The Airport Automated Biometric Facilitation Report: From Curb-to-Gate

Market Analysis and Forecasts 2018 - 2022

Comprehensive Market Data - Critical Insight - Targeted Revenue Forecasts

September 2018

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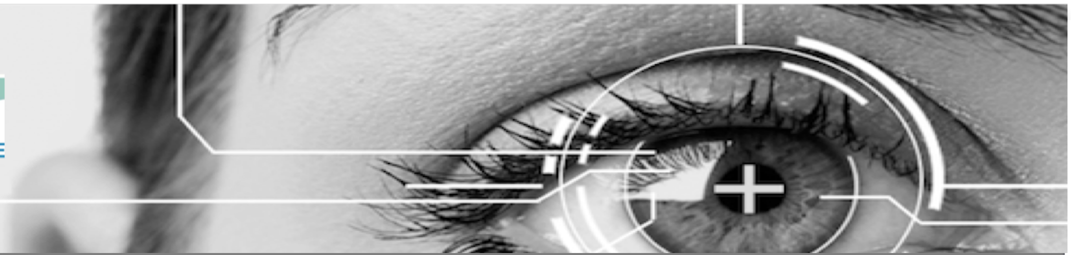

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Report Overview

Scope: This report presents data driven insight into the worldwide opportunity for the development and deployment of Automated Biometric Facilitation Solutions for Airports.

OBJECTIVE: To present global and regional market forecasts that provide the basis for short-term, mid-range, and long-term strategic planning for technology and solution development, market investment, and phased adoption of Airport Automated Biometric Facilitation Solutions.

AUDIENCE: Individuals responsible for strategic planning, business and market development, investments, and sales related to Airport Automated Biometric Facilitation initiatives including airport operators, airlines, biometric vendors, system integrators, investors, consultants, solution providers, and public and private sector staff responsible for evaluating, developing, and implementing Airport Automated Biometric Facilitation programs.

METHODOLOGY: Data is drawn from significant market and technical developments, tests, pilots and deployments, public domain and private data sources, research and reports, surveys, and interviews with airports, airlines, immigration officials, vendors, integrators, intermediaries, customers, privacy and civil liberties advocates, and other relevant technology and leading industry experts. Forecasts are derived from modeling market opportunities based on public domain and proprietary primary data and secondary data sources and are flexibly structured to account for known and predictive factors. Primary data determines known model data. Models are then adjusted to reflect current deployments, anticipated projects, existing and planned infrastructure, and market drivers and disruptors. Conservative assumptions for predictive factors such as technology pricing and anticipated adoption rates are introduced to determine forecasts.

KEY CONCLUSION: By 2022, the market for Airport Automated Biometric Facilitation will reach nearly $390 million annually growing at a CAGR of 20% between 2018 and 2022 generating a total of $1.34 billion between 2018 and 2022. Europe will dominate the global market in terms of both units sold and revenue through the forecast period reaching exceeding 35% annual revenue and unit over the forecast period.

AUTHOR: C. Maxine Most
Principal, Acuity Market Intelligence

About Acuity Market Intelligence

Acuity Market Intelligence is an emerging technology strategy and research though leader with a proven record of accurately anticipating biometric and digital identity market trends. Founded in 2001 to bring strategic market development expertise to the nascent biometrics market, Acuity has a stellar reputation for consistently providing original, thought-provoking, accurate, and reliable biometric and digital identity industry insight and analysis. Acuity's data-driven approach provides Clients with critical market intelligence that supports the creation and implementation of market development strategies that produce quantifiable results.

Market Development Expertise

Acuity Market Intelligence provides biometrics and digital identity data driven market analysis grounded in a thorough understanding of technology concepts and processes. As the digital identity revolution unfolds, Acuity will continue to help vendors, integrators, investors, policy makers, and commercial executives clarify the context and quantify the data that is required to understand this rapidly evolving marketplace.

Acuity's expertise is applied in five key areas:

- **Market Analysis** – Identification and evaluation of key technological developments, market trends, industry players, and deployment effectiveness.
- **Opportunity Analysis** – Vertical market segmentation and identification, prioritization, and sizing of the most lucrative opportunities for a given product, service, or solution.
- **Solutions Analysis** – Requirements and functional specifications
- **Due Diligence** – Evaluation of market players to ensure:
    - Opportunities have been adequately and accurately assessed.
    - Financial, operational, and strategic plans are in place to create sustainable market viability.
    - Product and service quality can be demonstrated.
- **Strategic Planning** – Creation of highly leveragable plans to develop, evaluate, and deploy emerging technology-based solutions with the objective of achieving the highest level of customer satisfaction and sustained market dominance.

Customized Services

Clients leverage Acuity's knowledge and expertise through a range of off-the-shelf, semi-custom, and fully custom product and service offerings. These include:

- **Executive Briefings/Strategy Sessions** – Interactive sessions provide targeted insight to Executives.
- **Segment Tracking** – On-going coverage of technologies, players, and market drivers and dynamics of a specific industry sector or technology marketplace.
- **Report**s – Periodic and one-off targeted analyses focused on a range of topics including: technology evolution, application development, vertical market adoption, opportunity, and competitive analyses.
- **Research** – Standard and custom research projects designed to address specific knowledge gaps.
- **Consulting** – Custom projects designed to support specific Client objectives.

Please contact **Acuity Market Intelligence** for additional information on services, availability, and fees.

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Preface

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This report provides a global overview view of the rapidly evolving market for Airport Automated Biometric Facilitation. This includes a range of fully automated and semi-automated solutions that are currently deployed or will be deployed at airports across the world. *The Airport Automated Biometric Facilitation Report: Form Curb-to-gate* is therefore intentionally limited in scope as a means to provide a deep dive into one aspect of biometric facilitation and does not in any way attempt to marginalize or ignore other important aspects of the larger market for biometrics in airports. This includes manual or assisted processing by border agents (current implementation of US Air Entry), or security personnel (CLEAR), retail payments, VIP privileges or access to lounges or other restricted areas, or use by airports or airlines for staff physical or logical access.

While the market for Airport Automated Biometric Facilitation represents an important component of overall biometrics marketplace, the overall number of units deployed is not overwhelming relative to the overall biometrics market currently being driven by mobile biometrics – now more than 3 billion devices worldwide. Acuity projects the Total Addressable Market (TAM) for all Airport Automated Biometric Facilitation to be 96,000 units worldwide. Of these, about 16,000 are the ABC eGates that replace border control agents at passport control desks, the most emblematic of all Airport Automated Biometric Facilitation. There are far greater numbers of the new and emerging Airport Automated Biometric Facilitation solution types. These include Automated Passport Control or APC Kiosks, fully Automated Immigration Check-in or AIC Kiosks, Automated Bag Drop or ABD Units, and Automated Immigration Boarding or AIB eGates. Each of these semi or fully automated processes is designed to address one component of an integrated approach to leveraging biometric facilitation to expedite and enhance the airports experience primarily for international travelers.

In spite of the relatively limited market size -- tens of thousands of units as opposed to hundreds of millions of units or even billions in the mobile space -- the market for Airport Automated Biometric Facilitation represents a far broader opportunity than simply the deployment of these potential 96,000 units. Airport Automated Biometric Facilitation represent the roll-out of customer facing "touch points" to what promises to be a far more complex and highly interoperable 21st century border management IT infrastructure designed to both facilitate global travel and provide enhanced sovereign security capabilities. And, over time these IT systems will be incorporated into an even more comprehensive network that integrates passenger and immigration processing into a global network that will fundamentally reshape the international travel experience.

Cheers,

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Introduction

The Airport Automated Biometric Facilitation Report: From Curb-to-gate is a data driven analysis of the current state and future of the market. The report relies extensively on primary sourced data -- which for the purposes of this report is defined as quantitative data obtained from sources directly tabulating or producing this data -- and on secondary data obtained from trusted sources. The report leverages model-derived forecasts to present a comprehensive view of the market. Data acquired, modeled, and forecast includes existing and planned automated biometric eGate, Kiosk, and Bag Drop deployments, international airport passenger traffic, contract costs, anticipated technology price performance drops, and conservative projections of adoption rates based on economic and regional factors.

Definitions

The analysis includes only *automated and semi-automated solutions* related to airport passenger biometric facilitation. This includes Kiosks and eGates used for immigration processing, security facilitation such as flight check-in or for automated boarding pass reading at security checkpoints, or at airport departure gates, as well as-biometric bag drop solutions. *Biometrics used at immigration counters staffed by border control agents are not included, nor – in the case of US Air Exit – are current airplane boarding trials based on face recognition not linked to any kid of physical barrier, where gate agents facilitate the barding process*. Therefore, for the purposes of this analysis, the following definitions apply:

SOLUTION TYPES	Definitions
ABC eGates	Automated Border Control Gates which may include a two-step process that rely on Kiosks delivered as part of the configuration deployed at ARRIVALS or DEPARTURE to replace border control agents seated at immigration counters.
ABC KIOSKS	Automated Border Control Kiosks at ARRIVALS (or for DEPARTURE pre-clearance) like those deployed for the US Global Entry program. ABC KIOSKS provide the same function as ABC eGates without an integrated physical barrier.
APC KIOSKS	Automated Passport Control Kiosks expedite ARRIVALS (or DEPARTURE pre-clearance) via self-service capture of Passport, immigration information, and face and/or fingerprint biometrics as required prior screening by a border control agent.
AIC KIOSKS	Automated Immigration Control Kiosks for DEPARTURE. These link an individual to their Passport via biometrics at check-in and may integrate with DEPARTURE ABC eGates, AIB eGates, and ABD Units.

AIB eGates	Automated Immigration Boarding Gates for DEPARTURE confirm that an individual is linked to a valid travel credential (e.g. ePassport) and boarding pass at a Boarding Gate. AIB eGates may also be used at Security Checkpoints and may link to AIC Kiosks, ABC eGates, and ABD Units.
ABD Units	Automated Bag Drop for DEPARTURE. May integrate with DEPARTURE AIC Kiosks, ABC eGates, and AIB eGates.

Figure 0-1: Report Definitions Table

Methodology

A combination of primary sourced data and model based projected data was used to develop the forecasts and analysis included in this report. Primary data acquired directly through government agencies and well-credentialed non-governmental agencies was presumed valid. Data acquired through sources with less qualified credentials or with strong motivation for particular outcomes was validated through additional sources and/or model-based alternatives.

Data and Data Acquisition

Primary data used to complete the analysis and develop forecasts for this report includes:

- Existing and planned Biometric eGate, Kiosk, and Bag Drop deployments,
- Biometric eGate, Kiosk, and Bag Drop published contracts and pricing,
- Annual airport international passenger traffic figures,
- Annual international tourist arrivals and departures,
- Existing and projected airport Infrastructure including check-in counters and kiosks, and departure gates, and
- Projected growth in international passenger volumes.

Only Airports currently serving at least 100,000 international passengers annually were included in the report as far as Market Projections. A small number of airports below this threshold have initiated programs and have been included in the projections.

Primary data was obtained directly from government agencies such as ministries of interior, homeland security, border control, and immigration, as well as public and private airport and airline authorities. Additional data was sourced from non-governmental agencies tasked with providing domestic and global insight into and statistics on global travel, tourism, economic development, and government expenditures. Source materials include online data and databases, published statistics, policy papers, budgets, program analyses, public statements, press releases, and direct consultation.

Finally, data was obtained through publicly available information from, statements by, and direct consultation with civil servants, consultants, vendors, integrators, analysts, and other third parties directly involved or with direct knowledge of specific relevant programs and deployments.

Model Development

Models were developed to project adoption and revenue based on known deployments and contract data. These projections are adjusted to account for regional indicators and variations such as political and social stability, levels of development, financial performance and stability, as well as other country or region-specific indicators or influencers. Models are also adjusted to account for existing market conditions, current deployments, anticipated projects, and existing and planned infrastructure. Conservative assumptions for predictive factors such as technology pricing and anticipated adoption rates are introduced to determine forecasts.

Market Analysis

Analysis is drawn from significant market and technical developments, tests, pilots and deployments, public domain and private data sources, research and reports, surveys, and interviews with vendors, integrators, intermediaries, customers, privacy and civil liberties advocates, and other relevant technology and leading industry experts. Critical data and key implications drawn from the primary data and forecasts are filtered through this knowledge base.

Forecasts

Adoption and revenue forecasts are presented globally, by region and by type of biometric automated solution. The forecasts have been developed through a rigorous process relying on the best available and/or projected data. As with all market forecasts, the most significant indicator is the scale of the projections not the precise numbers. Furthermore, where assumptions were required to calculate forecasts, the underlying principal was to rely on conservative rather than aggressive estimates. In this way, ***the report offers a conservative market forecast baseline indicating the scale of opportunity expected over the next five years***.

Adoption estimates are relative to the Total Addressable Markets (TAM) for each Airport Automated Biometric Facilitation solution. For the purposes of this analysis, a per passenger normalized value was determined based on existing Airport Automated Biometric Facilitation solution deployments, awarded contracts, regional service norms, and deployment levels of similar self service solutions. TAM values are than projected based on current and anticipated international passenger traffic volumes at the airports included in the analysis.

Because of the complex nature of the Airport Automated Biometric Facilitation market, and the associated complexity involved in modeling data and forecasting revenues, *it is critical that the methodology, assumptions, and model notes in the Appendix be reviewed to gain relevant insight form the data.* Additional information is provided throughout the report in specific sections to reinforce the underlying assumptions where deemed necessary.

Table of Contents

Table of Figures

19. Appendix A: Forecast Methodology and Assumptions

Report content is based on a proprietary approach using customized forecast methods and tools applied to primary and projected data.

Methodology

A combination of primary sourced data and model based projected data was used to develop the forecasts and analysis included in this report. Primary data acquired directly through government agencies and well-credentialed non-governmental agencies was presumed valid. Data acquired through sources with less qualified credentials or with strong motivation for particular outcomes was validated through additional sources and/or model-based alternatives.

Primary data used to complete the analysis and develop forecasts for this report includes:

- Existing and planned Biometric eGate, Kiosk, and Bag Drop deployments,
- Biometric eGate, Kiosk, and Bag Drop published contracts and pricing,
- Annual airport international passenger traffic figures,
- Annual international tourist arrivals and departures,
- Existing and projected airport Infrastructure including check-in counters and kiosks, and departure gates, and
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Only Airports currently serving at least 100,000 international passengers annually were included in the report as far as Market Projections. A small number of airports below this threshold have initiated programs and have been included in the projections.

Primary data was obtained directly from government agencies such as ministries of interior, homeland security, border control, and immigration, as well as public and private airport and airline authorities. Additional data was sourced from non-governmental agencies tasked with providing domestic and global insight into and statistics on global travel, tourism, economic development, and government expenditures. Source materials include online data and databases, published statistics, policy papers, budgets, program analyses, public statements, press releases, and direct consultation.

Data was obtained through publicly available information from, statements by, and direct consultation with civil servants, consultants, vendors, integrators, analysts, and other third parties directly involved or with direct knowledge of specific relevant programs and deployments.

Analysis is drawn from significant market and technical developments, tests, pilots and deployments, public domain and private data sources, research and reports, surveys, and interviews with vendors, integrators, intermediaries, customers, privacy and civil liberties advocates, and other relevant technology and leading industry experts. Critical data and key implications drawn from the primary data and forecasts are filtered through this knowledge base.

Models were developed to project adoption and revenue based on known deployments and contract data. These projections are adjusted to account for regional indicators and variations such as political and social stability, levels of development, financial performance and stability, as well as other country or region-specific indicators or influencers. Models are also adjusted to account for existing market conditions, current deployments, anticipated projects, and existing and planned infrastructure. Conservative assumptions for predictive factors such as technology pricing and anticipated adoption rates are introduced to determine forecasts.

Adoption estimates are relative to the Total Addressable Markets (TAM) for each Airport Automated Biometric Facilitation solution. For the purposes of this analysis, a per passenger normalized value was determined based on existing Airport Automated Biometric Facilitation solution deployments, awarded contracts, regional service norms, and deployment levels of similar self service solutions. TAM values are than projected based on current and anticipated international passenger traffic volumes at the airports included in the analysis.

Adoption and revenue forecasts are presented globally, by region and by type of biometric automated solution. The forecasts have been developed through a rigorous process relying on the best available and/or projected data. As with all market forecasts, the most significant indicator is the scale of the projections not the precise numbers. Furthermore, where assumptions were required to calculate forecasts, the underlying principal was to rely on conservative rather than aggressive estimates. In this way, ***the report offers a conservative market forecast baseline indicating the scale of opportunity expected over the next five years***.

Assumptions and Notes

The following assumptions were used in the acquisition, filtering, integration, and calculation of data and the development of associated adoption and revenue forecasts:

- All revenue forecasts are in United States dollars. All currency conversions were based on current values from the XE Universal Currency Converter (www.xe.com).
- Only Airports serving 100,000 annual international passenger traffic are included in the report analysis.
- Annual international passenger traffic numbers for airports based on data from Airports Council International (ACI).
- A 5% increase in international passenger traffic was applied to all passenger traffic data.
- This model does not explicitly project for planned new airport terminals, gates, and check-in counters but relies on the 5% across the board passenger volume increase to account for new construction increases.
- A model based on annual international passenger traffic was used to project ABC eGate, ABC Kiosk, and APC Kiosk requirements. Additional data on airport check-in counters, self-service kiosks, baggage facilities, and the number of boarding gates at airports was incorporated to project AIC Kiosks, AIB eGates, and ABD Units.
- Assumptions for passengers Airport Automated Biometric Facilitation solution type varies by type as well as region based on proprietary modeling factors e.g. service levels, economic development, infrastructure investment, etc.

- Adoption rates vary by solution type and region based on a number of proprietary modeling factors e.g. service levels, economic development, infrastructure investment, etc.
- The analysis assumes one kiosk per check-in counter plus additional kiosks based on United States ratio of self-service kiosks provided by ACI data.
- The percentage of international passengers at a given airport was used to determine the percent of check-in counters, self-service kiosks, bag-drop units and the number of boarding gates to apply towards Airport Automated Biometric Facilitation projections.
- Airport Automated Biometric Facilitation program costs vary depending on the existing infrastructure, volume, geographic region, and complexity of applications. Fully loaded costs averages were calculated based on available contract data for existing deployments.
- Average base price for ABC solution types are as follows and include HW, SW, Installation and three years maintenance:

Fully loaded cost per eGate	**$199,982**
Fully loaded cost per ABC KIOSK	**$75,000**
Fully loaded cost per APC KIOSK	**$60,000**
Fully loaded cost per AIC KIOSK	**$60,000**
Fully loaded cost per AIB eGate	**$199,982**
Fully Loaded ABD Unit	**$220,000**

- Regional adjustments were applied to base unit prices.
- A 5% annual price per unit reduction was applied to all Airport Automated Biometric Facilitation solution types
- Normalized values for the number of passengers were applied to project Total Addressable Market.
- Replacement units based on 5-year lifecycles were applied to all projections. *This impact annual units installed but not total units deployed*.
- Where conflicting primary or projected data were identified, conservative estimates were used.

20. Appendix B: Author Biography

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Acuity Founder and Principal, C. Maxine Most ("max"), has more than 30 years' experience in international emerging technology market development. Throughout her career, Ms. Most has evangelized emerging technology on five continents. Since 2001, she has focused on biometric and digital identity markets where she has earned a stellar reputation for innovative thought leadership and a proven ability to accurately anticipate biometric and digital identity market trends.

Ms. Most founded Acuity Market Intelligence - a strategic research, and analysis consultancy now recognized as the definitive authority on global biometrics market development - in 2001 to bring strategic market development expertise to the then nascent biometrics market. Since that time, Ms. Most. has earned a reputation for consistently providing original, provocative, accurate, and reliable thought leadership and industry analysis that Clients rely on to achieve business success.

Ms. Most is the author of numerous Acuity research report including The Global Biometrics and Mobility Report, The Global *National eID* Industry Report, and The Global ePassport and eVisa Industry Report, as well as a contributor to several books including "Digital Identity Management" edited by digital identity thought leader David G. Birch. Ms. Most regularly offers insight and analysis in on and off-line publications, is quoted often in industry, business, and consumer press, and presents regularly at industry events on the evolution and development of biometrics and digital identity markets.

Previously, Most managed the Computer Aided Molecular Design market for Silicon Graphics Computer Systems, directed Pacific Rim operations for a hospitality-based interactive services company, and founded and operated a Silicon Valley-based retail company. She has also designed and delivered sales and technical training courses worldwide and began her career as a software engineer specializing in 3D graphics applications. Ms. Most is a graduate of the University of California, San Diego with a multi-disciplinary degree in Mathematics, Computer Science, Economics, and Visual Arts.

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