

US Air Force Has New IDEAS For Information Delivery

1. INTRODUCTION

Members of the Plans and Analysis Division (DPSA) were fielding about 9,000 ad hoc requests for personnel data each year. The analysts and data retrieval experts could not keep up with the demand, even by putting in many overtime hours. Ad hoc requesters often had to wait for days or weeks for DPSA to respond to a particular request.

These requests would come from the highest levels of Air Force leadership including the Air Force Commander and Director of Personnel all the way down to squadron level commanders and even Air Force Institute of Technology students. In addition, requests would come from publications such as the Air Force Times and Airman Magazine, public and private groups, for and not for profit organizations, and even from private citizens under of the Freedom Information Act. Once a request was received and understood, a query had to be coded, the program run, and the results returned to the customer.

In addition to ad hoc requests, many recurring reports were generated at regular intervals. While these weren't as time consuming as ad hoc requests because their code was already written, they were still a drain on resources. This paper will show how extensive this problem was and how it was overcome using new internet based technology.

2. OLD PROCESS PROBLEMS

Requests for demographic personnel data came via phone calls, e-mails, and formal administrative channels. While an ad hoc data question may seem straightforward and easy to accomplish, a single request often generates a great amount of activity. Phone call requests were problematic in that each call interrupted the person who answered the phone (no secretaries are assigned) and it also interrupted the action officer who ultimately had to work the request. Problems also accompanied written requests which generated formal taskings, suspenses, and a cycle of administrative reviews. Because requests for information overwhelmed resources, it often took weeks for some customers to get data, and in many cases, customers were turned away. Prior to the improvement, data requests were handled one at a time. Well over 10 people at the Air Force Personnel Center (AFPC) (action officers, branch chief, division chief, director, multiple division level administrative personnel, front office administrative personnel, executive officers, AFPC Deputy Commander, and AFPC Commander) might get involved in processing a single data request. Multiply this times thousands of requests per year, and the problem was overwhelming. Figure 1 graphically displays a typical request.

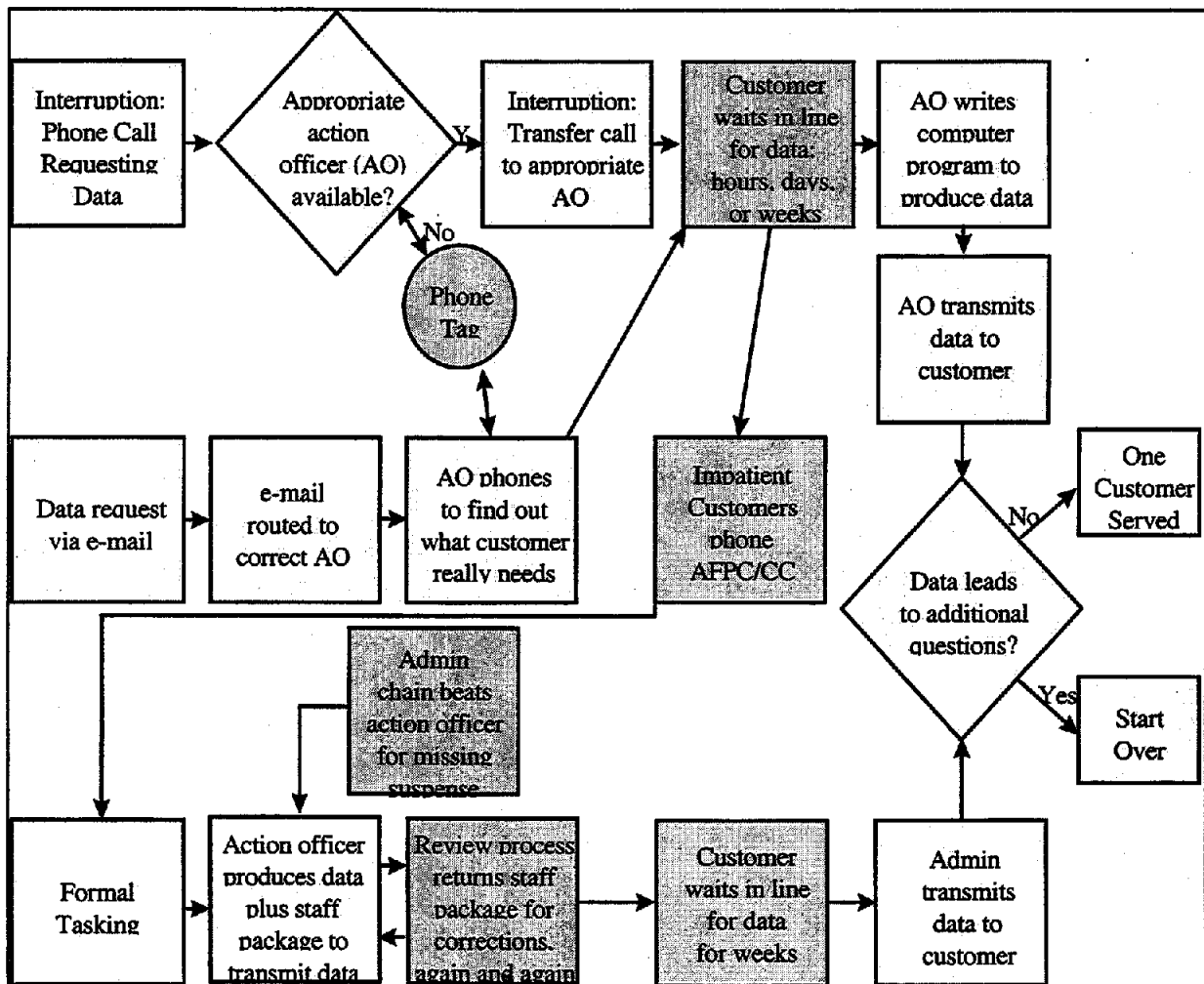


Figure 1 Old Process

Round The Clock Data Access

The process problem is compounded by the global nature of the U.S. Air Force. Customers in Europe, the Pacific, and places in between had to wait until AFPC's duty hours before calling or they had to work their request through e-mail or formal taskings that would be processed through various time consuming levels of command both to DPSA and back to the customer.

Frequently, weekends were just two more workdays as far as data retrieval goes. On a Sunday afternoon, a member of the Headquarters Air Force Personnel Issues Team at the Pentagon might want to know how many Hispanic entry skill level personnel there are in the AF with a bachelors degree to prepare for a briefing on Monday morning. Consequently, someone from the data retrieval shop would get a phone call and have to come to work, code the request, run it, and ship the results back. Friday afternoons were also prime for hot data retrieval projects that needed to be completed with enough time left to prepare a briefing for Monday.

Process Descriptions

Operations research analysts, also saddled with frequent demographic questions, were not able to devote their time to the more important proactive work of optimization, simulation, and forecasting. As shown in Figure 1, just the coordination of a project can be extremely time consuming. Add to that the time it took an analyst to translate the problem into code (which can take hours), run the job, and ship out the results and a single request can take days to accomplish.

Demographic Definitions

A standard set of demographic definitions did not exist. This caused inconsistencies and friction among data retrieval groups at various echelons within the Air Force. (For example: if one's marital status is single, does that mean...never married? divorced? annulled?) Time consuming deliberations to reconcile data frequently resulted when one group's numbers didn't match another's.

Multiple Retrieval Tools

Multiple retrieval tools and different coding procedures also created conflicting results. The Air Force doesn't have a standard retrieval tool. Consequently, an analyst in another directorate within AFPC may code a particular problem using one retrieval tool, while an analyst in the Data Retrieval Section may use another. The different approaches frequently did cause conflicting results. Even when the retrieval tools were the same, different coding techniques still created different results when inconsistent assumptions were made.

Defined Questions

Often, those requesting data didn't really understand what they needed until they received the results of their query. This led to more questions and frustration on both sides.

Phone calls were the best way to conduct business since the customer and the analysts could discuss the issue and work at clarifying misunderstandings. E-mail and formal taskings either required the programmers to make assumptions when the request was less than clear, or call the customer for clarification. Either way, when attempting to turn a data request into code, the programmers needed constant communication with the customer to help ensure the problem was understood and the solution was appropriate.

3. NEW PROCESS (IDEAS)

The answer to these problems is AFPC's Interactive Demographic Analysis System (IDEAS). This application resides on the AFPC World Wide Web (See <http://www.afpc.randolph.af.mil>, select "Personnel Statistics", then "IDEAS"). Anyone in the world with Internet access can now get an incredible volume of AF personnel demographic information with a few clicks of a mouse...no programming skills needed! The unique feature of this application is that no one needs to anticipate all possible questions and build countless numbers of standard reports. In this

application, the user indicates from a menu the data of interest and the software hits a database to retrieve it. At the present time, there are about **100,000,000** demographic cuts of the database that users can request! For example, a member of the media might want to know how many female fighter pilots there are in the AF who were ever promoted ahead of their contemporaries. Under the old process, it might have taken 3 or 4 weeks to get this data by requesting it under the Freedom of Information Act. Now, the data is available in a matter of seconds! No waiting, no call-backs, no phone tag, no paperwork, no cost, an immediately satisfied customer, and no administrative hassle for members of AFPC! An immediate answer is available 24 hours a day. Figure 2, shows that the process is now streamlined. Notice that nobody in AFPC touches the data request!

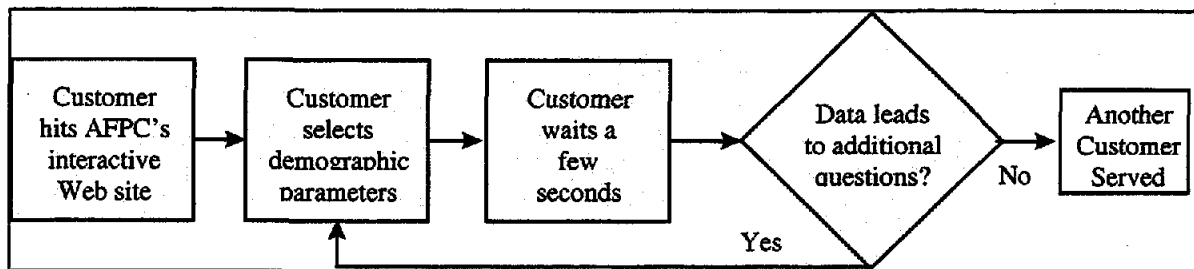


Figure 2 New process

Interactive Demographics Analysis System

Here's how it works.... A customer, anywhere in the world, anytime, day or night accesses AFPC's Home Page, then selects "Personnel Statistics" followed by "IDEAS" to get the Interactive Demographics Analysis System web page shown in Figure 3.

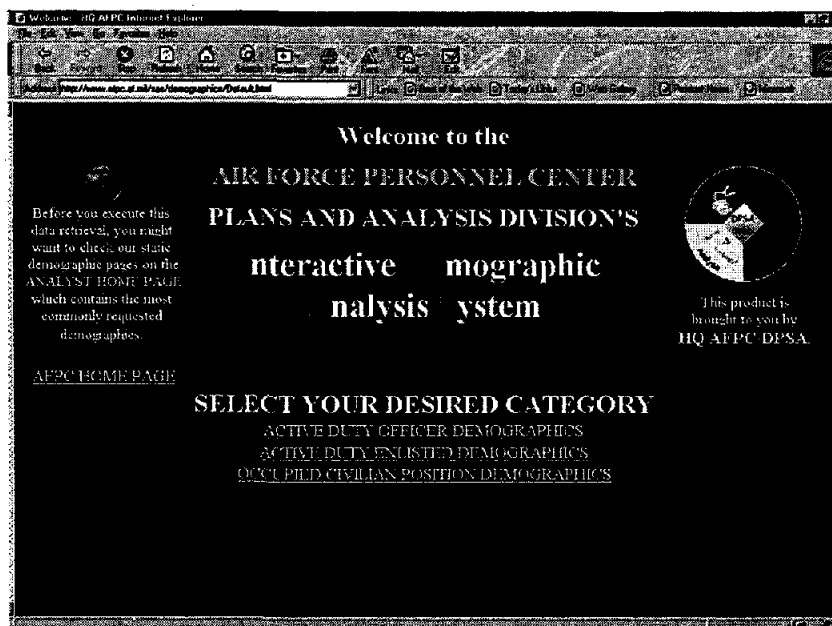


Figure 3 IDEAS Welcome Page

Displayed on the IDEAS Welcome Page is a category selection list of available databases. The

customer selects either Active Duty Officer Demographics, Active Duty Enlisted Demographics, or Civilian Position Demographics by simply clicking on the label. Additionally, links are available to send the customer back to either AFPC's Home Page or the Analyst Home Page containing links to other statistical demographic information.

Basically what happens when the customer clicks on Active Duty Officer Demographics, for example, is a request goes back to AFPC's server to display the form the customer needs to request specific tabulated formats of data as shown in Figure 4.

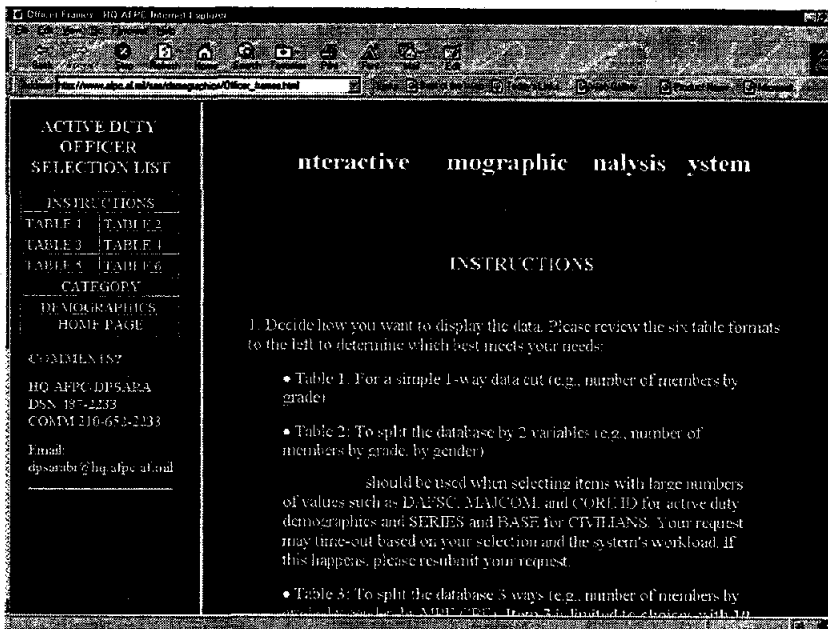


Figure 4 Selection List and Instructions

The left side of the page contains links to the instruction page (initially displayed), all of the forms needed to request tabulated data (Table formats 1 through 6), a link to the list of demographic categories and a link back to the IDEAS home page. The Selection List remains displayed so the customer can easily switch among the different table format options.

When a table is selected by simply clicking on the label (we'll use Table 4 for this example), a diagram of the table format is displayed along with one to four drop down menus for the rows and/or column as shown in Figure 5. The table options are:

1. Table 1—One row item
2. Table 2—Two cross tabulated row items
3. Table 3—Three cross tabulated row items
4. Table 4—One row item and one column item cross tabulated
5. Table 5—Two row items and one column item cross tabulated
6. Table 6—Three row items and one column item cross tabulated

ACTIVE DUTY OFFICER SELECTION LIST

INSTRUCTIONS
 TABLE 1 | TABLE 2
 TABLE 3 | TABLE 4
 TABLE 5 | TABLE 6
 CATEGORY
 DEMOGRAPHICS
 HOME PAGE

COMMENTS:
 HQ AFPC/DPSARA
 DSN 487-2233
 COMM 210-651-2233
 Email:
dpsarab@hq.afpc.af.mil

TABLE 4--SELECT ROW AND COLUMN ITEMS

Item 1	Item 2	Item 3	Item 4	TOTAL
ITEM 1	100	100	100	300
ITEM 1	100	100	100	300
ITEM 1	100	100	100	300
ITEM 1	100	100	100	300
ITEM 1	100	100	100	300
ITEM 1	100	100	100	300
ITEM 1	100	100	100	300
TOTAL	600	600	600	1800

DATABASE: CURRENT

STATISTIC:
☐ Numbers
☒ Numbers & Percent

OUTPUT:
☐ View
☒ View & Save

Figure 5 Table 4 Format

At this point, the customer selects the following:

1. Row item—a list of 36 officer, 32 enlisted, or 22 civilian demographic variables
2. Column item—a list of 25 officer, 23 enlisted, or 10 civilian demographic variables
3. Database—current data (default) or historical fiscal year snapshots back to 1994
4. Statistic—either straight numbers (default) or numbers with associated percentages
5. Output—view the table in formatted tables (default) or view the table in a format which allows cut and paste or allows the file to be saved for importing into an application such as a spreadsheet or word processor

Demographic variables for column items and row three items (for those tables that have them) are limited to those variables having 10 or fewer values. This was done to limit the size of the resulting tables. This is also why Table 6 format has its output forced to “View & Save”. Formatting the output to be visually appealing takes a lot of storage and consequently, a lot of time to travel across the internet.

Once the row and column items are selected and the customer presses “Submit”, the request is sent to one AFPC server, then the options are sent to another server to process the request. The databases the program accesses are subsets of the complete personnel files located on yet another computer. The internet databases only contain those variables listed in the drop down menus. This serves two purposes: first, the database is kept small to reduce access time, and second, security is ensured since there is no other personnel information like names and social security numbers to be compromised.

Actual processing time on the second server is very short. In the case of officers, grade by gender, shown in Figure 6, the process took 4.84 seconds (the database contains about 75,000 officer records). Actual time between pressing the “Submit” button and getting the results back

vary depending on internet activity and distance.

OFFICER EXTRACT - MAY 1998	GENDER		TOTAL
	MEN	WOMEN	
	#	#	#
GRADE			
2LT	4,844	1,256	6,100
1LT	7,035	1,844	8,879
CPT	22,116	4,960	27,076
MAJ	13,593	2,316	15,909
LTC	9,209	1,291	10,500
COL	3,654	271	3,925
TOTAL	60,431	11,938	72,369

This request took 4.84 seconds of real time

Figure 6 Results

Compare this 4.84 seconds processing time plus transmission time to picking up the phone, calling AFPC, explaining a request to an analyst, and waiting for the code to be written, run and the results returned, one can see the benefits of this application.

4. IDEAS—THE SYSTEM

IDEAS consists of two main software components, the Graphical User Interface (GUI) written in HyperText Markup Language (HTML) and available on all internet browsers, and a data retrieval software tool. HTML is used to create the forms the customer fills out before pressing the "Submit" button. The information is sent over the internet to a Common Gateway Interface (CGI) program that passes the information on to another computer and the data retrieval program that accepts the table number, demographic variable(s), statistic and output types. Once the data is extracted from the database and formatted to the customers specifications, the table is passed back through the internet to the requesting browser and displayed. Total software cost: \$10,000.

The hardware consists of two servers. The first, belonging to AFPC provides a gateway for the server that processes the request. This processing server has dual 200MHz Intel processors, 256 Mb RAM and nine 4.3 GB hard drives costing \$46,000.

Two active duty Air Force Technical Sergeants worked for two months on the project. One, a computer operator helped set up the hardware and installed the software while the other, a computer programmer, coded the GUI and data extraction and formatting programs.

5. BENEFITS

In addition to streamlining the process, the following are additional benefits of IDEAS:

1. Highly paid analysts are free to do analysis—phone call requests have decreased by an estimated 80%.
2. Access to demographic data is available to anyone, 24 hours a day, 7 days a week.
3. Follow-up questions can be immediately formulated and submitted.
4. Data massaging is avoided since everyone has access to the data.
5. Paperless environment—numbers can be taken directly from the output and placed into digital reports.
6. IDEAS data definitions became the Air Force standard by virtue of its global access. Customers can ask questions directly with developers through an e-mail link.
7. The output is application independent—tables can be imported into applications like spreadsheets and word processors.
8. Field units, which employ about 500 programmers to retrieve personnel data, may be able to reevaluate their employee requirements.

6. SUMMARY

For \$56,000 and 2-months development time by two people, IDEAS has paid for itself many times over. Not only is it of great worth to the Data Retrieval Office, but it has also become a model for about 20 other similar internet applications currently under development. IDEAS has evolved over the past few months to include civilian data and historical data for officers and enlisted. In the future I will include Air Force Reserve and Air National Guard data—giving commanders and other decision makers access on demand to Total Force data and information.

Biography

Mr Eddie Stevens, recently retired from the US Air Force as a Master Sergeant is now a SAS employee. He built IDEAS in 1998 while assigned to the AF Personnel Center, Randolph Air Force Base Texas. His design, development and deployment of this personnel data tool has been recognized as the first web-enabled personnel application for the U.S. Air Force. Eddie Stevens holds a M.A. degree in Education from Boston University and a B.S. degree in Business Administration and Management from the University of Maryland.

Major Mary Crissey, operations research analyst at Randolph Air Force Base Texas, has seen first hand the impacts of deploying this web enabled personnel application for the U.S. Air Force. She began her military career on a 4 year ROTC scholarship in Math at Univ of WA in Seattle . Other Air Force assignments include tours at the Pentagon, Associate Professor Faculty at the University of Washington and research scientist at nuclear weapons laboratory in Albuquerque, New Mexico. She has over 12 years experience with SAS and has presented at 2 National SUGIs (one in Hawaii and one in Nashville). She has a Masters degree in Oeprations Research from the Univ of Maryland. Mary was a section Chair for the PNWSUG 1996 while she was on faculty at the University of Washington. Currently she is the president of the local chapter of INFORMS , an information and operations research society.