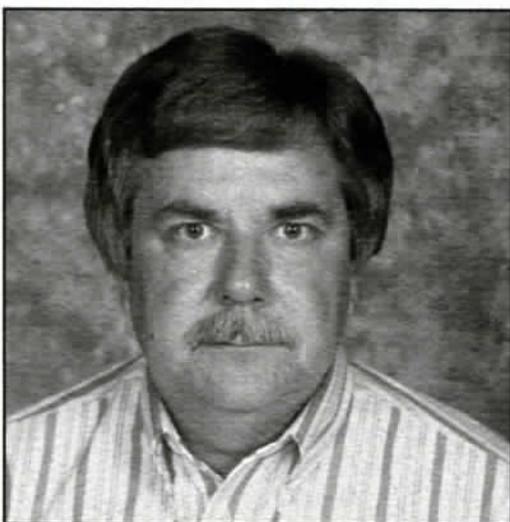


In Memoriam Dick Heinemann



Long-time EROS employee, Dick Heinemann, passed away July 14th at his home in Valley Springs after battling cancer for 15 months. He celebrated his 50th birthday July 7th. Dick began work at EDC in November 1979 as an Electronic Engineer. Most recently, he served as a Principal Systems Engineer. Over much of his time at EDC, Dick applied his mathematical and engineering skills to become expert in satellite ground systems engineering and flight dynamics. On his own time, Dick wrote a satellite orbit-modeling program which is still used by EDC staff. Dick worked on many crucial EDC projects over the past 20 years including AVHRR and Landsat 7. Dick's dedication, ingenuity, and friendship will be missed. ☹

EDC Launches New Era with Landsat 7

by Ron Beck

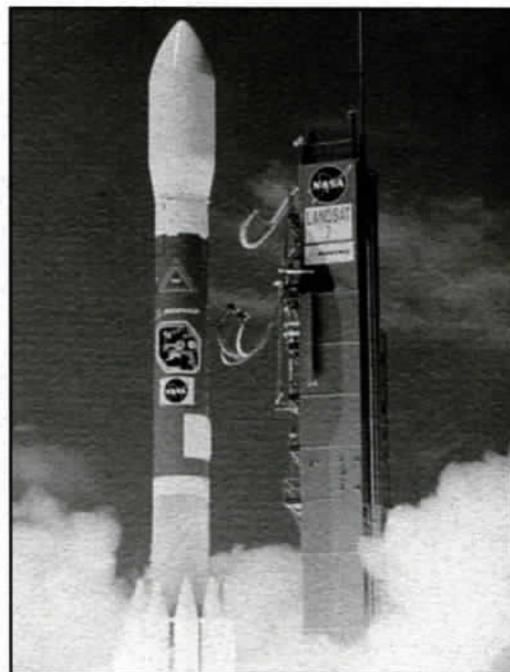
On Thursday, April 15, with ideal weather conditions, a large crowd gathered at Vandenberg Air Force Base in California to watch the launch of Landsat 7. Three days later, over 70 EDC employees spent their Sunday at the EDC as the first signals from the satellite were processed to create the Landsat imagery familiar to a community of scientists, resource managers and educators around the world. When the first scene, which included southeastern South Dakota, was collected and processed, the Center, for the first time, had direct reception with the Landsat series of earth observing satellites. Finally, the original rationale for locating the Center in the middle of the continental U.S. was achieved.

As of this writing, all systems are meeting the most optimistic expectations. Over 3000 test engineering scenes have been acquired. Spectacular views of San Francisco, active volcanos in Alaska and Mexico, and dike systems in Holland have been observed. As the science community previews the early scenes, demands for timely data are growing.

The first 75 days after launch constitute an extensive testing and evaluation period. That testing includes a 5 day underfly of Landsat 5,

during which calibration adjustments are made and communication links with established

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Landsat 7 is launched April 15, 1999 aboard a Delta II rocket at Vandenberg Air Force Base, California.



UP FRONT

Two benchmark dates have been added to the history book on the EROS

Data Center: April 15, 1999 and April 18, 1999. On April 15, Landsat 7 was successfully launched from Vandenberg Air Force Base in California, and on April 18, the first data were sent from the orbiting spacecraft to the principal receiving antenna here at our Center.

In mid July, a third date of significance will be added when the USGS responsibility for Landsat processing becomes fully operational and we "open the doors" to public demand for Landsat 7 data.

It is truly an exciting time in the history of the Center. Many people have been working and hoping for years for this to

all come about. (The original reason for locating the Center near Sioux Falls was to collect Landsat signals directly from the spacecraft as it acquired data over any spot in the conterminous United States; now we finally achieved that with Landsat 7.) The addition to the original building was possible in part because of a commitment to Landsat 7. Much of the growth in numbers of employees the past few years was driven by a need to get ready for these responsibilities. And, now, the pressure to deliver is here.

The challenge was a long time coming and many "battles" needed to be won. We can go back to the early leaders at the Sioux Falls Development Foundation, including Al Schock, Dave Stenseth, and Russ Pohl, visionaries who have always supported us. We can reflect on the far thinking of Glenn Landis and Al Watkins, my predecessors who established a base organization ready for new responsibilities. And, we can

congratulate R.J. Thompson, who in 1991 proposed to me and the other members of our Senior Staff that we should "recapture" our Landsat responsibilities and charge ahead with planning and imaginative thinking.

All of these leaders were important. Equally significant, however, is the well deserved track record the Center staff has for performance. NASA turned to the Center for Landsat 7 responsibility largely because we have a reputation for getting the work done. I have written this before and it is worth repeating...the workforce at the EROS Data Center has a collective reputation for success. It is largely due to your efforts, creativity, and responsiveness that we now enter this historic new chapter in the evolution of the Center...the Landsat 7 era.

Donald T. Lauer

Landsat 7

Continued from page 1

international ground stations are evaluated.

In July the system will become 'fully operational' and users from around the world will be able to order digital products from Landsat 7 through the EROS Data Center. Data will be acquired for the EDC facility through direct transmission, transfer from antennas in Norway and Alaska, and by storage and later transmission via solid state recorders aboard the satellite. Potentially, 250 scenes per day will be collected. Additionally, data will be acquired by a growing list of ground stations in foreign sites. The total will provide scientists an unprecedented source of data of the planet.

Finally, early August will mark the formal dedication of the USGS EROS Data Center responsibility for Landsat 7. In ceremonies at the Center, representatives from the USGS and NASA will officially transfer many of the operational responsibilities for Landsat 7 from NASA to the USGS and the EROS Data Center. ☺

EDC Travel, Never a Dull Moment!

In the 25 years the EROS Data Center has been in existence, many of our employees have traveled all over the world on EDC business. What follows are some funny, frightening, and arguably, very interesting "travel stories."



Don Lauer

In my 24 years at EDC, I have been involved in only one traffic accident while on official travel orders. It occurred in China in 1991.

Three colleagues, three of our Chinese hosts, and I had left Beijing and were visiting a Provincial Mapping Office in the remote city of Xining in west central China. We decided to take an all-day excursion to Qinghai Lake out on the Tibetan Plateau. As we sped down a narrow, bumpy road and through a large herd of yak being tended by Tibetan horsemen, one of the animals bolted in front of our van. There was a tremendous crash, the yak was killed instantly and the front of the van was crushed--luckily, nobody was hurt. The van was drivable, but we couldn't move because we were surrounded by angry Tibetan horsemen

who could speak neither English nor Chinese and only Tibetan (which nobody in our van could speak). Our Chinese driver wanted compensation for the damage to the van and the Tibetans wanted the same for the animal we killed. After some tense, non-communicative arguing, we paid and then quietly drove away from the scene of what is now often referred to as the "Yakcident."



Brian Berg:

I was on travel at NASA's Jet Propulsion Lab (JPL) for Sir-C training and was flying out of LAX in Los Angeles. I had purchased a water gun that, as I

remember, was green and pink or green and red or some sort of bright colors, for my son, Jake. As I passed through the metal detector/x-ray area, I was detained and had my luggage searched as LAX security thought the colored water gun was real. Keep in mind that the water gun was still in its package! After security determined it was indeed a water gun they said I would not be able to take it onto the

Continued on page 3

EDC Travel*Continued from page 2*

aircraft and that it must be checked. Naturally (did I mention that I was at LAX) I didn't have time to check in the water gun and was forced to leave it behind. You should have seen the look on Jake's face when I told him about the water gun that wasn't!

**John LaVergne:**

During my travels to Africa, I had less-than-great luck with my luggage. At one point, I was 3-for-8 in having my luggage arrive with me (in 5-of-8 trips I got my luggage anywhere from 4 days to 10 weeks later). On one of the trips where no luggage arrived, I was, I thought, fortunate because another EDC employee (Tom Bodoh) was coming over the following week. Having faith in my fellow software programmers, I called EDC to ask that Tom bring me some essentials, including some underwear. Well, Tom arrived the next week, took me aside and told me that the "underwear instructions" had been forwarded to him. He then handed me a three-pack of boys' Teenage-Mutant-Ninja-Turtle underwear. Needless to say, I was only slightly amused by this. Later in the day, however, Tom did admit that it was only a joke, and that he did indeed have some clean shorts for me. That night he presented me with a three-pack of men's Fruit-of-the-Loom underwear that my dear friend (Doug Hollaren) had purchased for me. Not only had Doug bought them, he had brought them along to a Software Development staff lunch, where all had a chance to play with them. They were passed around the table, and several witty sayings such as "You've seen London, you've seen France, but we've all seen your underpants"... "Anything over 40 lbs, lower by rope"... "Mary was here", etc. were written on them. A big red target was drawn on the back of one, red bows were sewn on another, the fly was sewn shut on one, the legs on another (I suspected the fly trick; but almost killed myself putting on the one with the legs sewn shut)! So, my fellow programmers came through for me, in a manner of speaking. I gave the Teenage Mutant-Ninja-Turtle underwear to some of the local kids, who were most happy to have them, although I'm sure they had no idea who the Turtles are, and my highly-decorated briefs worked just fine. ☺

EROS Facilities Update

by Jim Sturdevant and Gary Dinkel

If you have visited other Federal Agencies, you already know that the facilities of the U.S. Geological Survey (USGS) EROS Data Center are special. EROS Staff work in one of the most beautiful and functional government buildings around. The main building is nestled on 318 acres of prairie, complete with agricultural areas, wood lots, wetlands, and a lake. We take great pride in our facilities, just as we do in our workforce and mission.

So...why don't we fix that leaky roof? Doesn't management see that my Department is overcrowded? Why can't somebody repave the visitor's parking lot? When will additional parking be constructed? Are these problems the results of poor planning? Did some facilities funding fall through? What's the story?

Well, here's our story, and we're sticking to it.

The story starts with our programs. The USGS EROS Data Center has aggressively taken on new and rapidly growing programs. These programs have tremendous impact on all aspects of our facility. A few of these programs are:

- National Satellite Data Archive - Congressional mandate to preserve the Nation's civilian remotely sensed data; archive population occurs around the clock; volume will grow over 10 fold in 5 years.
- Landsat 7 - New responsibilities for program management and operations.
- Land Processes Distributed Active Archive Center for NASA's Earth System Enterprise - Even more satellite data management and operations functions.
- Data Sales - Growing demand for earth science data; sales tripled in last 4 years.
- Emergency Response - New responsibility as Executive Agent for the Federal Emergency Management Agency.
- Applications Research - Dynamic programs demonstrating societal relevance through partnerships with dozens of international and domestic organizations.
- National Civil Applications Program - New responsibility as the National Mapping Division's archive for classified assets.

Continued on page 4*Aerial view of the EDC grounds and facilities.*

Facilities Update Continued from page 3

These and other programs have led to unprecedented staff increases. Over half of our staff have been hired in the past 3 years. Current staff numbers exceed the capacity of finished areas. Current parking demand exceeds capacity by 50 percent. Real-time satellite data operations responsibilities require new back-up power and protection systems. Additional conditioned and specialized archive areas are needed.

Another chapter of our story includes some facility facts and figures. The 1999 operating budget for Facilities Management is about \$4 million. The original EROS building is over 25 years old (constructed in 1972-73). The building addition was completed in 1996. The main building consists of 230,000 square feet of finished space, plus 80,000 square feet of mechanical and crawl space, and 50,000 square feet of unfinished basement space in the new addition. The main building includes three computer rooms, two conditioned archives, and perhaps the largest photographic laboratory in the civilian government. EROS also includes three outbuildings and a waste water-treatment facility. EROS facilities and its facility systems are as expansive and diverse as those of a small town.

Chapter three is about the building addition. The expansion project was designed to be a \$13 million addition. Just before construction was to begin in 1994, Congress reduced funding to \$9 million. We could have decided to shrink the building, and complete all of its components. But instead, based on anticipated growth, we decided to keep the building at its fully designed size and eliminate some major components. Scratched from the plan were parking areas, access road to rear of building, terracing, a finished basement, cafeteria, and major mechanical and electrical systems.

One little chapter is about the great hail storm of 1997. Baseball and softball sized hail caused over \$1 million in damage on a stormy Sunday afternoon in July. Without a means to obtain emergency funding for repairs, funds were redirected from programs to fix some items, including the atrium roof.

However, many items remain to be fixed, including the roof over the rest of the building and rooftop air conditioning units.

The story is not complete without a chapter on how our facility is administered. Most federal buildings are owned and maintained by the U.S. General Services Administration. Federal agencies lease their facilities from GSA, and GSA maintains their facilities. But EROS is owned by the USGS. Total responsibility for all facility operations and maintenance is delegated down to the Data Center. This arrangement gives us flexibility and control, and we wouldn't change it. However, the source of funds for our facility is the EDC operating budget. Upgrading and repairing facilities are balanced with staffing increases and other program issues. A recent positive development in facility administration, however, is the higher degree of attention the issue is receiving from the highest levels of the USGS. The USGS Policy Council, the highest governing body in the USGS, is developing a major Congressional funding initiative for USGS facility improvements in fiscal year 2001. Several of our facility needs are part of this initiative.

New and growing programs, aging facilities, unfinished building addition, hail damage, and difficult priority issues. Certainly the Data Center's major facility requirements can seem overwhelming. The required facility repairs, replacements, and improvements have a total price tag of over \$7 million. Is the situation hopeless? Certainly not. The final chapter of our story is one of hope (and planning and processes).

Facility management processes at the EROS Data Center have been improved, and here's how:

- The key to facility improvements is a Working Capital Fund (WCF), which is basically a savings account, regularly funded and reserved only for the facility. A facility WCF was started at the Center last year. Funds can be drawn from the account starting next year. A facility 5-year capital improvement plan was developed last year. It serves as a guide for decision-making. Major construction projects, as

well as routine maintenance items, are now on a schedule.

- Regular and professional facility needs assessments help determine priorities.
- A strong emphasis has been placed on preventative maintenance of facility systems. Small problems are identified and repaired before they become big problems.
- New and professional facility management software tools are being used.
- An active Safety Committee and an active Facility Infrastructure Committee help identify needs and set priorities.

In spite of these improvements, there is no one-time, fast-and-easy solution to the Data Center's facility problems. A variety of solutions and many funding sources are being pursued. Progress is being made. This year, a few of the facility improvements are:

- Complete new cafeteria.
- Renovate dissemination. Begin designing a new parking lot, old cafeteria renovation, and basement collateral facility.
- Replace 26-year old uninterruptible power supply. Replace photo lab floor.
- Repair chillers, sewer line, and fire alarm system.
- Begin designing the replacement of the 26-year old cooling towers.
- Install efficient office furnishings in some areas, allowing space for more staff.

We are now in the midst of planning next year's operating budget. Facility needs are being balanced with all other Data Center requirements. The 5-year facility plan is being used as a guide. Office space shortages have been identified as a top priority. Plans and actions will be consistent with this priority.

So, the EROS Data Center facilities story is basically like this: young and strong facility matures at the same time as the programs it supports experience rapid growth. It's a story of growing pains. That's basically a positive story. We will solve our facility problems through a variety of means. As we move forward, we must all be patient and understanding. If you have questions, contact the Facility Management Office or your branch representative on the Facility Infrastructure Committee. ☺

The Role of the EROS Data Center DAAC Expands

by Bryan Bailey

The Land Processes Distributed Active Archive Center (DAAC) was established as part of NASA's Earth Observing System (EOS) Data and Information System (EOSDIS) initiative to process, archive, and distribute land-related data collected by EOS sensors, thereby promoting the interdisciplinary study and understanding of the integrated Earth system. The role of the Land Processes DAAC, also commonly known as the EDC DAAC, subsequently was expanded to include processing and distribution responsibilities related to Landsat 7 data.

With the successful launch of Landsat 7 on April 15, the EDC DAAC currently is gearing up for operational processing and distribution of Landsat 7 enhanced thematic mapper, plus (ETM+) data, commencing in early July. The ETM+ acquires data in the visible, near-infrared, short-wave infrared, and thermal spectrums in 115 mile (183 kilometer) swaths. The DAAC also is preparing for launch of the EOS Terra satellite (formerly EOS AM-1), currently still scheduled for sometime this summer, and specifically for the data processing, archiving, and distribution responsibilities

to follow. Terra will carry two sensing systems for which the EDC DAAC will have major data processing and/or distribution responsibilities. These are the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) and the Moderate Resolution Imaging Spectroradiometer (MODIS).

ASTER is a cooperative effort between NASA and Japan's Ministry of International Trade and Industry, with the collaboration of scientific and industry organizations in both countries. The sensor actually consists of three separate instrument subsystems that will record reflected and emitted radiation in 14 total bands. Each subsystem operates in a different spectral region: the visible and near infrared (VNIR), the shortwave infrared (SWIR), and the thermal infrared (TIR). ASTER is the only high spatial resolution instrument on the Terra platform, with spatial resolutions that vary from 15 meters in the VNIR to 90 meters in the TIR, and it is capable of acquiring down track stereo imagery.

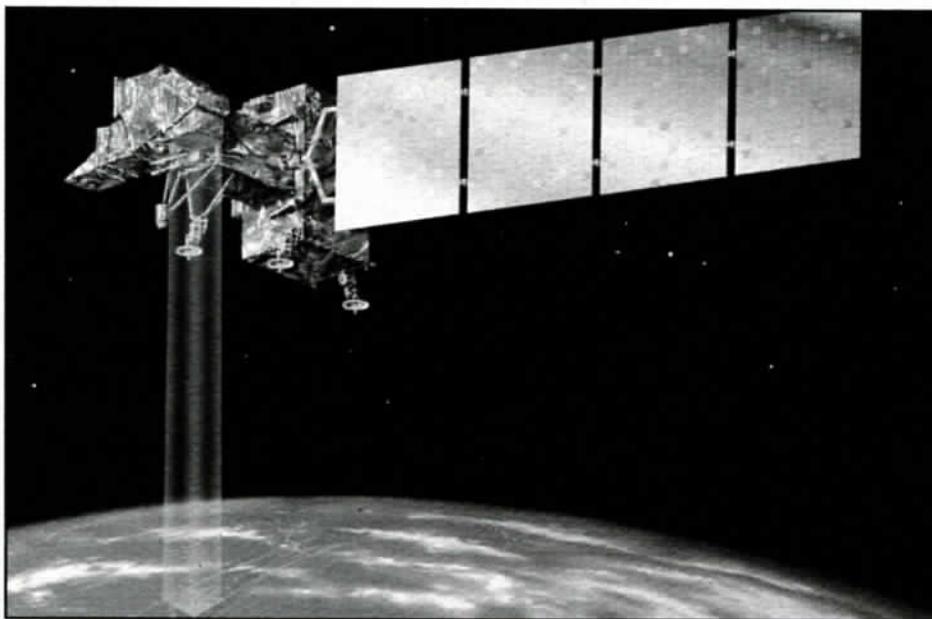
The EDC DAAC will receive Level 1a and 1b data on tape from Japan. These data will be distributed to users, and used

to generate a series of higher-level standard data products, which also will be distributed to users. Such products include radiance, temperature, and emissivity products, as well as a digital elevation model (DEM) which will be produced from ASTER stereo images.

MODIS has more spectral bands (36) than ASTER, but it acquires data with spatial resolutions that vary between 250 meters to 1 kilometer. However, a single swath of MODIS data is 2,330 kilometers (1,448 miles) wide compared to the 60 kilometers (37 miles) wide swath of ASTER data. Consequently, MODIS will be used more as a monitoring tool than ASTER or Landsat 7 ETM+. The data should contribute to major improvements in our understanding of global dynamics and processes occurring on the surface of the Earth, in the oceans, and in the lower atmosphere, and should play a vital role in the development of validated, global, and interactive Earth system models able to predict global change more accurately.

The EDC DAAC will archive and distribute higher-level MODIS standard data products designed to study land-related problems and processes. Such products include vegetation indices, thermal anomalies, leaf area indices (LAI) and fractional absorbed photosynthetically active radiation (FPAR), net primary production, and many others.

Landsat 7, ASTER, and MODIS data and products will be available from the EDC DAAC via the EOS Data Gateway, a web-based client. According to current plans, ASTER and MODIS data and products will be distributed at no cost to users, at least initially. Users will incur a cost of \$475 or \$600 per scene for Landsat 7 data, depending on the processing level ordered. ☺



Landsat 7 satellite, launched on April 15, 1999.

Do you have an interesting story you would like to share?

If so, how about becoming a "Guest Writer" for the next issue of the EROS Data! Contact Mark Barber, extension 6176 to submit your story.

Raytheon Demographics: Gender, Diversity, and Education Statistics

The following statistics and bar graphs represent the tremendous change and growth EDC's largest support contractor has experienced during much of this decade.

Gender:

Total workforce - 484
Female - 36.3%
Male - 63.7%

Diversity:

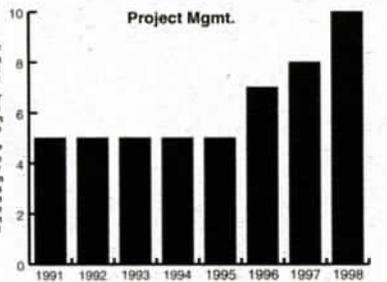
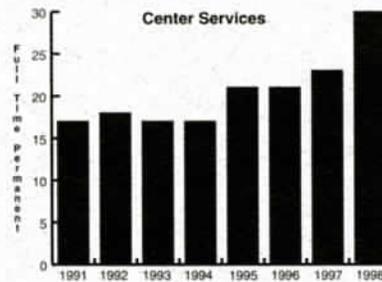
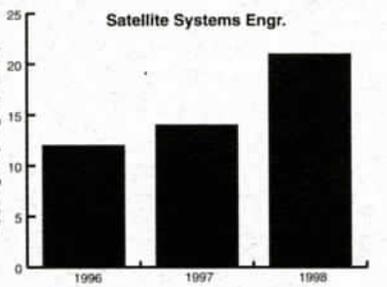
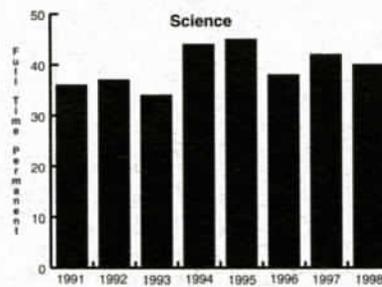
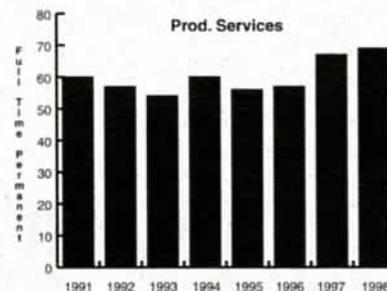
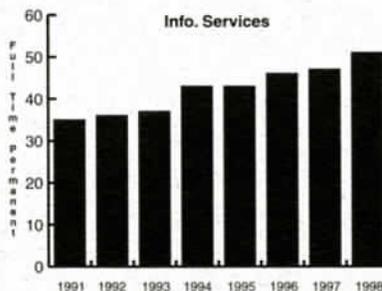
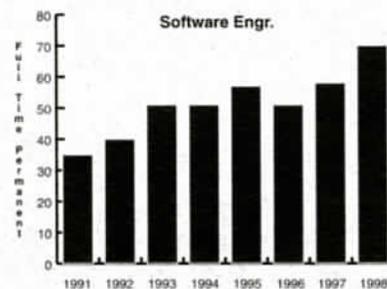
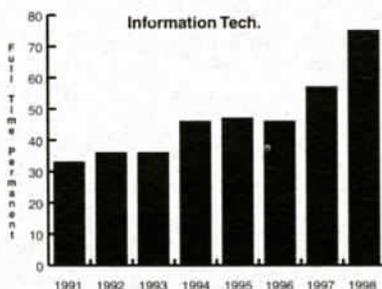
Female White	170	Male White	295
Female Asian	5	Male Asian	9
Female Indian	1	Male Indian	2
Female Black	0	Male Black	2
Female Hispanic	0	Male Hispanic	0
Total	176	Total	308

Total minority in workforce	4%
Total minority female	1.2%
Total minority male	2.7%
Minority among female	3.4%
Minority among male	4.2%

Education:

Average age	38.75 years
Average length of service	8.75 years
Degrees among workforce	66.7%
AA degree	13.3%
BS, MS	81.4%
Ph.D.	5.3%

Raytheon Staff Growth By Department
1991 - 1998



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