PSCR 2020² THE DIGITAL EXPERIENCE













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Mobile Fingerprint Capture for First Responders Challenge







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What's the Problem?

Criminal history records are critically important

- Arrest process includes fingerprint capture that become part of that record
- Records are heavily used for background checks
 - Determination of employment eligibility
 - Firearm transfer decision
 - Working with vulnerable population
- Accuracy of records is extremely important







"Cite and Release" is problematic

- Limited personnel and equipment resources
- Initiatives to limit jail populations

Current available technologies

- Mostly hardware peripherals
- Many are used for identification-records look up
- Few are used for fingerprint capture/enrollment

Obstacles and Technology Gaps

- Must meet standards
- Identification of technical requirements
- Address technology gaps

Contactless vs Contact

- What's the difference?
- Officers need a contactless solution
- Mobile devices have potential





Desired Outcomes



- Better % of enrollment
- Reduction in missed opportunity
- Expedited Enrollment



 Cost savings: No need to purchase multiple peripherals



• Officers do not want to carry additional devices

Technology Innovation

John Beltz NIST PSCR





Example: Accurately measure distance



Accurate 3D fingerprint capture requires knowing the precise distance from the camera to the finger.

- Device's on-board sensors (including video camera) may be used to measure distance to the capture target to aid in accurate fingerprint capture.
- Emerging smartphone hardware supports new capabilities (Time of Flight, LIDAR).

Example: Flattening 3D images



A significant challenge for contactless fingerprint capture is that certain assumptions are made for finger/hand pose and shape which introduce distortion in the captured image.

• Onboard camera of a smartphone may be used to establish the pose and position of hand and fingers.

Example: Improve rendering algorithms



Algorithms currently used for rendering a flat image from a 3D surface point-cloud scan can be computationally intense. Algorithm improvements can enable rendering on computationally modest smartphones.

• Novel methodologies and algorithms may be created to enhance rendering capabilities.

Example: Accessing ultrasonic capture capabilities



Fingerprint sensors including in current smartphones and tablets are not available for 3rd party use. These sensors are exclusively used for device authentication, and biometric data is stored in protected enclaves.

 Establish a way of utilizing the fingerprint sensor on a smartphone by an authorized 3rd party applications.

Open Innovation

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Open Innovation Overview







PSCR's Open Innovation program focuses on:

- Advancing public safety communications
- Leveraging the creativity, expertise, and innovative solutions from a diverse array of contributors and collaborators across the globe
- Incentivizing participants to solve discrete, welldefined problems using both monetary and nonmonetary awards
- Crowdsourcing, Prize & Challenge Competitions, Hacka-thons, Data Jams, Ideation, Collaborative Iteration & Design, and Team-building Activities

Open Innovation Overview



12 Challenges launched garnering over 350 submissions



• Participants from 20 U.S. States and 7 countries



Over \$2.2 Million in Prizes awarded to-date to over
118 winning teams

Why a Prize Challenge?



Support goals that harness science, technology and innovation

High-impact, multi-disciplinary partnerships

Award prizes to the most promising solutions

PSCR's Prize Challenge Process



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As a subject matter expert

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With us about partnering on research opportunities

ATTEND

PSCR's workshop later this summer – more info coming soon!



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https://www.nist.gov/ctl/pscr/openinnovation-prize-challenges

