DHS S&T RFI 70RSAT26RFI000019 · BIOSURVEILLANCE & BIOLOGICAL DETECTION CAPABILITIES

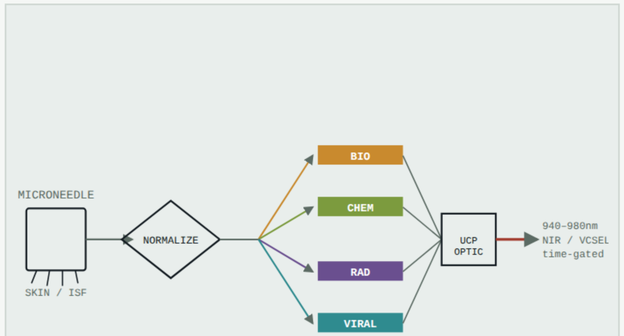
MicroneedleDx — Personal Biomarker Triage

Universal Threat Detection Platform · minimally-invasive, continuous human exposure confirmation on the same field optical engine.

QUAD CHART · PERSONAL / 1 OF 2

NovaVera Corp. / Intelligent Material Solutions, Inc.
Princeton, NJ · www.nova-vera.com

01 · OVERVIEW



- Asks whether exposure has reached the **person**, not just the room — companion to fixed environmental nodes.
- **SmartForge** microneedle interface draws sub-µL interstitial fluid; wearable patch or single-use handheld format.
- Shares one rare-earth upconversion optical engine across the whole UTDP family — no separate lab platform.
- Also accepts whole blood / finger-prick, urine, saliva, and swab eluate through the same cartridge bay.

02 · TECHNICAL APPROACH

Four-layer converging-funnel architecture: **ingestion → normalization → modular cartridge → upconversion optical detection.** Time-gated CMOS readout separates excitation flash from biological autofluorescence.

Cartridge	Representative targets
Biological	B. anthracis, Y. pestis, F. tularensis, ricin, botulinum, monkeypox, Marburg
Chemical exposure	AChE/BuChE inhibition, nerve-agent & mustard adducts
Radiological triage	γ-H2AX, p53 activation, lymphocyte depletion
Viral / host-response	SARS-CoV-2, influenza, IL-6, CRP, IFN response

10–30 min	**TRL 3–4**	**TRL 6**
sample → answer	MicroneedleDx patch	UCP detection chemistry

03 · DEVELOPMENT ROADMAP

PH 0	0–3 mo	Finalize DHS/Army target panels; confirm SmartForge microneedle scope and DEVCOM CBC testing parameters.
PH I	3–6 mo	Core detection demo — liquid-input cartridge and optical detection; initial chain-of-custody workflow.
PH II	6–12 mo	Normalization integration across modalities; field dashboard.
PH III	12–18 mo	**Full panel expansion + MicroneedleDx prototype; DEVCOM CBC target-panel validation.**
PH IV	18–24 mo	**Ruggedized pilot; MicroneedleDx field evaluation; interoperability & cybersecurity testing.**

04 · PARTNERS, ROM COST & POC

NovaVera/IMS	UCP crystals, platform architecture, system integration
Leiden Univ.	Infectious-disease assay expertise (Dr. Paul Corstjens)
Maxim Bio	Assay development, optimization, manufacturing & scale-up
SRI Intl.	Updated VCSEL / detector optical engine
SmartForge	Microneedle fabrication & sampling module
DEVCOM CBC	Biodefense target guidance & testing pathway

Phase I prototype demo	**$750K–$1.5M**
Full platform integration	**$2M–$4M**
MicroneedleDx patch	**$20–$150 / patch**
Assay panel development	**$250K–$1M / panel**

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