AES*Direct* - INTERNET DATA COLLECTION OF U.S. EXPORT INFORMATION

Charles A. Woods
U.S. Census Bureau, Foreign Trade Division

Abstract

AES*Direct* is the Census Bureau's free Internet data collection service for exporters, forwarders, and others to file their Shipper's Export Declaration (SED) information electronically with the U.S. Government. The SED data is used as input to the official export trade statistics of the United States.

The Automated Export System (AES) is the precursor to AES*Direct*. The AES is the electronic data collection methodology created by the U.S. Customs (Customs) and the Census Bureau to collect all export related information. The AES is a mainframe data collection service. The Census Bureau implemented AES*Direct* to provide Internet interactive, batch, and web-integrated data collection services to further reduce reporting burden on the U.S. export trade community. AES*Direct* interfaces with AES and is a significant advancement based upon its widespread use and general acceptance in the trade community.

Since its inception in October 1999, AES*Direct* has collected information for over 2 million shipments from over 4,700 companies. AES*Direct* functionality is unsurpassed in that both interactive and batch filings are permitted through the same Internet service. In addition, the use of templates or previously submitted data as proxy for today's or future shipments is innovative. Further, AES*Direct* integrates with commercial business web applications. As a shipper is online ordering international delivery services from a forwarding or carrier service, the service's business web application will seamlessly transfer the shipper and the shipment information to AES*Direct*, leaving only a few data fields to complete? a dramatic further reduction in burden.

AES*Direct* continues to evolve to meet new and expanded business and Government requirements. Methods of research, review and evaluation, including feedback from the export trade community, will ensure that it remains robust.

Historical Perspective

In the United States, the Census Bureau, specifically the Foreign Trade Division (FTD), is responsible for collecting, compiling and publishing statistics on U.S. merchandise imports, exports, and the balance of trade? a principle economic indicator.

Statistics on international trade are among the oldest sets of statistics continuously compiled by the U.S. Government. The Treasury Department first compiled and published estimates of the balance of trade as far back as 1790 as compiled from ship's manifests. Statistics compiled from actual trade documents first became available in 1820. Until recently, U.S. international trade statistics were still compiled from paper documents submitted to Customs for each import or export transaction.

Trade statistics must be reliable. They must be timely, accurate, and fully cover the economy. Critically important business and Government decisions, made daily, are based upon these statistics. For example:

- Port authorities use the data to assess their competitive position versus other ports, identify opportunities to increase market share, or evaluate the need to expand port facilities.

- Transportation companies: truck, air, rail, and ocean vessel companies use the data to assess their market share, competition, and potential new trade routes.

- Manufacturing, agricultural, and other exporting companies use the data to research new or expanding foreign markets or to assess the impact of imports upon their industry or upon selected commodities.

- The U.S. Government, in particular the International Trade Commission, Office of the U.S. Trade Representative, Federal Reserve Board, and the Department of Commerce use the data to set or validate quotas, to negotiate trade agreements, and to make decisions concerning the U.S. economy.

Background

In 1985, the Census Bureau's FTD received more than eight million export declarations and more than seven million import documents?a formidable amount of paper to manually collect, clerically process, microfilm, and from which to key the data for statistics. Costs associated with the manual processing and capture of the data were spiraling. The burden and costs to importers and exporters were mounting as trade volumes and paperwork increased. Thousands and thousands of keying and edit rejects required resolution by Census Bureau staff. Carry-over, or that amount of data not received and processed in the correct month, was approaching 50 percent for imports and 25 percent for exports. The quality of the data was surely suspect.

By 1999, the Census Bureau still processed 5 1/2 million paper export documents. Customs is required to spend untold staff hours and other resources to collect, sort, mail, and store these. The cost to the Census Bureau for data capture alone, excluding research and related activities, was $3.7 million in 1999, $4.2 million in 2000, and is expected to be $3.3 million in 2001. The SED processing cost estimates for the export trade community run to the hundreds of millions of dollars each year.

In addition to these costs, there have been other problems associated with the paper-based process. Through studies conducted at major ports, the FTD found that between 3 and 7 percent of all export transactions never got reported. Of those that are reported on the paper SED, more than 50 percent contain one or more errors.

SEDs are also used for export control purposes such as for the control of critical technologies, weapons of mass destruction, and the control of precursor chemicals used in the manufacture of illegal drugs. The security of the United States and the health and safety of every U.S. citizen relies upon the complete and accurate filing of the SED by the thousands of exporters, forwarders, and transportation carriers.

The Census Bureau is committed to correcting these inadequacies and improving the quality and accuracy of the trade statistics through the implementation of new technology and the reduction of respondent burden. To date, the Census Bureau/Customs partnership has been innovative in implementing new technology and automation in the import documentation process. Over 99 percent of the 25 million annual import transactions included in statistics are reported electronically through Customs to the Census Bureau.

Attention was then focused on further automating export data collection and processing since as late as 1999, over 1/3 of the 1.5 million monthly transactions included in trade statistics were still reported on paper documents. The Customs/Census Bureau goal in this endeavor is to reduce the burden on U.S. companies, facilitate legitimate export shipments, protect the health and safety of US citizens, and to make the United States a world leader once again in providing the highest quality export trade statistics.

The Automated Export System (AES) - The First Step

The AES is the computer system that brought the process of export reporting into the 21st century and is the precursor to AES*Direct*. The first meetings to develop the concept of AES were held in 1994, and included the Census Bureau, Customs, other Government agencies, and the export trade community. The Census Bureau and Customs working in close cooperation and partnership developed and implemented AES on Customs computer systems. In 1995, AES began its phased implementation in 5 seaports. After the successful trial, it was expanded to all seaports, and then to all modes of transportation.

The AES eliminates the paper SED by facilitating a computer-to-computer exchange of information. By transmitting the shipment information directly to Customs, exporters and their agents gain several benefits: they reduce costs and save time, they eliminate another paper document, and they have a much better sense of export compliance. For the first time, the exporter knows that the shipment information was received by Customs and that it was edited, verified, and accepted. Customs benefits by receiving shipment information prior to export, thereby assisting in the enforcement of export control regulations. The Census Bureau benefits by receiving information that is much more timely and accurate. The error rate on paper SEDs was more than 50 percent; the error rate of data received via AES due to extensive edits is less than 3 percent.

The beauty of AES is its simplicity?it eliminates the extra steps of preparing and handling the paper SED. Exporters or their agents transmit shipment information directly to the Customs computer. The AES reviews the information transmitted and responds with several kinds of messages, including receipt of data, warning messages, and messages that ask the sender to verify the data. If necessary, the sender will respond to the messages, and perhaps retransmit the data. That's it, a very simple process. But, as simple as it is, it was not without criticism.

Participation in AES requires the development or purchase of software and hardware necessary to communicate with Customs mainframe computer. Small- and mid-size companies expressed great concern about these programming issues and higher costs and suggested they might not participate in AES. AES*Direct* was specifically implemented to alleviate this concern. The FTD decided to assume the costs of electronic filing for companies by developing and operating a service using the Internet. The long-term costs to provide such a service are dramatically less than handling and processing paper documents to capture the same information.

AES*Direct* - How it got started

In 1997 in a discussion with two trade-related software vendors, the FTD brainstormed alternative options for filing data with AES at Customs. Out of this discussion came a proposal presented by a joint venture of the two companies to conduct a proof-of-concept test of the

Internet data collection option. A contract was let for the proof-of-concept and work commenced. A rudimentary system was ready in 2 months. The resulting company and Government evaluation reports for this test indicated that Internet data collection was not only feasible but also cost beneficial to both participating companies and the Government. The decision to risk trying something new succeeded. However, many comments, suggestions, and recommendations on how to improve the system and process were made in each report.

By early 1998, the vision of the Internet data collection system for export transactions was well in focus. Work proceeded later that year to develop functional requirements that led to the creation for a Request for Proposal (RFP). The RFP was eventually posted for bids in early 1999 with 17 companies bidding for the job. A bid evaluation team created specific criteria for evaluating the bids and selected the company most meeting the Government requirements. The contract was let in mid-1999 to Flagship Customs Services, Inc. of Silver Spring, Maryland for the development, implementation, support, and maintenance of our interactive and batch Internet application. The AES*Direct* became operational that fall without a hitch and with much fanfare.

AES*Direct* - System Description

AES*Direct* is the Census Bureau's free, Internet-based system for the filing of SED information to AES. AES*Direct* can be accessed at <www.aesdirect.gov>. It is the Internet alternative to filing paper SEDs or filing directly with AES at Customs. Exporters, freight forwarders, or anyone responsible for reporting export shipment information to the U.S. Government can use AES*Direct*.

AES*Direct* significantly streamlines the export reporting process by reducing the paperwork burden, reducing costly document handling, and ensuring that export information is filed in a timely manner. It also helps ensure that companies using it have complied with U.S. Government export reporting requirements.

AES*Direct* was originally developed to assist small- and mid-size companies in filing export data electronically to the U.S. Government. These are companies without the resources to invest in highly technical, expensive hardware and software to report to AES at Customs. However, companies of any size or number of export shipments can use AES*Direct*.

The system is anchored by a web browser user interface with options for batch filing, off-line keying, and client web integration. The browser interface runs on 2 server clusters running Windows NT. The database runs on 2 UNIX servers, one serving as a backup mirror to the primary. A separate location disaster recovery site mirrors, in a smaller scale, the production site. Telecommunications are provided via frame relay to Customs and ISDN and dial-up for external users.

Data security provided by AES*Direct* meets Federal security requirements as certified by the General Services Administration. After a user registers on-line for the system, they receive a username and password to access the tutorial. Once the user has completed the tutorial and passed the quiz, they are certified to file and have their password set to do so. When data is transmitted between the user and AES*Direct,* it is encrypted ensuring confidentiality. Data stored on the system can only be accessed by using the original filing username and password.

AES*Direct* - Functional Overview

AES*Direct* is designed to capture and edit all data fields from the SED, including mandatory, conditional, and optional data. When SED information is entered interactively into AES*Direct*, an immediate validation of the data is performed. If errors are found, the filer is immediately notified for resolution. AES*Direct* will not allow data with fatal errors to be transmitted to AES at Customs. When AES*Direct* accepts SED data as valid, it is automatically queued for transmission to AES at Customs and is transmitted on an every 5-minute schedule. AES*Direct* uses the official master reference files and tables from the Census Bureau in the data validation process. These same files on AES*Direct* also can be used as look-up tables to locate appropriate codes to use in filing data.

After AES*Direct* transmits data to AES at Customs, AES will respond back to the sender via email as to whether the data were accepted or rejected. Users can also query AES*Direct* about the status of their shipments. AES*Direct* retains a filer's SED data in its secure, password-protected system for up to 5 years. At any time during this period, SEDs can be retrieved by the filer, corrected as necessary, and resent to AES to eventually correct the trade statistics. Filers can also use previously submitted SEDs as templates for new shipments, simply by changing appropriate data fields, the date, and the shipment number and resubmitting. This feature has the potential to save companies time and money associated with rekeying data.

Users may also create reports that can be customized to their preference. These reports, for example, can list all shipments sent today, sent last week, or sent to one foreign party. One can also design a report summarizing shipments by time period or any one of several other characteristics. Even though the AES*Direct* database meets Government document retention regulations, AES*Direct* also provides a method for filers to print shipment data in an easy to read format.

In addition to interactive input, AES*Direct* also provides the capability for filers to upload a batch file from their PC system containing multiple transactions in two different formats. Data submitted in this manner will also be validated, processed, and stored in AES*Direct,* in the same manner as those submitted interactively. Both the ANSI X12 and the Customs Proprietary Format are acceptable formats for batch files.

AES*Direct* Participation

Since its inception, over 7,500 companies have registered for AES*Direct* use. Of those, over 5,700 have reviewed the tutorial, taken the familiarity quiz, and have been certified to file SEDs in AES*Direct*. Over 4,700 of those companies are operational and sending their export data over the Internet. AES*Direct* has now collected over 2 million SEDs and has been averaging nearly 200,000 SEDs a month for the last several months. Over 77 percent of the eligible export transactions are now filed through AES and AES*Direct* now makes up nearly 20 percent of those shipments.

Research, Evaluation, and Review

The FTD is committed to continually improve AES*Direct* to meet the ever-changing needs of U.S. businesses in international trade. This is being accomplished through a structured and

coordinated research and evaluation effort. We have challenged the export trade community and our own staff to make comments and suggestions to improve the system. This research, evaluation, and review is much of the reason for the growing success of AES*Direct*.

The improvement program has revolved around the following major efforts:

- Usability Lab reviews. The FTD met with several members of the Usability Staff of the Census Bureau's Statistical Research Division and requested that an expert review be conducted. Four experts from four different disciplines independently reviewed AESD*irect*, met as a team, and developed a list of usability problems and recommendations to resolve them. Comments and suggestions included ways to improve the tutorial, navigation, use of templates, and screen and field colors and placement.

- User surveys. There are three groups of "users" of AES*Direct:* (1) those who have only registered and may have reviewed the system and the tutorial, (2) those who registered, reviewed the tutorial, passed the quiz, and are certified to file, and (3) those who are certified and also filing. Each group was asked in an electronic questionnaire emailed to them about their status, for example, why they only registered and did not complete the tutorial and quiz or why they have not started to file as yet. In addition to asking about specific aspects of their status, the questionnaires also requested comments and suggestions concerning any portion of the system.

- Post Implementation Review (PIR). Customs has implemented System Development Life Cycle methodology for major system development projects such as AES. One aspect of that process requires a very structured methodology to manage Information Technology (IT) projects. This portion of the process provides continuous management of IT projects through selection, control, and evaluation. The evaluation phase includes a requirement to conduct a PIR. The purpose of the PIR is to determine whether the system meets mission needs, does what it is supposed to do, satisfies users, meets performance measures, and is cost beneficial. Even though the PIR was targeted to evaluate AES, many aspects of AES*Direct* were evaluated to better understand the larger process.

- User and marketing meetings. The FTD has a goal to convert as many paper document filers to electronic reporting as possible. Once converted, we must also continue to support the system's users. The FTD has aggressively conducted over 20 marketing and user meetings throughout the United States. The marketing meetings inform nonfilers about AES, and in particular, AES*Direct,* and attempt to persuade them to convert to electronic filing. The user meetings are to address current issues and problems, discuss system enhancements, and solicit user suggestions for improvements.

- Direct user feedback. Direct user feedback has always been in the offering. Exhibit booths at conferences and trade shows, and the meetings described above have provided ample audience and format for such give and take. However, the FTD has implemented several innovative methods to enhance user input; this includes such things as assigning customer service representatives to every system user and creation of an email address for AES*Direct* related questions or comments.

Results of Continuous Research, Review, and Improvement

- Full electronic support. Since the tool, AES*Direct,* is for electronic data collection, the FTD has worked diligently to ensure that all interaction with users can and will be on-line including such things as help, questions and answers, registration forms, reference materials and files for look-up, data editing messages, development specifications, etc.

- Usability enhancements. The panel of experts recommended several relevant improvements that have been incorporated. These include: replace the tutorial requiring downloaded software with simple HTML pages, improve navigation in the tutorial and throughout the system, be consistent with explanatory information, improve the controlling methodology of the quiz?indicate which questions were wrong and go back only to those, improve the use of templates and the code look-up features, and improve the color and layout of several screens.

- Evaluation forms. At all meetings with the trade community, we have made it standard practice to distribute and request response to meeting/system evaluation forms. Questions such as the following are asked: did the meeting meet your expectations, what was good, what needed improvement, any system recommendations, any changes needed?

- Email address ASKAES. As part of the effort to make communicating with client support staff easy, we implemented an easy to remember email address for all correspondence. Users simply send material to <askaes@census.gov>. This mailbox is reviewed several times daily with mail distributed to appropriate staff for response.

- AES*WebLink.* This major enhancement enables Internet developers to pass data from their Internet applications directly into AES*Direct.* For example, data from a courier's bill of lading created on-line by a user is extracted by the courier's software and transmitted to AES*Direct* to populate the SED. This will make it easier for end users to enter data into AES*Direct* and eliminate double entry of data. The AES*WebLink* is a plug-in capability for sharing information between AES*Direct* certified Internet applications and AES*Direct,* streamlining electronic export data capture and information flow, and reducing the burden of data entry even further.

- Enhancements to the tutorial. The tutorial was dramatically changed based upon user feedback and the usability review. The tutorial does not now require downloading software to view it. The tutorial is now a tour of the relevant sections of AES*Direct* and since written in HTML can be quickly followed either on the web site or from a separately distributed CD-ROM.

- Users Guide. Even though AES*Direct* can be understood from extensive on-line information, we have developed a users guide to provide back-up information, step-by-step instructions, and handy guides as to what to do in all situations.

- Spanish version of the Users Guide. Many of our customers for AES*Direct* conduct business on the southern border and in primarily Spanish-speaking areas of the country. To ease their fears and improve their understanding of the system, we have translated the users guide into

Spanish. Official submissions of data in AES*Direct*, the SED, and associated legal documents are still required in English.

- AES*PCLink.* This major enhancement alleviates additional concerns some users have expressed about on-line Internet access being expensive and service being unpredictable in many areas. Others have expressed a concern about the additional cost of phone lines just for AES*Direct.* The AES*PCLink* is a data keying system installed on a user's desktop PC as either downloaded from AES*Direct* or installed from a CD-ROM. It is similar in look, feel, and functionality to AES*Direct.* However, it is off-line. Whenever a user wants to transmit data to or receive messages from AES*Direct*, the user establishes their Internet connection.

- Hands-on workshops. Even though AES*Direct* use is shown and explained in a tour of the web site, some potential users have reservations about using it without assistance. The FTD established hands-on workshops for potential new users to visit a computer lab in their city and be trained using the system. At the end of the workshop, attendees will have first-hand knowledge and will be certified to begin using AES*Direct.*

- Customer support. From the inception of AES and AES*Direct,* we have made a commitment to support the users of the system. We have created a branch with customer service representatives or client reps. When a company registers for AES*Direct*, they are assigned a client rep who will help them at any time with data, filing, or technical questions or problems.

- Developers' Center. In keeping with the theme that all interactions should be electronic, we have embellished the AES*Direct* web site with extensive general and technical information for any company to use, develop, and implement any aspect of the system. For example, the technical details to implement AES*WebLink* including data definitions, plug-in specifications, exception handling, and telecommunications are documented.

- Use of AES*Direct* in FTD. Several areas of the FTD are responsible for resolving data errors and discrepancies from illegible documents or for inputting data as received for export shipments from other Federal agencies. Instead of correcting or completing paper documents, the FTD staff, based upon their own suggestion, simply key data directly into AES*Direct* as any other user.

- Video News Release (VNR). To enhance our marketing efforts, we contracted for and developed a VNR. The staff of the FTD present AES*Direct* information such as reasons to use it, how to access, benefits, goals, how to contact us, etc. in a 5-minute video. In addition, the president of the National Customhouse Brokers and Freight Forwarders Association provides introductory comments. The VNR is mailed to prospects, distributed at meetings, or played during marketing meetings to entice paper filers to use the system.

- Customs proprietary format for batch. When AES*Direct* was first implemented, it would only accept batch files in the ANSI X12 format. To provide additional filing options for AES users, we added the Customs format. Now all AES batch users have a backup Internet site to file their shipment data when problems with telecommunications arise. Companies

may also decide to use the batch capabilities of AES*Direct* when communications upgrades to AES are imminent.

- Archive service. Shippers are legally required to retain and have access to documentation concerning each and every shipment for 5 years. Current year shipments are already on-line in AES*Direct* for easy access to use as templates. Shipments for the previous 4 years are now available in the archive to reference, print, or include in reports, meeting the legal record retention requirement. Users do not have to create their own system to meet this requirement.

- Status lights for SED sections. The AES*Direct* menu screens are now color coded for easy reference as to whether the section is complete and correct (colored green), whether there are warnings to investigate (yellow), or whether error conditions exist (red). Optional or conditional document sections are no longer displayed in the color-coded menu area so as not to confuse users as to full document status.

- Templates. A user has the option to retrieve a previously submitted shipment and modify it as appropriate and resubmit it as a new shipment. This is quite useful in an environment, such as international trade, where there are existing business relationships and repetitive types of shipments. We have now enhanced this feature to include the ability to create, store, and retrieve up to 10 user created templates. Prior shipments may not always be appropriate to use as a template.

Recognition

Former Commerce Secretary William Daley praised AES*Direct* in a press release as "…an effort to make government more efficient and boost U.S. exports." The following is a sampling of quotes from satisfied trade industry users of the system.

> "AES*Direct* is very easy to use over 99% of the time. In turn, it saves me time by not having to worry about presenting the paper SED to the carrier. I know that the carriers appreciate this service as well."

> "It's clean, efficient, and gives the opportunity for correct data collection to satisfy Government requirements… with the links and lookups, correct SEDs are quickly filed. "

> "Thumbs up to AES*Direct*. I have found the system to be very user friendly even when I can't remember all of the steps…"

AES*Direct* has also received several awards for the innovative application of Internet technology to daily, real world business and Government interactions.

- In the spring of 2000 AES*Direct* was awarded the Census Bureau's Director's Award for Innovation for "…developing an innovative approach to collect export documentation over the Internet. It creates an opportunity for all business, small and large, to participate in an e-commerce government program."

- Along with the AES, AES*Direct* received recognition by receiving a Hammer Award from former Vice President Gore's National Partnership for Reinventing Government. AES and AES*Direct* "…are being recognized for reinventing the process of export shipment reporting by replacing paper documents and manual procedures with streamlined procedures, electronic data transmissions, and e-commerce."

- AES*Direct* received an honorable mention in the Government Executive Magazine's 2000 Innovations in American Government award program. As cited, "…AES*Direct* is a cutting edge use of the Internet by a government agency…and makes a break in traditional use of the Internet."

- AES*Direct* also received an honorable mention in the E-Government 2001 program when recognized as "AES*Direct* is an innovative and progressive use of the Internet by a Federal agency. It creates an opportunity for all businesses to participate in e-commerce and e-government and provides a new strategy to integrate their programs with the fast growing Internet solutions."

Lessons Learned

Nothing earth shattering here except a verification that system, project, and business management methodologies do work. We have a long-term commitment to provide a service to the export trade community. We must be good listeners and be responsive to invigorate, to capture the market, to continue to meet the requirements of the ever-changing international trade environment, and meet our statistical mission.

There are four areas that we think critical to this effort and in which we are committed to excel. Focus and determination in these areas will ensure continued use of AES*Direct*. This includes:

- Customer support. It must be continuous, honest, 2-way and be delivered in many manners such as by phone, email, company visits, attending conferences, staffing trade booths, conducting meetings, and personal follow-up.

- Commitment to improvement. The international trade business environment and technology will change?we accept this as an axiom. We will continue to enhance and improve the processes and the system to meet new and expanding requirements and conditions. Improvements will ensure that our customers will use the system to meet their needs.

- Processes for research, review, and evaluation. A structured and repeatable process to conduct research and evaluation is a must. One must create methods for user interaction that bring customers close to system operators. We will continue to conduct user meetings, customer satisfaction surveys, and evaluations of all that we do.

- Listening for recommendations from all audiences. Ideas come from all areas. One must be open and receptive and actually listen to hear the best. Recommendations and ideas for enhancements and improvements come from users, managers, supervisors, customers, developers, support staff, contractors; any interaction.