is versatile being designed for:

- Use in field operations
- Use in laboratory analysis
- Use in remote testing by UAV or other vehicles
- Use in clinical diagnostic laboratories.

TECHNICAL DESCRIPTION:
The ViriChip System consists of a functionalized chip containing 10 micrometer domains of specific capture ligands (antibodies, aptamers, etc.) arrayed in multiplexed format. The specific ligands are qualified to capture intact virus particles, virus-like particles, or sub-virion structures existing on the outer surface of the virus. The chip, assembled into a microfluidics cartridge, receives and analyzes fluids for virus capture. Processing and readout by atomic force microscopy are automated. Analysis software is coordinated with data collection. Data and analysis transmission is designed for existing communication mechanisms. The System will detect and identify biothreat viral agents collected from water, air, foods, surfaces, and body fluids.

CONTACT INFORMATION
BIOFORCE NANOSCIENCES, INC.
609 E Lincoln Way, Suite 609
Ames, IA 50010
POC: Kerry Frey
515-233-8333
kfrey@bioforcenano.com
www.bioforcenano.com

COST
- $35,000-$50,000/system
- <$1/analysis

Survey Source
Vendor Supplied Information
System scores are compared across the four scenarios and ranked from highest to lowest.

**Evaluation Criteria**

**Throughput:**
- Between 15 and 30 minutes for detection
- Multiple samples, multiple tests/sample per run
- Greater than 750 samples every 2 hours
- The system could be adapted to a fully automated system with some effort
- Device or system is intended for multiple detection assays
- 0-1 solutions, buffer, eluents, and/or reagents
- 1 component
- Less than 5 minutes is required for set-up
- 1-2 steps are required for detection

**Logistics:**
- Very brief (minutes-hours) training and minimal technical skills
- Approximately the size of a toaster
- Between 5 and 25 kg
- System or device uses batteries
- 4-8 hours battery life

**Operations:**
- Can be used from 4°C to 41°C
- Components must be stored at 4°C
- Performance is not influenced by relative humidity
- Between 6 months and 1 year shelf life
- 5-10 years expected life
- Results can be viewed in real-time
- The system could easily be adapted into a fully autonomous system
- The system software is open but modification requires licensing
- The system hardware is open but modification requires licensing

**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 10 µL
- Excellent specificity. System has occasional false alarms under certain conditions (<2%)
- 1-100 PFU per mL

**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.

**Scoring Analysis**

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