IARPA Nail-to-Nail Challenge Registration

All Stage 1 Registrations need to be submitted to Challenge.gov by March 17, 2017

Company Info		Technical POC	
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N2N System Description			
Title: Contactless Capture using MorphoWave		☐ Software Solution (uses conventional sensor) X Hardware/SW Solution (custom hardware and software)	

Abstract

At a high level, what do you propose to do?

Using Morpho's proprietary and revolutionary technology to capture fingerprints using contactless device – the MorphoWAVE (certified by the FBI - http://www.morpho.com/en/media/fbi-certifies-morphowave-desktop-contactless-fingerprint-scanner-20160105) , we plan to acquire multiple copies of the friction ridge data for an individual to provide the Nail-To-Nail capture capability.

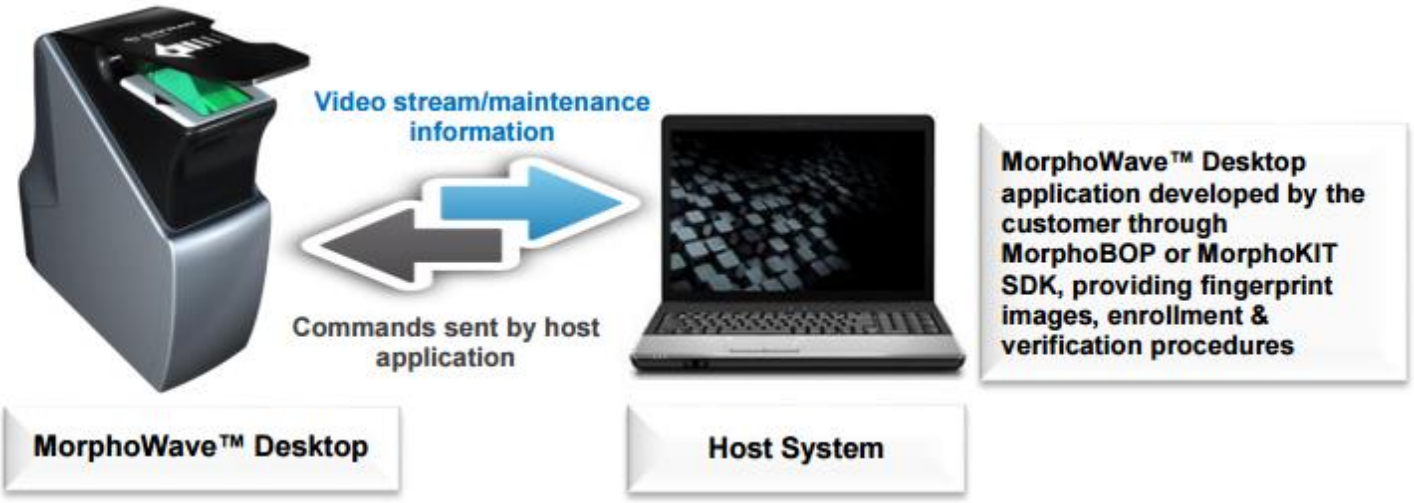
Concept of Operations

How would a user interact with the device?

A user would pass their hands (and fingers) one by one to capture the friction ridge area thus completing the capture sequence. A representative example can be seen in the video - https://www.youtube.com/watch?v=fomrvwsaCWI
We plan to make some changes to the capture sequence as part of this challenge to increase the usability of the MorphoWAVE from access control to meet the requirements of the challenge.

System Diagram

What are the main system components and their interrelationships/dependencies?
In particular, please address:



The MorphoWave will connect to a standard laptop via USB 3.0 connection. It has its own power supply compatible with 100-240V and draws 3.75A. It has a hard metal and plastic body and a glass scanner. No modifications will be made to the scanner or the laptop as part of this effort.
The MorphoWave has no mechanical movements.

Anticipated Equipment

What are the software packages and/or hardware components?

- MorphoWAVE Desktop
- Associated Software
- Matching software

Devices

Will you be constructing a new device for this challenge or will you be extending the use of an existing device for this challenge? Please select one of the following: Creating New Device or Augmenting Existing Device.
Augmenting Existing Device

Matchers

*A) Which Matcher will your team use for the **tenprint** to **tenprint** comparison? Please select one:*
____ *Government* _X_ *Custom* ____ *Not Sure*
*B) Which Matcher will your team use for the **latent** to **tenprint** comparison? Please select one:*
____ *Government* _X_ *Custom* ____ *Not Sure*

Safety Assessment

Are there any components (electrical components, illuminators, etc.) in your design which may cause safety concerns with human subjects testing?
No, please refer to the following NIST document for information that was conducted on the usability of MorphoWave based on a study group (http://nvlpubs.nist.gov/nistpubs/ir/2016/NIST.IR.8159.pdf). Furthermore, the MorphoWAVE is currently being evaluated by NIST under CRADA for such and assessment

Innovation

What makes this approach unique?
Currently, a contact scanner must be used to capture nail-to-nail fingerprint images. Using a contact scanner, also requires expert intervention to help to subject capture the prints, as getting high-quality prints is not intuitive to an untrained user. MorphoTrak proposes an approach that not only removes the need for an operator, but also removes the need for the user to contact a scanner block all together, which also has hygienic and throughput benefits. Using our contactless fingerprint technology, a user can self –capture images
MorphoWave generates high-quality fingerprint images by using high-speed imaging and structured light technology combined with advanced image processing. These technological advances are important considerations when capturing wet, dry, or worn fingerprints, because these are often difficult to capture with traditional contact devices. With MorphoWave, an individual's hand is simply passed over the sensor. While exposure time is short, the camera's high resolution, high frame rate, and high sensitivity result in minimally blurred images.
The MorphoTrak technology is based on three-dimensional (3D) modeling and reconstruction of the fingers. The lighting is optimized to display the maximum friction ridge contrast, and to support processing of the advanced image-contrast-enhancement algorithm. The image capture of all four fingers is completed in less than a second – the time it takes to pass the hand over the sensor.

Appendix:

Two short videos showing the capability of MorphoWave are available at:

https://www.youtube.com/watch?v=4z3Fau01yBs https://www.youtube.com/watch?v=8D4uSVxihoY

Figure 1: MorphoWave Contactless Fingerprint Capture

The MorphoWave scanner captures fingerprints with a wave of the hand.

MorphoWave Basic Features

Basic features of MorphoWave include:

- FBI PIV IQS Certification.
- Dynamic acquisition by passing the hand over the sensor (max hand speed 0.5 m / s).
- Contactless capture (maximum distance of 1 in. or 2.5 cm).
- Four-fingerprint acquisition with one pass.
- No image stitching occurs on any fingerprints captured.
- Optional thumbs-capture performed in dynamic mode: MorphoWave can capture 10 fingerprints dynamically: 4 + 4 + 1 + 1.
- Wrong-hand detection at the enrollment stage (left hand vs. right hand).
- Captured fingerprint images are compatible with existing database created from contact fingerprint scanners.
- 500 ppi acquisition that is compatible with existing contact and contactless fingerprint scanners.

MorphoWave Key Advantages

MorphoWave's key advantages include:

- Acquisition time in less than one second
- Wet and dry fingers easily read
- Low fail-to-acquire rate
- Positive user experience – easy to use
- Hygienic and safe
- No latent or residual / ghost impressions (as with traditional scanner blocks)
- Lower maintenance cost compared to traditional contact scanners (no cleaning required between scanning)
- Positive user experience
- Rapid throughput compared to traditional scanners