

## Size Matters

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Why Integrated Biometrics' Columbo FAP 30 Sensor Delivers  
Greater Accuracy than FAP 20 or FAP 10 Alternatives







## Introduction

The Federal Bureau of Investigation (FBI) has three standards for single-finger scanners: FAP 10, FAP 20, and FAP 30. All three meet the FBI’s requirements for PIV certification. However, the size of the sensor for each of these formats dramatically affects accuracy in real-world use. Integrated Biometrics’ Columbo outperforms FAP 10 and FAP 20 units, due both to its larger sensor (nearly twice the size of FAP 10) and through other performance advantages that come with its light-emitting sensor (LES) technology.

## FAP 30 – Verified More Accurate

The FBI’s PIV standard covering FAP 10, FAP 20, and FAP 30 sensors suggests that all three formats are equally viable for single-finger scanning. All things being equal, the smallest sensor should represent the best balance of size and results. However, testing from the National Institute of Standards and Technology (NIST), performed in conjunction with the FBI, demonstrates that FAP 10 and FAP 20 sensors fail to deliver the same levels of accuracy as FAP 30 scanners.

These three sensor formats vary dramatically in the amount of a fingerprint they cover, which impacts the amount of information gathered in each image as well as the finger positioning for accurate scanning:

Dimensions	FAP 10	FAP 20	FAP 30	Control
Image Width	0.5" (12.70mm)	0.6" (15.24mm)	0.8" (20.32mm)	Full image width (1.6" or 40.64mm max)
Image Height Sample	0.65" (16.51mm)	0.8" (20.32mm)	1.0" (25.40mm)	Full image width (1.5" or 38.10mm max)
				

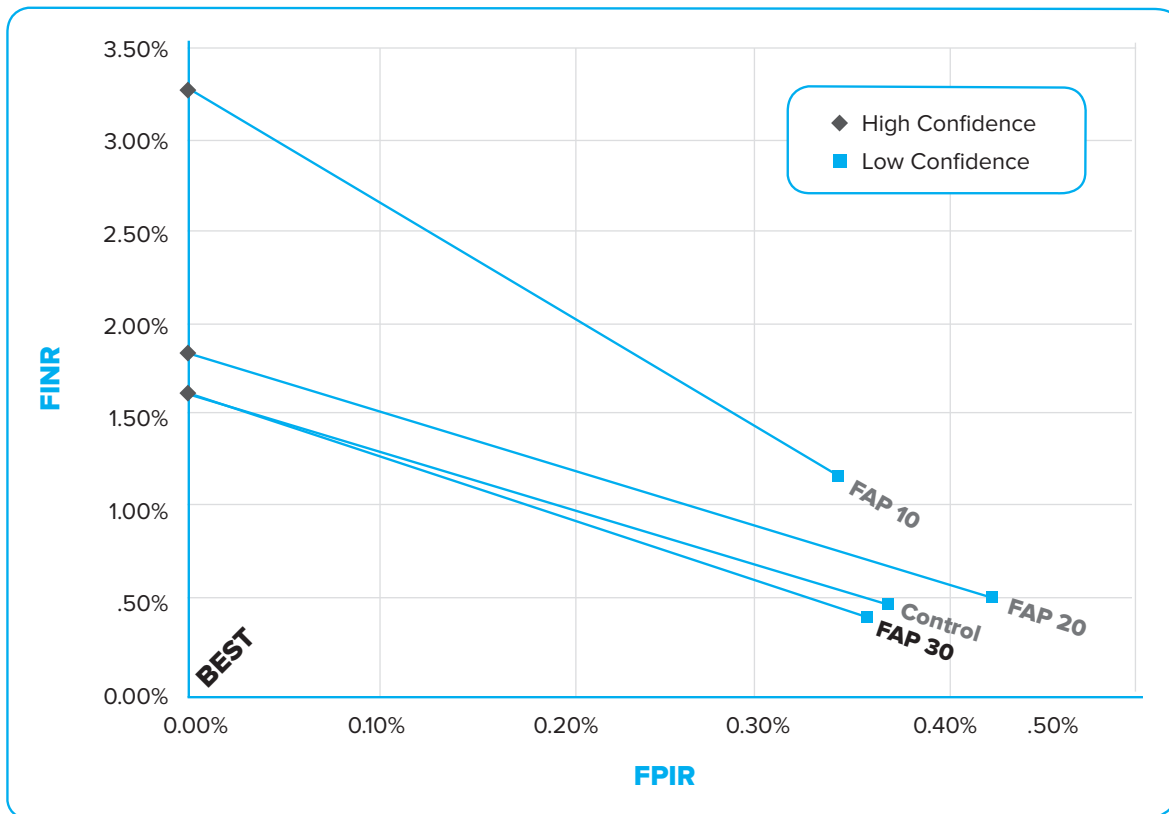
NIST IR 7950, March 2014

FAP 30 provides greater surface area than FAP 10 or FAP 20. As a result, FAP 30 sensors deliver quantifiably stronger results. According to NIST IR 7950\*:

- FAP 30 sensors deliver results that nearly align with control testing, with relatively few false positive or false negative identification
- FAP 10 units fail to identify their targets (false non-identification rate or FNIR) more than twice as often as FAP20
- FAP 20 units dramatically fail to match FAP 30 units for accuracy across both false positive and false negative analyses
- FAP 10 sensors scanning four fingers still fail to approach the accuracy of FAP 30 sensors scanning two fingers

The following table demonstrates these results, covering both false negative (non-identification) and false positive (improper identification) testing:

### Error Tradeoff for Mobile ID FAPs



NIST IR 7950, March 2014

\* Examination of the Impact of Fingerprint Spatial Area Loss on Matcher Performance in Various Mobile Identification Scenarios (NIST IR 7950, March 2014)

## Other Factors That Affect Performance

Just as all FBI PIV-compliant sensor formats are not equal, different FAP 30 sensors deliver varying levels of accuracy and performance. For example, Integrated Biometrics' Columbo FAP 30 scanner uses a patented light-emitting sensor (LES) to generate fingerprint images. This approach enables Columbo to use the larger FAP 30 format, delivered in a physical unit that is significantly smaller and lighter than is possible using backlit prism-based sensors.

LES technology also improves speed, usability, and accuracy, enabling an FAP 30 scanner that:

- Requires dramatically less power to operate
- Scans dirty fingers and resists latent fingerprints
- Generates PIV-compliant imaging without membranes or pads that require frequent replacement
- Operates in bright light or direct sunlight, as well as extreme temperatures

The result is a large sensor in a compact, lightweight, and highly reliable scanner that produces exceptional results even under challenging environmental conditions.

## Conclusion

NIST testing proves that not all FBI PIV certified single-finger scanners deliver equally accurate results. In fact, FAP 30 sensors such as Integrated Biometrics' Columbo are superior to FAP 10 and FAP 20 units for mission-critical enrollment and verification operations. Columbo's LES technology also differentiates Columbo from other FAP 30 products, generating fast, accurate results and greater reliability under an exceptional range of operating conditions.

## **About Integrated Biometrics**

Integrated Biometrics, LLC designs and manufactures FBI-certified fingerprint sensors for law enforcement, military operations, homeland security, national identity, election validation, social services, and a wide range of commercial applications. The company's patented light emitting sensor technology enables lightweight scanners that outperform traditional prism-based devices in size, power consumption, portability, and reliability. Identity management solutions providers, government agencies, and corporations around the world rely on Integrated Biometrics' products to enroll and verify individual identity quickly and accurately, even in remote locations.

For more information, contact Integrated Biometrics:

+1 888 840-8034 | [sales@integratedbiometrics.com](mailto:sales@integratedbiometrics.com) | [www.integratedbiometrics.com](http://www.integratedbiometrics.com)