



TWIC Reader Acquisition Cost Estimates

The Transportation Worker Identification Credential (TWIC) program is entering a regulatory phase that will define requirements and policies for the deployment of automated TWIC readers within the maritime transportation sector. TWIC readers will enhance security for those seeking unescorted access to secure areas of regulated vessels and facilities by eliminating weaknesses associated with having security personnel rely solely on the visual inspection of TWIC cards. TWIC mission objectives will be better achieved by having maritime operators routinely use readers to perform electronic checks of TWIC cards for card validity, card authenticity, and cardholder identity.

This paper is intended to assist the Department of Homeland Security (DHS), those members of Congress with oversight responsibility and maritime industry stakeholders toward a better understanding of the cost of acquiring and deploying TWIC readers. A recent report from the Government Accountability Office (GAO) has suggested that potentially billions of dollars could be needed to install TWIC card readers in thousands of the nation's ports, facilities and vessels.¹ The International Biometrics and Identification Association (IBIA), a non-profit trade association, has prepared this report as a "bottoms-up" attempt to estimate the total acquisition cost of TWIC readers based on what we believe to be reasonable assumptions derived from interviews with reader manufacturers, access control system providers, maritime industry stakeholders and our expectations of the timing and scope of pending Coast Guard regulations related to TWIC reader use.

Policy and regulatory decisions on the use of TWIC readers will influence the number of TWIC readers that are ultimately deployed and the functions that they must perform for specific risk categories of facilities and vessels and during various threat conditions. For example, the TWIC Reader Rule could state that under the lowest of three maritime security threat conditions (MARSEC 1), facilities classified as low-risk may only have to perform visual inspection of TWIC cards at entry points. Facilities categorized as medium risk may be required to routinely read the card holder unique identifier (CHUID) from the TWIC card and perform basic validation checks. However, biometric verification may only be required at these facilities on a random basis or more frequently during elevated threat conditions. High-risk facilities may be required to perform card validation and fingerprint verification during each access transaction.

The TSA and Coast Guard provided an estimate of the number of applicable facilities and vessels during the initial TWIC Notice of Public Rule Making² as follows:

- Land-based facilities 3,492
- Outer Continental Shelf (OCS) facilities 42
- Vessels 10,785

¹ GAO report number GAO-11-657 dated May 2011, page 38

² See *Federal Register* / Vol. 71, No. 98 / Monday, May 22, 2006 / Proposed Rules

As previously stated, the number of fixed or portable readers required will be greatly influenced by regulatory decisions not yet finalized, as well as through the Coast Guard Facility Security Plan (FSP) or Vessel Security Plan (VSP) review process. For this reason, it is only possible to provide an estimate of the projected cost of TWIC readers. However, it is possible to make some educated sizing of the projected reader population by citing the projected needs of some surveyed facilities and applying a set of extrapolation assumptions.

An example of a medium to large container terminal surveyed for this purpose is the Port of Miami container terminal. This facility handles over 2,000 trucks per day through ten inbound lanes and six outbound lanes. The inbound lanes are configured as follows:

- 7 truck lanes
- 2 multi-use lanes (trucks and personal vehicles)
- 1 personal vehicle lane

In addition, this facility has two pedestrian gates.

We can assume that this facility is classified as a medium to high-risk facility. Therefore, reading of the TWIC card is required for all entry transactions. We can then estimate that the Port of Miami container terminal would require a total of 14 fixed mount TWIC readers with 12 at vehicle lanes and two at pedestrian gates. This assumes that each multi-use lane will require two readers mounted for both high and low profile vehicles. In addition, we can assume that the facility security office will use three handheld TWIC readers for roving security spot checks and other ancillary TWIC card holder authentication and/or registration applications.

The number of points of entry at Miami tracks well in proportion to the truck volume at two other large container terminals that we have observed (Long Beach, California and Elizabeth, New Jersey). Some facilities with less vehicle traffic and/or different types of cargo will require fewer lanes and, thus, fewer readers. It should be noted that many facilities and vessels that are exempt from reader use will still likely acquire fixed or portable readers for registration purposes and for random security checks of TWIC cards. This is true because maritime operators will need some method of periodically checking the TSA "cancelled card list" to determine whether a registered TWIC card has been revoked by TSA. This can only be done by reading the unique identifier from the memory of the TWIC card since it is not printed anywhere on the card. Downloading of the TSA cancelled card list can be a back-office function using a PC connected to a web interface. However, a smart card reader device is required to acquire the unique identifier and other certificate data from the card for entry into the back-office system. This could be a portable reader device or it could be a reader peripheral attached to a PC.

Based on an analysis of the maritime industry public comments on the Advance Notice of Public Rule Making (ANPRM), it is assumed that 80% of the regulated vessels will not be required to use on-board readers. However, we do expect that many vessel operators will select portable readers for crew and employee registration or for mustering applications at the boarding gangway.

During early TWIC planning in 2002, 25 ports were surveyed by TSA. It was determined that each of these ports (including their combined tenant facilities) had an average of 170 vehicle and pedestrian entry points. Since these 25 ports were typically medium to large operations, the average can be reduced by 40% to an assumption of 102 entry points for the average port. By applying ratios observed

at the Port of Miami it is possible to extrapolate this to equate to a number of TWIC readers per port using the following assumptions:

- 90% of entry points are vehicle gates
- 10% of entry points are pedestrian entry points
- 22% of the vehicle gates are multi-use entry points that require two fixed readers (high and low mount)
- Portable readers are in addition to fixed readers and comprise 21% of the fixed reader estimate

Based on the above, we can calculate the number of readers for an average port operation (including its tenant terminals) as follows:

- Vehicle entry gate readers = $(102 \times 90\%) + (102 \times 90\% \times 22\%) = 112$ readers
- Pedestrian entry point readers = $(102 \times 10\%) = 10$ readers
- Average total fixed readers per port = 122
- Average mobile handheld readers per port = $(122 \times 21\%) = 26$
- Average all reader types per port = $(122 + 26) = 148$

There are 146 ports in the U.S. that are subject to MTSA regulations with a combined total of 3,492 separate tenant or port-operated facilities. We are assuming that 30% of the facilities will be exempt from any reader requirements in the final reader rule because they are deemed to be low risk facilities. Therefore, the readers required at all ports, and their tenant facilities, can be estimated as $146 \times 70\% \times 148 = 15,126$ readers. Of these, we can estimate that 12,469 are fixed readers and 2,657 are portable readers. This estimate does not include reader devices that would be required for administrative purposes such as physical access control system (PACS) registration in a terminal operator's security office. It can be assumed that one reader is required for administrative purposes in each regulated facility (even if exempt from the reader use at gates), it can be projected that another 3,492 readers will be required, of which 2,759 will be fixed reader peripherals attached to a PC and 733 are portable. This results in 15,228 fixed readers and 3,390 portable readers for a total of 18,618 TWIC readers at land-based facilities.

There are 42 outer continental shelf (OCS) facilities each with an assumed requirement for two portable readers for entry access control and/or spot checks. In addition, we can assume that each OCS facility will also have a fixed reader attached to a PC for administering local PACS registration in its security office. Therefore, the number of OCS facility readers is estimated to be 3 per OCS facility for a total of 126 readers of which 42 are fixed administrative readers and 84 are portable readers.

Of the 10,785 MTSA regulated vessels, we are assuming that 80% are exempted from having TWIC readers as a result of small crew size or low-risk cargo classification. Of the remaining 2,157 vessels, we are assuming that there is an average of two entry points into secure or restricted areas of the vessel (such as engine room or bridge) that will require fixed TWIC readers. In addition, we are assuming that 50% of the vessels requiring TWIC readers will also utilize one TWIC handheld reader for crew boarding and exiting when at port. In addition, we can assume that each vessel that is required to use TWIC readers will also have a reader for administering local PACS registration in its security office. Based on the above, it is possible to estimate the population of TWIC readers on vessels as follows:

- Crew entry point fixed readers = $(2,157 \times 2) = 4,314$ readers
- Portable readers = $(2,157 \times 50\% \times 1) = 1,079$ readers
- Fixed Administrative readers = $(2,157 \times 1) = 2,157$ readers

The total number of readers utilized on regulated vessels would thus be 7,550, of which 1,079 would be portable readers and 6,471 would be fixed readers either mounted on a bulkhead entry point or connected to a PC. The following is a summary of the above estimates:

Category	Fixed Readers	Portable Readers	Total Readers
Land Facilities	15,228	3,390	18,618
OCS Facilities	42	84	126
Vessels	6,471	1,079	7,550
Total	21,741	4,553	26,294

Based on a survey of selected reader manufacturers that are listed by TSA on the TWIC web site as having passed the criteria for the Initial Capability Evaluation (ICE) test, the price range of TWIC reader hardware devices is estimated as follows:

- Fixed mount outdoor readers - \$2,500 to \$4,000
- Fixed mount indoor/administrative readers – \$2,000 to \$3,500
- Portable readers - \$1,500 to \$4,000

It is further assumed that 70% of fixed readers (or 15,219 readers) will be used at remote outdoor entry points and that 30% of fixed readers (or 6,522 readers) will be used indoors either mounted at indoor entry points or as peripheral devices attached to administrative PCs for registration of TWIC information into the local physical access control system.

Software license, wiring, installation, integration, physical access control system, field control panels, etc. that may be required are not included in the above cost estimates. These ancillary costs can be significant, particularly for fixed mount readers placed in outdoor environments where installation costs may require the routing of underground communications and electrical connections from a central PACS to the reader(s). Portable readers have little if any installation cost but typically carry a software license cost of \$1,000 to \$2,000 each.

Based on the above, we can approximate the average total acquisition cost of TWIC readers as follows:

- Average fixed-mount outdoor reader cost = \$17,250
 - \$3,250 - Reader hardware
 - \$1,000 - Reader Software license
 - \$10,000 - Installation and cabling
 - \$3,000 - Integration with existing physical access control system (PACS)
- Average fixed-mount indoor/administrative reader cost = \$13,750
 - \$2,750 - Reader hardware
 - \$1,000 - Reader software license
 - \$5,000 - TWIC-to-PACS registration software license
 - \$2,000 - Installation and cabling
 - \$3,000 - Integration with existing physical access control system
- Average portable reader cost = \$4,250
 - \$2,750 - Reader hardware
 - \$1,500 - Software license

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Based on the preceding set of assumptions, total TWIC reader acquisition costs can be estimated as follows:

Category	Quantity	Avg. Cost	Total Cost
Outdoor Fixed Readers	15,219	\$17,250	\$262,527,750
Indoor Fixed Readers	6,522	\$13,750	\$89,677,500
Portable readers	4,553	\$4,250	\$19,350,250
Total	26,294	\$14,131	\$371,555,500