# Surveillance Impact Report

Verogen MiSeq DNA Sequencing Instrument
Police

As required by San Francisco Administrative Code, Section 19B, departments must submit a Surveillance Impact Report for each surveillance technology to the Committee on Information Technology ("COIT") and the Board of Supervisors.

The Surveillance Impact Report details the benefits, costs, and potential impacts associated with the Department's use of Verogen MiSeq DNA Sequencing Instrument.

**DESCRIPTION OF THE TECHNOLOGY**

In order protect life and property, prevent crime and reduce the fear of crime, we will provide service with understanding, response with compassion, performance with integrity and law enforcement with vision.

In line with its mission, the Department's Crime Lab uses Verogen MiSeq DNA Sequencing Instrument to generate sequenced DNA profiles from evidence samples left at crime scenes and reference samples submitted to the lab for the purpose of accurately and expeditiously identifying, apprehending, arresting, and convicting criminal offenders or to identify human remains.

Police shall use Verogen MiSeq DNA Sequencing Instrument only for the following authorized purposes:

*Authorized Use(s):*

| |
|---|
| Generate sequenced DNA profiles from evidence to search against databases of evidence and reference samples for the purpose of accurately and expeditiously identifying, apprehending, arresting, and convicting criminal offenders and exonerating persons wrongly suspected or accused of crime or to identify human remains |
| Generate sequenced DNA profiles from submitted reference samples for direct comparison to evidence samples for the purpose of accurately and expeditiously identifying, apprehending, arresting, and convicting criminal offenders~~, and exonerating persons wrongly suspected or accused of crime or to identify human remains.~~ |

Prohibited use cases include any uses not stated in the Authorized Use Case section.

Department technology is located SFPD Crime Lab - Police Building 606, San Francisco.

**Technology Details**

The following a is product description of Verogen MiSeq DNA Sequencing Instrument

The MiSeq FGx System is the first and only next-generation sequencing (NGS) instrument developed and validated for forensic genomics. Combining proven data quality with ease of use, the system is

the key to a unique, single-platform solution built on gold-standard NGS technology. Prepare and sequence libraries and analyze data in a single workflow designed to scale for a growing portfolio of applications, including new tools like forensic genetic genealogy (FGG). Dedicated reagent kits and matched analysis software empower answers for all human identification cases. Backed by validation and implementation services, the MiSeq FGx System is a compact, bench-top platform that saves valuable laboratory space. The first and only instrument to interrogate SNPs and STRs in a single run, the MiSeq FGx System preserves precious sample while demonstrating robust performance. Develop more thorough, detailed DNA profiles from a wide range of sample types, from high-quality genomic DNA (gDNA) to degraded, mixed, and limited samples. Specifications: Power requirements 100–240 VAC at 50/60 Hz, 10A, 400 W RFID radio frequency 13.56 MHz RFID power 100 mW Dimensions 68.6 cm × 56.5 cm × 52.3 cm (27 in × 22.2 in × 20.6 in) Weight 54.5 kg (120 lbs) https://verogen.com/wp-content/uploads/2018/07/MiSeq-FGx-forensic-genomics-solution-data-sheet-VD2018003.pdf .

A. How It Works

To function, Verogen MiSeq DNA Sequencing Instrument The Verogen MiSeq system performs sequencing of DNA from evidence and reference samples needed for comparison. The system allows forensic scientists to analyze a minimum of 231 genomic DNA markers simultaneously—supplying significantly more actionable data than commonly analyzed using older methods. The Verogen system can develop more detailed profiles from degraded, mixed, and limited biological evidence samples, addressing a wider range of forensic questions in a single test. Below are the components of the system: Verogen MiSeq and accompanying reagents – Massively Parallel sequencing instrument – used on samples that yield no results or no CODIS matches when attempted with Life Technology instruments and accompanying reagents. ForenSeq Universal Analysis Software – software to analyze DNA sequencing results .

All data collected or processed by Verogen MiSeq DNA Sequencing Instrument will be handled or stored by an outside provider or third-party vendor on an ongoing basis. Specifically, data will be handled byFBI-DOJ to ensure the Department may continue to use the technology.

**IMPACT ASSESSMENT**

The impact assessment addresses the conditions for surveillance technology approval, as outlined by the Standards of Approval in San Francisco Administrative Code, Section 19B:

A. The benefits of the surveillance technology outweigh the costs.

B. The Department's Policy safeguards civil liberties and civil rights.

C. The uses and deployments of the surveillance technology are not based upon discriminatory or viewpoint-based factors and do not have a disparate impact on any community or Protected Class.

The Department's use of the surveillance technology is intended to support and benefit the residents of San Francisco while minimizing and mitigating all costs and potential civil rights and liberties impacts of residents.

A. Benefits

The Department's use of Verogen MiSeq DNA Sequencing Instrument has the following benefits for the residents of the City and County of San Francisco:

☐ Education

| | |
|---|---|
| ☐ Community Development | |
| ☐ Health | |
| ☐ Environment | |
| ✠ Criminal Justice | efficiently generate comprehensive and useful data from biological evidence collected at a crime scene to aid the forensic DNA analysis, related criminal investigations and close more criminal cases |
| ☐ Jobs | |
| ☐ Housing | |
| ☐ Other | |

Additional benefits include: N/A

B. Civil Rights Impacts and Safeguards

The Department has considered the potential impacts and has identified the technical, administrative, and physical protections as mitigating measures:

CODIS is the acronym for the Combined DNA Index System and is the generic term used to describe the FBI's program of support for criminal justice DNA databases as well as the software used to run these databases. The National DNA Index System (NDIS) is considered one part of CODIS, the national level, containing the DNA profiles contributed by federal, state, and local participating forensic laboratories. Forensic DNA sequencing analysis is regulated by the federal government. In order to enter any profiles into the CODIS database, the lab must be accredited and follow the DNA Quality Assurance Standards. The SFPD lab is accredited by A2LA and follows the DNA Quality Assurance standards and has done so since 2002 Accreditation assures that the lab both has written policies and procedures and has demonstrated that they follow them. The SFPD crime lab has procedures that comply with the DNA quality assurance standards. There procedures cover documentation processes, roles and responsibilities, training requirements, data maintenance policies, security of data and physical security/control of access by only authorized users with an audit trail. The forensic laboratory has significant environmental safeguards including monitored perimeter and interior alarms connected to DOC, electronic door locks and key control as well as restricted access between the laboratory operational spaces (all required for accreditation of the laboratory) Forensic DNA sequencing analysis is only performed on evidence samples, which are items of interest left at a crime scene. When sequencing is performed on samples from individuals it is for comparison purposes to evidence samples.

In the case of DNA sequencing, privacy concerns depend largely on the perceived purpose of the search, the degree of intrusion, and the expectation of privacy.

**Perceived purpose of the search**: Criminal investigation and to establish the identity of an individual involved with a crime. DNA samples are brought to crime lab for DNA sequencing after a crime has been committed. Samples are left behind at the crime scene by a suspect/perpetrator. Testing the samples through this process accurately and expeditiously identifies criminal offenders or conversely exonerates persons wrongly suspected or accused of crime.

**Degree of intrusion**: Sensitive information is contained in a DNA sample which is why it is critical for the Department to maintain safeguards around potential misuse of DNA information. The DNA samples are collected ~~either~~ from the crime scene. ~~or authorized by court order leaving a minimal~~

~~degree of intrusion.~~

**Expectation of privacy:** Physical collection of the DNA is sourced at a crime scene where perpetrators have diminished expectation of privacy or are authorized by a judicial determination of probable cause. Only crime scene samples are processed by this technology.

C. Fiscal Analysis of Costs and Benefits

The Department's use of Verogen MiSeq DNA Sequencing Instrument yields the following business and operations benefits:

| | Benefit | Description |
|---|---|---|
| ☑ | Financial savings | Forensic DNA sequencing analysis can focus an investigation and eliminate unnecessary staffing costs |
| ☑ | Time savings | Forensic DNA sequencing analysis can focus an investigation and eliminate unnecessary investigation |
| ☐ | Staff safety | |
| ☑ | Improved data quality | Forensic DNA sequencing analysis provides investigators with information grounded in science and is proven to be reliable. |
| ☐ | Other | |

The total fiscal cost, including initial purchase, personnel and other ongoing costs is

| | | | |
|---|---|---|---|
| FTE (new & existing) | n/a | | |
| Classification | n/a | | |
| | ***Annual Cost*** | ***Years*** | ***One-Time Cost*** |
| Total Salary & Fringe | $0 | 0 | $0 |
| Software | $0 | 0 | $0 |
| Hardware/Equipment | $0 | 0 | $154,000 |
| Professional Services | $0 | 0 | $0 |
| Training | $0 | 0 | $0 |

| | | | |
|---|---|---|---|
| Other | $16,000 | 0 | $0 |
| Total Cost [Auto-calculate] | $170,000 | | |

2.1 Please disclose any current or potential sources of funding (e.g. potential sources = prospective grant recipients, etc.). SIR, ASR

Current technology is funded by the department – the latest purchase of the Verogen MiSeq will be purchased using federal grant funds.

The Department funds its use and maintenance of the surveillance technology through

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**COMPARISON TO OTHER JURISDICTIONS**

Verogen MiSeq DNA Sequencing Instrument are currently utilized by other governmental entities for similar purposes.

**APPENDIX A: Surveillance Impact Report Requirements**

The following section shows all Surveillance Impact Report requirements in order as defined by the San Francisco Administrative Code, Section 19B.

1. Information describing the Surveillance Technology and how it works, including product descriptions from manufacturers.

The Verogen MiSeq system performs sequencing of DNA from evidence and reference samples needed for comparison. The technology used is massively parallel sequencing allowing for more information from highly degraded samples and mixed DNA samples. Below are the components of the system:
Verogen MiSeq and accompanying reagents – Massively Parallel sequencing instrument – used on samples that yield no results or no CODIS matches when attempted with Life Technology instruments and accompanying reagents.

ForenSeq Universal Analysis Software – software to analyze DNA sequencing results

The MiSeq FGx System is the first and only next-generation sequencing (NGS) instrument developed and validated for forensic genomics. Combining proven data quality with ease of use, the system is the key to a unique, single-platform solution built on gold-standard NGS technology. Prepare and sequence libraries and analyze data in a single workflow designed to scale for a growing portfolio of applications, including new tools like forensic genetic genealogy (FGG). Dedicated reagent kits and matched analysis software empower answers for all human identification cases.

Backed by validation and implementation services, the MiSeq FGx System is a compact, bench-top platform that saves valuable laboratory space. The first and only instrument to interrogate SNPs and STRs in a single run, the MiSeq FGx System preserves precious sample while demonstrating robust performance. Develop more thorough, detailed DNA profiles from a wide range of sample types, from high-quality genomic DNA (gDNA) to degraded, mixed, and limited samples.
Specifications:
Power requirements 100–240 VAC at 50/60 Hz, 10A, 400 W
RFID radio frequency 13.56 MHz
RFID power 100 mW
Dimensions 68.6 cm × 56.5 cm × 52.3 cm (27 in × 22.2 in × 20.6 in)
Weight 54.5 kg (120 lbs)

https://verogen.com/wp-content/uploads/2018/07/MiSeq-FGx-forensic-genomics-solution-data-sheet-VD2018003.pdf

2. Information on the proposed purpose(s) for the Surveillance Technology.

The SFPD crime lab generates sequenced DNA profiles from evidence samples left at crime scenes and reference samples submitted to the lab. Direct comparisons of evidence to reference samples are made, in additional, DNA profiles can be entered into databases such as CODIS (FBI's Combined DNA Index System) to identify potential matches.

3. If applicable, the general location(s) it may be deployed and crime statistics for any location(s).

SFPD Crime Lab - Police Building 606, San Francisco

4. An assessment identifying any potential impact on civil liberties and civil rights and discussing any plans to safeguard the rights of the public.

CODIS is the acronym for the Combined DNA Index System and is the generic term used to describe the FBI's program of support for criminal justice DNA databases as well as the software used to run these databases. The National DNA Index System (NDIS) is considered one part of CODIS, the national level, containing the DNA profiles contributed by federal, state, and local participating forensic laboratories. Forensic DNA sequencing analysis is regulated by the federal government. In order to enter any profiles into the CODIS database, the lab must be accredited and follow the DNA Quality Assurance Standards. The SFPD lab is accredited by A2LA and follows the DNA Quality Assurance standards and has done so since 2002
Accreditation assures that the lab both has written policies and procedures and has demonstrated that they follow them. The SFPD crime lab has procedures that comply with the DNA quality assurance standards. There procedures cover documentation processes, roles and responsibilities, training requirements, data maintenance policies, security of data and physical security/control of access by only authorized users with an audit trail. The forensic laboratory has significant environmental safeguards including monitored perimeter and interior alarms connected to DOC, electronic door locks and key control as well as restricted access between the laboratory operational spaces (all required for accreditation of the laboratory)
Forensic DNA sequencing analysis is only performed on evidence samples, which are items of interest left at a crime scene. When sequencing is performed on samples from individuals it is for comparison purposes to evidence samples.
In the case of DNA sequencing, privacy concerns depend largely on the perceived purpose of the search, the degree of intrusion, and the expectation of privacy.
Perceived purpose of the search: Criminal investigation and to establish the identity of an individual involved

with a crime. DNA samples are brought to crime lab for DNA sequencing after a crime has been committed. Samples are left behind at the crime scene by a suspect/perpetrator.
Degree of intrusion: Sensitive information is contained in a DNA sample which is why it is critical for the Department to maintain safeguards around potential misuse of DNA information. The DNA samples are collected either from the crime scene or authorized by court order leaving a minimal degree of intrusion.
Expectation of privacy: physical collection of the DNA is sourced at a crime scene where perpetrators have diminished expectation of privacy or are authorized by a judicial determination of probable cause.

~~5. The fiscal costs for the Surveillance Technology, including initial purchase, personnel and other ongoing costs, and any current or potential sources of funding.~~

| | |
|---|---|
| ~~Number of FTE (new & existing)~~ | ~~n/a~~ |
| ~~Classification~~ | ~~n/a~~ |
| ~~Total Salary & Fringe~~ | ~~$0~~ |
| ~~Software~~ | ~~$0~~ |
| ~~Hardware/Equipment~~ | ~~$0~~ |
| ~~Professional Services~~ | ~~$0~~ |
| ~~Training~~ | ~~$0~~ |
| ~~Other~~ | ~~$0~~ |
| ~~Total Cost [Auto-calculate]~~ | ~~$0~~ |

~~Current technology is funded by the department – the latest purchase of the Verogen MiSeq will be purchased using federal grant funds.~~

5~~6~~. Whether use or maintenance of the technology will require data gathered by the technology to be handled or stored by a third-party vendor on an ongoing basis.

Handled by third-party vendor, ongoing: true

Vendor name: FBI-DOJ

Special data handling required: true

7. A summary of the experience, if any, other governmental entities have had with the proposed technology, including information about its effectiveness and any known adverse information about the technology such as anticipated costs, failures, or civil rights and civil liberties abuses.

https://verogen.com/ndis-approval-of-miseq-fgx/
https://verogen.com/first-criminal-conviction-with-next-gen-forensic-dna/

**APPENDIX B: Crime Lab Standards**

SFPD Crime Lab is A2LA accredited. A2LA is a non-profit, non-governmental, third-party accreditation body, offering internationally-recognized accreditation services to testing and calibration laboratories, inspection bodies, proficiency testing providers, reference material producers, and product certifiers. For more information about A2LA, please visit www.A2LA.org.

A2LA accreditation conveys to judicial and regulatory authorities that an organization has confidence in its work product, and that this confidence has been confirmed by a third-party, non-profit organization. As a designated agency, A2LA, through its Forensic Examination Accreditation Program, is recognized to assess laboratories performing DNA analyses on DNA samples obtained from identified subject(s) for the purposes of entering the resulting DNA profile or DNA record into a DNA database, as well as laboratories performing DNA analyses on known or casework reference samples considered evidence by that laboratory.

A2LA offers two options:

- An assessment-only service to the FBI Quality Assurance Standards for DNA Testing and Databasing Laboratories to all organizations that are currently approved by the NDIS board and are seeking an external assessment to meet Section 15.2.
- A dual assessment to the FBI Quality Assurance Standards for DNA Testing and Databasing Labratories and ISO/IEC 17025.

**APPENDIX C: CODIS – NDIS Statistics**

The National DNA Index (NDIS) contains over 14,328,685 offender[1] profiles, 4,117,039 arrestee profiles, and 1,055,090 forensic profiles as of September 2020. Ultimately, the success of the CODIS program will be measured by the crimes it helps to solve. CODIS's primary metric, the "Investigation Aided," tracks the number of criminal investigations where CODIS has added value to the investigative process. As of September 2020, CODIS has produced over 533,268 hits assisting in more than 521,562 investigations.

**California as of September 2020**

| Statistical Information | Total |
|---|---|
| Offender Profiles | 2,108,927 |
| Arrestee | 858,727 |
| Forensic Profiles | 118,341 |
| NDIS Participating Labs | 24 |
| Investigations Aided | 91,881 |

https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics

**San Francisco Forensic Profile data (as of September 2020)**

| | |
|---|---|
| SFPD Forensic Profiles | 3800 |
| SFPD Investigations Aided | 1787 |

**APPENDIX D: QUALITY ASSURANCE STANDARDS FOR FORENSIC DNA TESTING**

Standards describing the quality assurance requirements that laboratories performing forensic DNA testing or utilizing CODIS should follow to ensure the quality and integrity of the generated data. (Effective July 1, 2020)

https://www.fbi.gov/file-repository/quality-assurance-standards-for-forensic-dna-testing-laboratories.pdf/view